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Chronic DP shortcomings on the wane?

By John Gallant
CW Staff

NEW YORK — A growing trend toward professionalism in the ranks of programmer staffing and management could lay to rest the ghosts of poor quality and low productivity that haunt many software development houses today.

That sentiment is the core of a recently released study undertaken by the Diebold Research Program of the Diebold Group, Inc., located here. The study, according to Director of Research Services David Dell, was conducted as part of Diebold's ongoing MIS-oriented research program. It involved interviews with leading software vendors, industry analysts and DP managers within 120 U.S. companies and an equal number of international corporations. Dell characterized the firms as Fortune 500 corporations with MIS budgets ranging from $30 million to $70 million.

The Diebold study opened by stating that programming is currently "labor-intensive, difficult to manage and expensive . . . [and] often leads to a product that is functionally deficient, unreliable and difficult to maintain." Thus, the study continued, it is not surprising that the programming community is widely considered to be inadequate in delivering usable, reliable programs; forecasting costs, resources and schedules; and achieving productivity rates "even close to being economically justifiable."

"Today, programmers are not highly professional, and neither the act of programming nor the methods for its management are well-defined," the Diebold study concluded.

See **STUDY** page 10

EDS reassures workers

Service firm says it will not drop GM's use of contract DP employees for at least a year

By John Gallant
CW Staff

DETROIT — The jobs of some 3,000 independent contract workers within General Motors Corp.'s U.S. computer and communications facilities appear secure — for at least the near future — in the wake of the auto giant's transfer of DP responsibilities to Electronic Data Systems Corp.

EDS became a wholly owned subsidiary of GM following stockholder approval last month of the automaker's $2.5 billion takeover of the Dallas-based computer services company [CW, Oct. 1, Oct. 22].

EDS officials told *Computerworld* last week that DP contract workers currently supplied to GM by more than 130 different personnel agencies would remain in their present jobs for at least one year — despite fears that EDS intended to end GM's reliance on contract workers quickly.

According to Ken Riedlinger, senior vice-president with EDS and a member of its board of directors, GM currently employs at least 3,000 contractors in a wide variety of DP positions. The contractors are in addition to the more than 10,000 full-time GM DP employees who will officially become EDS employees Jan. 1 (see story page 9). He said the contractors will gradually be replaced as EDS hires and trains new employees.

While Riedlinger's statement appeared to sound a death knell for the current crop of GM contractors, he told *Computerworld* that his company intends to hire as a full-time EDS employee any contractor

See **GM** page 8

TOP OF THE NEWS

Retailing colossus Sears, Roebuck & Co. is undertaking a massive effort to integrate private-line data communications networks into a monolithic network that will combine voice and data. **Page 4.**

■

You win some, you lose some. General Motors Corp. DP workers to be transferred to the Electronic Data Systems Corp. payroll will gain some lucrative stock options but lose out on overtime and other GM benefits. **Page 9.**

■

Young, talented, trusted and dangerous. This is the typical profile of a DP criminal, according to the Federal Bureau of Investigation. **Page 10.**

■

We don't want to raise our rates, but . . . AT&T last week said it may be forced to do just that should the Federal Communications Commission approve the tariff proposals of local phone companies. **Page 16.**

■

And then there were two. The Japanese and IBM, that is, are the remaining viable contenders in the large-scale disk drive business. At least that seems to be the writing on the wall as a result of Storage Technology Corp.'s recent Chapter 11 bankruptcy filing. **Page 135.**

■

FYI

High-tech nomads find job-shopper lifestyle rewarding

By David Olmos
CW Staff

Charles Fahnestock has worked as an electronics technician for 18 years, but he has seldom held a steady job. In the past eight years alone, he has journeyed to Massachusetts, New Mexico, Michigan, California, Colorado, Connecticut and Vermont for employment.

But there is nothing involuntary about Fahnestock's nomadic work life. It is not the result of a tight job market, a bad employment record or job dissatisfaction. It is a matter of personal choice.

Fahnestock, a printed-circuit board designer and computer-aided design and manufacturing system operator, is part of an important subculture of workers spawned by the computer industry. They are engineers, programmers and other technicians who work as temporary employees at a series of firms. Their jobs can last for several months or, in some cases, several years.

"It takes a certain breed of person to be able to do this," said Fahnestock, who, with his wife Joyce, travels from job to job in a 35-foot trailer that doubles as their home.

See **TEMPS** page 6

CW photo by D. Olmos

Mobile home, mobile life for job shopper Fahnestock and wife.

Nixdorf's 8890 additions boast larger memory

WALTHAM, Mass. — Nixdorf Computer Corp. last week expanded its 8890 line of IBM 4300-series-compatible processors with four models that are said to accommodate more main memory and peripherals than older 8890 CPUs. At the same time, the company unveiled the 8890/CP, a turnkey communications processor designed for use in distributed processing and networking applications.

The newly announced 8890 processors are the Models 12, 32, 52 and 72. A spokeswoman said the company still plans to manufacture and market the original four 8890 models — the 10, 30, 50 and 70 — but said that the company will probably phase the older systems out of the lineup over time. Currently, all eight

See **NIXDORF** page 8

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NEWSPAPER

Micro makes veterans' day

Alabama data base expected to go nationwide by year's end

By Edward Warner
CW Staff

MONTGOMERY, Ala. — While many across the nation celebrated Veteran's Day with a holiday from work this week, hundreds of veterans in this state may have a computerized data base to thank for the fact that they have jobs.

By December, U.S. Labor Department officials expect the Alabama data base to be in nationwide service as well.

The data base, the Computerized Federal Contractor Awards Information System (CFCAIS), stores the U.S. Commerce Department's list of all businesses to receive federal contracts in Alabama and informs the Alabama Job Service, the state's job-finding agency, whenever a new federal contract is available there. A federal contract carries with it the requirement that the contractor attempt to hire Vietnam veterans or those with service-related disabilities. Alabama Job Service employees visit contractors shortly after the contract is announced to help them find suitable veterans to hire.

Before the CFCAIS came into use, state job finders in Alabama and all other states received notice of new federal contracts in their areas on a quarterly basis, causing long delays before the state could make its hire-a-vet pitch to the employer, said James C. Gates, state director for veterans employment and training. There were even instances, Gates said, where contracts were completed before the state job finders learned of them.

In the 12 months since the data base came into use in Alabama, state Job Service employees have been able to place 2,500 more veterans than the year before, Gates said, adding that "I have a feeling that this program gave some impetus to that [improvement]." The state, he said, places 12,000 to 13,000 veterans in jobs each year.

Last month, the U.S. Labor Department gave $24,950 to the Alabama Department of Industrial Relations, which operates the CFCAIS, to enable it to bring the data base into nationwide use in a pilot project.

Upgrading the system for national use will require purchasing a new microcomputer with 20M bytes of storage capacity — probably an IBM Personal Computer XT — said Alabama state labor official Frank Willet. Also needed, Willet added, will be a dot matrix printer similar to the Epson America, Inc. FT-100 and a copy of Lotus Development Corp.'s Symphony integrated software package to tie it all together.

The data base is currently housed on an Addressograph-Multigraph Corp. AM 425 word processing system, a unit that incorporates a letter-quality printer that is used to generate the congratulatory form letters that the state sends to those who receive federal contracts in Alabama. The letters will not become part of the national system, however.

By December, Gates said, the CFCAIS will begin sending a weekly list of businesses within each state which have received federal contracts. The states will, in turn, refer the names to the Job Service office in the area where the firm is located. The employers will then be contacted and offered the opportunity to hire veterans, according to Gates.

Using a Hayes Computer Products, Inc. Smartmodem, CFCAIS each day downloads the department's daily list of new federal contracts onto a diskette on the AM 425 from the computers of the Commerce Department.

The congratulatory letters it sends to new federal contractors also remind the contractor of the Veterans Readjustment Assistance Act, which mandates that they make an effort to hire Vietnam veterans and tells them to expect a call from a local Job Service representative. A copy of the letter, Gates explained, is sent to the local Alabama Job Service office.

STC revamps management, inks pact

LOUISVILLE, Colo. — Storage Technology Corp. (STC), which two weeks ago filed for bankruptcy protection [CW, Nov. 5], announced last week a management reorganization and a pact with Chemical Bank for a $150 million line of credit that the company said will enable it to "move forward" under Chapter 11 of the Federal Bankruptcy Act reorganization.

Naim S. Aweida, brother of Chairman and Chief Executive Officer Jesse I. Aweida, announced his resignation as president and chief operating officer. Aweida's resignation had been speculated for some time, and the firm reportedly had been actively seeking a new president. STC said Jesse Aweida would assume the duties of chief operating officer; no one was named president.

In other changes, the company announced Howard Derby was promoted from vice-president of field engineering to vice-president of field operations, in charge of all sales and field engineering activities; company cofounder and Executive Vice-President Zoltan Herger was placed in charge of the company's optical storage business unit; and Sewell Sleek, formerly vice-president in charge of the storage tape division, was named acting head of engineering and manufacturing operations.

The line of credit from Chemical Bank is subject to court approval and would give Chemical a "superpriority" claim status under bankruptcy regulations, which would place Chemical ahead of STC's unsecured creditors. STC owes more than $200 million to unsecured creditors.

CORRECTIONS

The Nickels and Dimes column in the Computer Industry section [CW, Sept. 17] incorrectly attributed a third-quarter earnings report to Science Management Corp. Science Management recently reported second-quarter revenues of $16.7 million, up 28% over the previous year, and a net loss of $1.1 million, or 43 cents per share, compared with a year-earlier loss of $175,000, or 9 cents per share.

The purchase price for Computer Consoles, Inc. (CCI) Timelaw in Law Office-power software was incorrectly stated [CW, Oct. 15]. For the CCI Power 6/32 superminicomputer, the Timelaw package costs $50,000, and to run on the CCI Power 5/20 and Power 5/30 machines, the Timelaw software is priced at $30,000.

Hot line seeks hot tips

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Sears to fuse private lines into unified net

Major communications project to incorporate cost-effective integration of voice and data

By John Dix
CW Staff

ARLINGTON HEIGHTS, Ill. — Sears, Roebuck & Co. is undertaking an ambitious feat: integrating the separate private-line data communications networks operated by its five business groups into a monolithic net that will also, where cost-effective, integrate voice and data.

Today, individual private-line networks are maintained by Sears Merchandise Group, the retail and catalog merchant; Allstate Insurance Group; Dean Witter Reynolds, Inc., a brokerage and financial services company; Coldwell Banker, a commercial and residential real estate firm; and Sears World Trade, which is involved in international merchandise trade.

In Februrary 1983, the corporation formed Sears Communications Network, Inc., a business unit whose basic mission is to integrate the networks of these companies to lower operating expenses and provide for new services. Eventually the centralized organization will supply the five business groups with all of their voice and data communications needs, including planning, coordination and support.

Integration in perspective

To put the integration effort into perspective, consider that next year the combined annual communications budget for the Sears' units will be more than $300 million, according to the best estimates of Gerard R. Weis, director of data communications.

To use that budget most efficiently, the five networks will be pulled together to remove overlapping geographical coverage. "There are probably one or more Sears stores, one or more Allstate offices and one or more Dean Witter Reynolds offices in any given metropolitan area," Weis explained.

Addressing the data communications objectives of the project in an interview at his office here recently, Weis said the goal is to establish a backbone network through which traffic can be routed to any host processing system within the Sears family of companies.

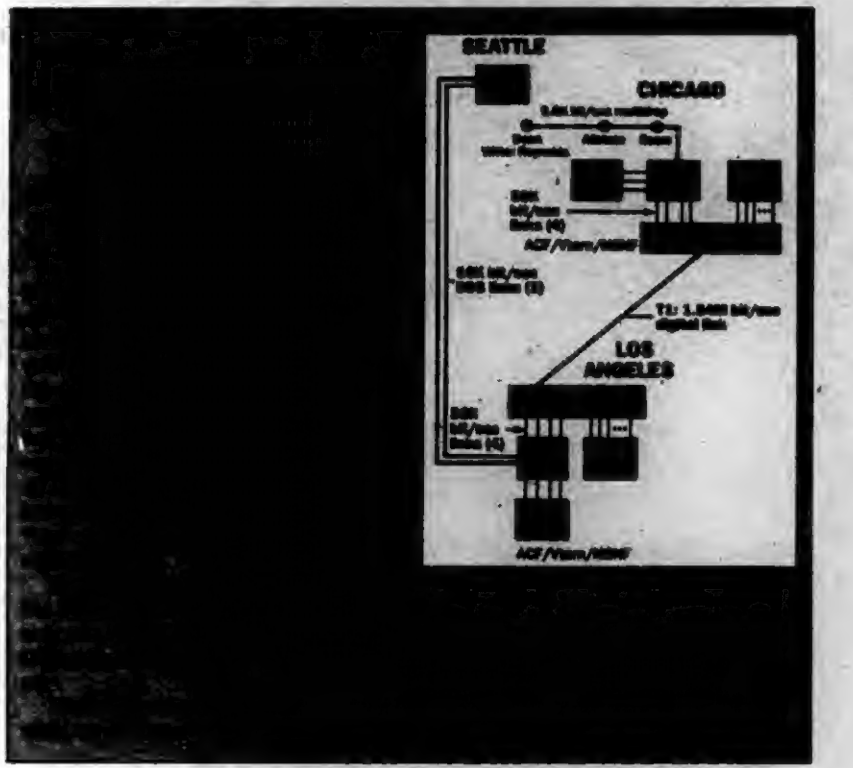
Homogeneous system

While complex and time-consuming, the integration effort will be greatly facilitated by the fact that each Sears company has IBM computer systems and networks of 3270 Binary Synchronous Communications and 3270 Synchronous Data Link Control (SDLC) terminals. Given the homogeneity of the products, the decision to go with IBM's System Network Architecture for the integrated network was straightforward, Weis said.

The network will slowly migrate to pure SDLC support because it provides for the greatest degree of facility sharing, he noted.

The integrated network will actually be a beefed-up version of the net presently serving the Sears Merchandise Group. This is the largest network in the company, used to support over 1,000 Sears stores. Six months ago Sears Communications began enhancing the net and adding additional IBM 3725 communications processors to it. Later this year the other networks will be merged with this network, a process that will extend into 1986.

Essentially, the backbone network will consist of 3725s strategically located throughout the country, connected by high-capacity lines, such as AT&T 56K bit/sec Digital Dataphone Service circuits or 1.54M bit/sec T1 digital facilities.



Facility type depends on traffic volume

The type of facilities used for the point-to-point links between 3725s will depend on the traffic volume between those points. "A 3725 located in Seattle," Weis noted, "may not require a T1-type facility, and we'll use multiple 56K bit/sec links for that. Other routes, such as between Chicago and Los Angeles, will be naturals for T1."

There isn't enough data traffic anywhere in the network to require a direct T1 interface to a 3725, the director said. Use of these high-bandwidth facilities is dependent on the coexistence of voice traffic. "We have been calculating the aggregate capacity coming out of data and PBX equipment at a unit level and figuring out how we can most cost-effectively meet the bandwidth needs," Weis explained.

The company is "not [architecturally] tied in to T1 in any way," he clarified. "We can use it where it's cost-effective or use 56K bit/sec digital facilities. This isn't a decision you can make once and not continue to look at. It depends on traffic analysis and tariffs."

Users can access any host in net

When completed, terminal users will be able to access any host processor in the integrated network through the 3725s, according to Weis.

"There is no channelization of the bandwidth that makes that happen. The terminal can logically connect, by entering a logon command, to CICS in any host in the network where [the user] has authorization to do so." The Network Control Program in the 3725s establishes and controls the host sessions.

The biggest challenge in this Herculean undertaking, according to Weis, is understanding the requirements of the different business groups served. "We are not here to put together a network and then go out and convince people that they ought to use it. It's the other way around. Our mission is to understand what they need and then go out and engineer and build it."

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Sears' ambitious network plans won't carry into office

By John Dix
CW Staff

As up-to-the-minute as Sears, Roebuck & Co.'s wide-area networking plans are, within the office, the company sees little need to adopt the communications technologies currently in vogue. It uses its telephone systems to switch calls, not data. Local networks do not give it goose bumps. And it does not have any plans to replace its terminals with personal computers.

While planning to integrate voice and data where cost-effective in the backbone network — which is being constructed by combining the five private-line networks currently operated by the Sears companies — that integration will not be extended into the office, according to Gerard R. Weis, director of data communications.

This means private branch exchanges (PBX) will not be used to support data devices. "In our case, the bulk of the data traffic is flowing through dedicated [IBM 3270] controllers; hence we haven't been very interested in hanging terminals off of PBXs," Weis said. "We don't do that at all; we just haven't had the need."

The preponderance of host-connected 3270-type displays also obviates the need for local-area networks, the director indicated. Although each of the five Sears' business groups makes its own decisions regarding local nets, Weis said he has not seen a rush to the technology. "For a business group that has a lot of 3270s, there is no obvious reason that it would want to install a local network," he said.

Weis

CW photo by J. Dix

Local networks will become more pervasive as the number of personal computers within the organization increases, Weis said. But the justification for these computers is based on applications rather than just as a replacement for terminals. There has not been a "wholesale migration away from fixed-function 3270s to personal computers," he clarified. To accommodate the few users who want to swap their 3270s for personal computers and still be able to access the network, Weis' group has published standards that specify the type of device the micro computers must emulate.

While Sears currently has little need for local networks, the company is in need of a building wiring standard. The IBM Cabling System, which specifies how to wire buildings to provide data outlets in every office, seems to fit the bill. Weis said that the Cabling System "was something that we as customers — not just communications, but data processing, too — have been looking for for a long time."

Use of the Cabling System will enable Sears to wire buildings once with the assurance that it will support future products.

"Is it the best thing in the world?" Weis asked. "I don't know. Is it adequate for us to do physical planning and go off and wire new sites? Yes, it is."

Sears unit looks for network resale options

When Sears Communications Network, Inc. was formed to consolidate the private-line networks operated by the five companies within the Sears, Roebuck & Co. family, another company was formed under the group to head up a venture into the communications resale business.

Called Sears Communications Co., the basic mission of the new unit is to explore ways to resell excess corporate network capacity.

Initially, the company is focusing on reselling capacity on a satellite network serving New York, Chicago, Dallas, Atlanta, Los Angeles, San Francisco and Denver that is leased from American Satellite Co. Roy Leyton, director of marketing for the Sears Communications Co., reported that the company is already supplying dedicated voice and data channels to 34 customers through this network.

Intends to resell capacity

And while it is too early to say how, Leyton said that the company intends to resell voice and data capacity on the company's backbone network that is being built by integrating the private-line networks of the five Sears companies.

In a related matter, a group within the Sears Merchandise Group, the retail and catalog merchant, is currently involved in a test project where it is serving transaction services to Phillips Petroleum Co. in Bartlesville, Okla.

In that experiment, Sears is testing the viability of offering enhanced communications services that use its communications network and call on its transaction expertise.

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TEMPS

from page 1

"You have to be confident . . . not a worrywart about where the next dollar is coming from. Some people have tried it and didn't like it because . . . they didn't know where their next job was going to be."

Temporary workers, or job shoppers as they call themselves, often work for temporary employment companies such as CAD/CAM Resources, Inc., a Waltham, Mass., firm that specializes in the high-technology field. Kevin Jackson, president of the company, said that because of the current boom in CAD/CAM, he has more jobs available than workers to fill them.

"It's very difficult to find these people," added Robin Shaw, owner of Temco, a two-year-old Minneapolis temporary firm, who claimed his business has increased sharply compared with last year.

Shaw and other representatives of temporary firms interviewed indicated that demand for their workers is on the rise, but there apparently are no hard statistics to support their claim. The U.S. Department of Labor does not keep statistics on the number of temporary workers employed in technical fields.

Temporary assignments offer several advantages to the worker, including higher wages. Temporaries are generally paid 20% to 40% more than permanent employees, but receive fewer fringe benefits, according to several placement firms.

Shaw said that temporaries are often hired to work on challenging product development projects. "Our people want to be where the action is," he said.

"Good people really don't like to sit on their duffs," added Tom Shaurette, president of Computerpeople, Inc., a Tampa, Fla., employment firm. "One reason temporaries are there is because something exciting is going on."

Fahnestock said, "Anyone in the engineering field likes a challenge, and when there's no challenge, it becomes ho-hum and you have a lack of interest in your work."

Jere Annis is a programmer who, 1½ years ago, quit his job as manager of a county government DP shop to work as a job shopper for Computerpeople. "The big advantage I've found is an opportunity to get exposure to different kinds of systems," Annis said. "The biggest disadvantage is having to learn the ropes in a new facility."

Temporaries said they also like not being subjected to the office politics that are sometimes a part of permanent employment.

Fahnestock cited office politics and a lack of advancement opportunities as reasons why he quit his job as an engineering aid in 1966 to try temporary work. "I was going nowhere there, and I didn't like playing kiss-up to the boss, so I left."

Shaw noted that many younger employees work temporarily to shop around for a prospective employer. "They want to have experience at different companies to see which workplace best fits their needs."

Sometimes it is the companies that do the shopping. Oftentimes, a temporary worker will be offered a permanent job if his employer likes his work and has a job opening.

Fahnestock said Martin Marietta Corp. in Denver has twice asked him to stay on as a permanent employee after his temporary assignments ended. He declined both times, but said such offers "make you feel like you've really done a super job."

Ted Widor, drafting manager for GTE Corp.'s Strategic Systems Division in Westboro, Mass., hires temporaries during peak work load times. He and other employers said temporaries allow them to adjust to work load fluctuations without worrying about laying off permanent employees when a job is completed. Such fluctuations are particularly characteristic of military-related business, they said.

"It doesn't pay to bring [permanent workers] in for a short time and then lay them off," CAD/CAM Resource's Jackson said. "It's just bad business."

While temporaries listed numerous benefits to their work, they also noted some drawbacks. "Sometimes, shoppers get into a company, and the [permanent employees] look down on them," Fahnestock said. "I guess it's because they know the shoppers are making more money than they are. They forget the shopper's job may last only six months and then he's out on the street."

The transient nature of their work lives means temporaries are often saying farewell to their coworkers.

"Some shoppers don't admit it," Fahnestock said, "but after you're on a job for awhile, it's kind of hard to leave. You build up a lot of good relationships with the people you work with. It's kind of sad."

Microsoft adds IBM-compatible network software, MS-DOS 3.1

By Eric Bender
CW Staff

BELLEVUE, Wash. — Offering personal computer networking software compatible with IBM's PC Network, Microsoft Corp. last week announced and began shipping its Microsoft Networks package and MS-DOS 3.1.

The two products — network operating software and the latest version of the nearly ubiquitous MS-DOS operating system, complete with networking hooks — will allow independent software vendors to write one version of their packages that will run on various networks, the company said last week.

According to Microsoft, most important among these networks is the PC Network. The Microsoft Networks package reportedly shares the PC Network's software application interface, while MS-DOS 3.1 corresponds to IBM's PC-DOS 3.1.

Microsoft Networks 1.0 is a software package said to implement session and presentation layers on the International Standards Organization communications model — insulating application packages from specific hardware configurations — and to contain a file and print server.

The software reportedly consists of redirector and server programs and associated utilities. The redirector program, installed on each personal computer on the network, captures local MS-DOS requests and forwards them to MS-DOS on a remote machine. The server application program reportedly runs on each network server, handling requests for data or shared peripherals.

Current MS-DOS applications will run and access network resources on a Microsoft Networks system without being rewritten, Microsoft said.

There are no physical or logical limits on the number of network nodes, Microsoft said. The supplier is working on extensions to the core network protocols to provide networking between MS-DOS and its Xenix operating system.

MS-DOS 3.1, required to support Microsoft Networks, is fully upward-compatible with MS-DOS 2.0 and 2.1, the company said. MS-DOS 3.1 reportedly provides an expanded file-naming structure that includes the name of the computer on which the file resides and manages files that are simultaneously shared among applications.

The network software announcement drew immediate support from the following system and network vendors: Digital Equipment Corp.; Zenith Data Systems; Hewlett-Packard Co.; Intel Corp.; Applied Computer Technologies; North Star Computers, Inc.; Corona Data Systems, Inc.; Corvus Systems, Inc.; 3Com Corp.; Nestar Systems, Inc.; Davong Systems, Inc.; AST Research, Inc.; Proteon Associates, Inc.; Ungermann-Bass, Inc.; Western Digital Corp.; Tecmar, Inc.; Orchid Technology, Inc.; and Interlan, Inc.

"We see it as an emerging standard, and we want to follow that standard," said Ron Kasik, director of systems software at Zenith Data Systems in Glenview, Ill.

Other vendors and analysts generally agreed that they expect widespread adoption of the network software. However, many were surprised that Microsoft Networks calls for a dedicated network server, while some pointed to other limitations.

"Microsoft Networks requires a dedicated server, and the PC Network does not," noted Craig Burton, marketing director at Novell, Inc., an Orem, Utah-based supplier of networking software. Burton said the Microsoft product also lacks "the sophisticated error recovery and the other functionality IBM put in."

Microsoft Networks "will be a big factor in getting a lot more software applications," predicted Buck Gee, president of Santa Clara, Calif.-based Software Connections, which sells network applications. However, he described it as "a minimal network operating system."

The setup requires dedicated servers because MS-DOS 3.1 is a single-tasking operating system, according to Microsoft. "Right now, a nondedicated server probably would have marginal performance," a company spokesman said. "In a multitasking environment, that issue goes away."

Microsoft is located at 10700 Northup Way, Bellevue, Wash. 98004.

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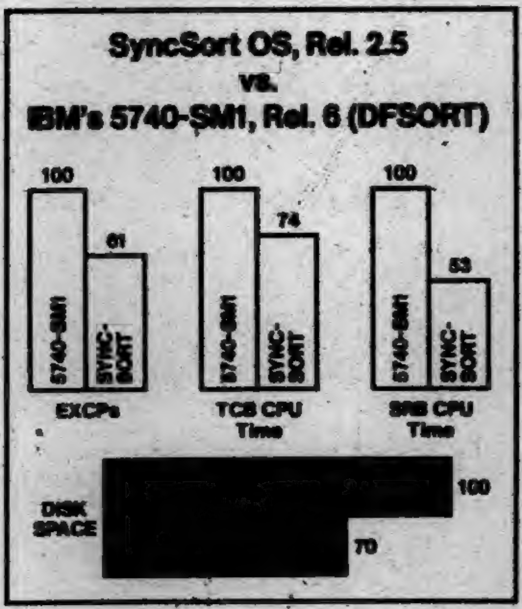

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GM from page 1

who wishes to continue working for the automaker. He said EDS has already hired a number of contractors who expressed interest in joining the company.

"It will probably be a year before there is any significant reduction in the use of outside contractors," Riedlinger said. "But no one will be put out of a job. We will offer employment to any of those people [personnel agencies] want to release and to any individual who wants to come to EDS. But over the long haul, it is our intention to eliminate the contractors the agencies are providing to GM."

An 'artificial' situation

Riedlinger described GM's extensive use of contractors as an "artificial" situation, stemming from the automaker's self-imposed head-count restrictions that resulted from a hiring freeze instituted several years ago. "EDS has never relied on outside [personnel] vendors," he said. "It is our style to provide services to our customers, including GM, directly through full-time employees who are committed to the same goals and objectives that EDS is."

Contractors' concerns about job security apparently stemmed from what Riedlinger characterized as an "offhand" remark made by an EDS employee during one of the company's more than 100 transition meetings with GM DP personnel. Asked about EDS' attitude regarding contractors, the representative responded, "The use of outside [personnel] vendors is like dope — once you get hooked on them, it's hard to quit."

"That meeting in July, which was attended by about 125 people, was only open to GM employees — contractors were not supposed to be present," Riedlinger said. "But a bunch of contract employees came to the meeting anyway and they started asking questions that we were not prepared to answer. It was an offhand remark made by an EDS employee on the spur of the moment in response to a question he thought came from a GM employee."

> *'Over the long haul, it is our intention to eliminate the contractors the agencies are providing to [General Motors].'*
>
> — Ken Riedlinger, senior vice-president, Electronic Data Systems Corp.

But one GM contractor, who asked not to be identified, said the remark was indicative of EDS' "gunslinger" approach to the contractor issue. "There are lots of ways to handle a conversion," the worker said, "but this is something else. Their approach to us was not at all friendly. They really started off on the wrong foot with all that hot and heavy stuff about dope."

According to Judy Daniels, president of the Lansing, Mich.-based personnel firm Human Resources Unlimited, Inc., many of the 30 data processing contract workers her agency had placed with GM's Oldsmobile facility in Lansing were concerned about the EDS takeover.

"I received quite a few calls from our contract people. They thought they were going to be out the door the very next week," she said. "It was very hard for them to separate fact from fiction. Although a number of them were later offered positions with EDS, they were hesitant to go because the whole thing was handled so poorly." Daniels said EDS had offered a three-year contract to her agency to continue supplying contract workers — a proposal that seems to contradict Riedlinger's one-year timetable for the replacement of those GM workers. Albert Schornberg, president of Analytical Technologies, Inc., a Birmingham, Mich.-based personnel firm that currently supplies about 75 contract workers to GM's Oldsmobile and Chevrolet divisions, said EDS informed his agency that it would need those workers for between two and three years.

According to Schornberg, the salaries of the contract workers his firm has placed with GM range from $22,000 to as much as $50,000 annually. He said EDS had approached him in an effort to recruit some of the contract workers as EDS employees, but his firm declined the offer.

"Anytime there is a major change like this, it causes concern among the workers," Schornberg said. "But [EDS'] relationship with us has been straightforward. They explained exactly what they wanted to do, and that was very helpful."

NIXDORF from page 1

8890 models are field-upgradable, the firm said.

The Model 12 can accommodate up to 2M bytes of main memory and up to 32 local or remote workstations. It offers an internal performance roughly equal to that of the older entry-level 8890 Model 10. The Model 10 supports 1M byte of main memory. A basic Model 12 configuration including the CPU, console and 1M byte of main memory costs $28,750, the vendor said.

The Model 32 can support from 2M to 4M bytes of main memory — twice as much as the Model 30 — and can support up to 96 local or remote workstations. The Model 32 is said to offer roughly the same internal performance as the Model 30. A basic configuration of the Model 32 including the processor, console and 2M bytes of main memory costs $46,500, the vendor said.

The Model 52 offers from 2M to 6M bytes of main memory and, like the Model 32, can support up to 96 local or remote workstations. The Model 52 can also support up to four system printers. The unit offers about the same performance as the current Model 50. The Model 50, however, offers a maximum main memory capacity of 4M bytes. A basic Model 52 configuration including the CPU, console and 2M bytes of main memory costs $53,500, the company said.

Topping off the 8890 line, the Model 72 is said to offer from 4M to 8M bytes of main memory and about the same internal performance as the 8890 Model 70. Like the Model 52, the Model 72 supports up to 96 workstations and four system printers. A basic configuration including CPU, console and 4M bytes of main memory costs $85,500, the vendor said.

The 8890 line can use Nixdorf's Nidos/VSE operating system as well as IBM's DOS/VSE, DOS/VSE-SP, SSX/VSE and VM/SP operating systems, a spokeswoman said.

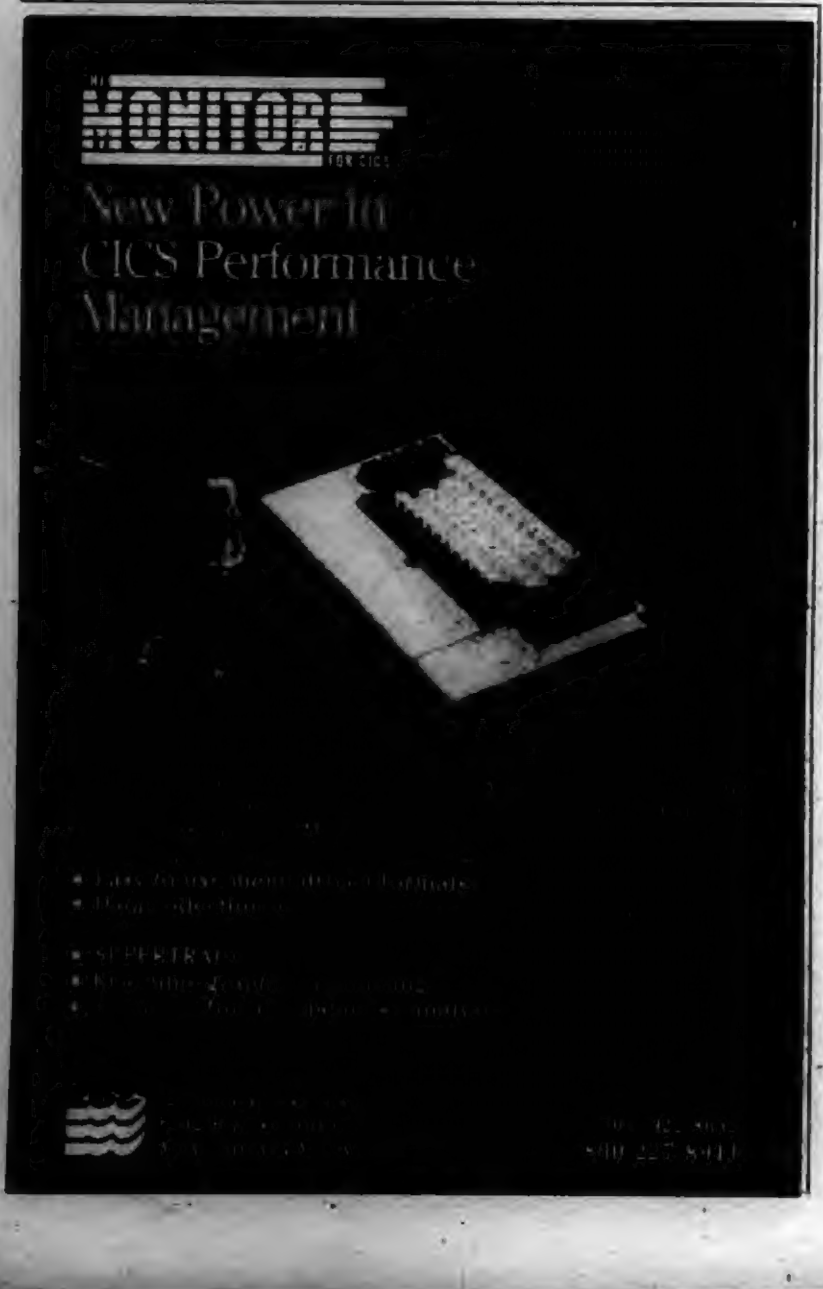
In addition, Nixdorf said, it plans to offer a preconfigured version of its 8890 Model 10 processor for distributed processing and networking applications. Called the 8890/CP, the unit includes 1M byte of main memory and integrated adapters for peripheral devices, including terminals, disk drives, printers, communications lines and tape subsystems.

The 8890/CP includes four of the company's 8278 CRT terminals. The vendor said the unit can be expanded to support 16 terminals. A streaming tape drive with a 1,600 bit/in. recording density and a data transfer rate of 20K byte/sec in a start/stop mode and 160K byte/sec in a streaming mode is also included.

A steel band printer that operates at 300 line/min is standard on the the 8890/CP. Printers that operate at 600 or 1,200 line/min can also be used with the 8890/CP, the vendor said. Four communications lines are included with the 8890/CP, as are two 129M-byte fixed-media disk drives. The disk drives are equivalent to IBM's 3310 disk drives, the vendor said.

Software included with the 8890/CP includes Nixdorf's Nidos/VSE operating system, an Ansi 74 Cobol compiler, an installation tool for tailoring the system to the user's application and a transaction control program.

The 8890/CP costs $99,950. It and the other newly announced 8890 models are available immediately. Nixdorf Computer is located at 300 Third Ave., Waltham, Mass. 02154.



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Articles may range from four to six typed, double-spaced pages. Artwork is welcome.

The submission deadline for the February Special Report is Dec. 28.

If you have a story to tell, write to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham 01701.

GM employees win some, lose some in transfer to EDS

By John Gallant
CW Staff

DETROIT — Ten thousand General Motors Corp. data processing employees who will soon be transferred to its newly acquired subsidiary, Electronic Data Systems Corp. (EDS) will enjoy a generous stock bonus award, but will lose such benefits as overtime pay, cost-of-living allowances and retiree health insurance.

In a transition plan presented to GM DP workers on Nov. 1, EDS announced that it intends to continue paying the employees' current salaries, including a final cost-of-living allowance that will be rolled into the workers' base pay at the end of the year. GM's U.S. employees will officially become members of EDS' work force on Jan. 1, following stockholder approval in mid-October of the auto giant's $2.5 billion takeover of EDS. Workers in GM plants outside the U.S. will be added to the EDS payroll during the next six months, according to EDS Senior Vice-President Ken Riedlinger.

Riedlinger said the GM workers transferred to EDS will receive between 100 and 1,000 shares of GM Class E stock, a new stock class that resulted from the merger, at 5 cents a share. The number of shares each employee receives reportedly will be based on the worker's age and number of years of service. With a market value of $46.25 as of Nov. 5, the stock award would be worth between $4,625 and $46,250. EDS said the total number of shares to be awarded will be between 2.25 million and 3 million. The award is intended as a one-time bonus, although the GM employees will be eligible for future stock awards based on performance.

Workers excited, but concerned

GM DP workers interviewed by *Computerworld* following the announcement of the transition plan said they were excited about what they considered to be the lucrative stock award, but were concerned about the loss of overtime pay, cost-of-living allowances and health insurance after retirement.

A GM spokesman said last week that about 95% of GM's 126,000 white-collar workers each receive a total of some $6,000 annually in quarterly cost-of-living allowances. Despite employee concerns, Riedlinger said, EDS' merit increases, which he said are paid more frequently than is the practice at GM, will more than compensate for the loss of cost-of-living allowances.

"People have tended to discuss only one side of this change — the loss of some benefits," Riedlinger said. "EDS merit raises average less than a year apart, and the average merit raise is 11%. The average merit raise at GM is only 3%, and it occurs no more frequently than once a year. If you take a [cost-of-living allowance] plus a 3% maximum merit raise and compare that with EDS' average, the EDS system is obviously going to be putting more money in the hands of GM employees than the GM system they say they want to keep."

Riedlinger conceded that EDS does not provide health insurance coverage for retired employees, but he said that was because the company "had not had that many people retire.

"We are a young company, and we haven't really faced that issue," he explained. "But I don't think there is a company in the world that pays greater attention to the needs of its employees than EDS. We take care of every legitimate employee need, and retiree health insurance is something that could be considered in the future."

Riedlinger said that in situations covered by federal law, EDS will continue to reimburse GM employees for overtime work, but that EDS does not embrace the practice of paying overtime wages to its salaried employees.

"Between now and Jan. 1, we will identify those overtime-related situations where we have to do one of three things," he explained. "We will either hire additional people to alleviate any work load problem, make a salary adjustment to any person who must work overtime or cover the situation through performance bonuses."

On the topic of worker relocation, he said no GM worker will be forced to transfer against his will. But EDS' philosophy is that advancement opportunities — and the salary increases that go with them — go to workers who are willing to transfer.

"When you have a company that is growing like we are, there are lots of opportunities all over the place," an EDS spokeswoman said. "Employees are asked if they would like to participate, and if they do not, there is no black mark placed against them. But if they choose to stay in one geographic location, they will be limited in the number of opportunities they are afforded."

One GM employee, who asked not to be named, said many workers are angry about the changes. "Although most of the ambiguity is gone now, people are generally pretty mad. The attitude is that GM sold us out. . . . The retirement health care cancellation is probably the single biggest issue here. We hired on with GM with the understanding that we had those excellent retirement benefits, and a lot of people stayed on with GM because of them. A lot of people are dismayed."

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Computer criminal profiled as 'modern-day Robin Hood'

CW AT DPMA

By Kathleen Sullivan
CW West Coast Bureau

ANAHEIM, Calif. — If the Federal Bureau of Investigation were to produce a composite portrait of the typical computer criminal, the picture that would emerge would show a young, talented employee, working in a position of trust in a company.

"We're not dealing with a Hal [the master computer] as in the film *2001: A Space Odyssey*, said FBI special agent James Donckels in a presentation before a seminar audience at last week's Data Processing Management Association's (DPMA) annual meeting held here. "The television show *Knight Rider* is nice," he continued, "but Kitt [the computerized car with a mind of its own] is not the thing we're dealing with."

Instead, Donckels said, data processing professionals are contemplating a problem that has a human face. It is a youthful one: The median age of the person who commits a computer-related crime is only 25 years old, he said. In most cases, he is an employee who thinks of himself as a "modern-day Robin Hood" and considers the illegal activity to be a game or a "challenging intellectual exercise," Donckels said.

In general, the employee commits the illegal activity while working. Usually, he works alone and enlists the aid of an accomplice only when he comes up against the limits of his technical ability to gain further access to the computer system, Donckels said.

Although there are no accurate figures on the extent of computer-related crime, Donckels said that 58% of the illegal acts are committed at the data entry level. Another 35% occur at the computer programming and machine operating level, while in 7% of the cases, the person penetrates a computer's operating system or the firm's communications facilities.

Donckels said the FBI faces unique problems in conducting investigations of computer-related crimes. Fearing public discredit and notoriety, few companies report the illegal activity. Because of the nature of the high-technology industry, which is constantly changing, data processing managers are not always familiar with their systems and would not be able to detect whether a crime had been committed, he said.

Because the evidence of a crime, such as an unauthorized entry into a system, can be easily destroyed, the FBI encounters problems obtaining the proof it needs to demonstrate the illegal activity. In addition, U.S. courts have not yet decided what constitutes the best evidence in a computer crime case, he said.

Investigations are also hampered by a lack of federal and state statutes allowing the prosecution of computer crime, said Clyde H. Wilson Jr., a Florida-based attorney who specializes in DP law.

"The evolution of law is slow, while the evolution of technology is fast," he said. A gap now exists between the two, he said. The laws currently on the books are difficult to apply to the new phenomenon. Laws relating to larceny, embezzlement, malicious mischief and wire fraud, for instance, do not address the unique characteristics of computer crime, he said.

While a variety of states have passed legislation relating to computer crime, Wilson described the situation as a "national problem that requires a national solution."

In the meantime, DP managers can take a number of steps to help minimize computer crime, said Louis R. Mills, president of Henge Corp., a California-based consulting firm. He said companies should restrict access to computer equipment, output reports, security procedures, data communications equipment and computer terminals. In addition, he made the following suggestions:

- Identify those employees who can do the most harm and pay attention to their work activities as well as their emotional well-being.
- Prevent the data processing staff from originating transactions.
- Use decoys or phony names in master files to help determine evidence of tampering.
- Do not let people work alone.
- Build in audit trails at all levels and require balancing and recording before continuing work.

STUDY

from page 1

"That is a controversial statement," Dell conceded. "But programming has not been a rigorous activity. It has been more like a craft than a profession. If you look at it in terms of traditional engineering disciplines, it has not been highly professional. It is a field that has grown rapidly, and its attitudes have not kept pace with what needs to be done."

But despite that gloomy overview, the study's findings point to a more rosy picture of the software development future. In what Diebold labeled a "major trend," the study stated that software development is becoming a more professional discipline. Diebold found that program design methodologies and "metrics for program quality and programmer productivity are beginning to mature and become a part of developing computer science curricula." In addition, researchers found the requirement of undergraduate and even graduate work in software engineering becoming more common in the hiring of programmers.

> *It is not surprising that the programming community is widely considered to be inadequate in delivering usable, reliable programs; forecasting costs, resources and schedules; and achieving productivity rates 'even close to being economically justifiable.'*
>
> — Diebold Research Program study

"Large corporations are not interested any longer in hiring people with just a couple of years' experience," Dell said. "Companies are looking more carefully at getting good people and holding on to them. Firms are looking at instituting better management practices, and that requires a more professional class of people."

Among the study's other findings:

- Software engineering development and management methods are evolving that were designed to control costs, create a more reliable product and increase productivity.
- Efforts to improve productivity have too often focused on the production of code itself. Diebold's research suggested that greater payoffs can be achieved by better supporting the actual design portion of the development process and by assuring quality through rigorous testing early in the product life cycle.
- A maturing of program management methods is taking place. The study concluded that there is a keener appreciation of the nature of the management role in the development process and a better understanding of the "importance of professional management that exercises control."
- A new class of what Diebold called MIS paraprofessionals is arising to support end users, who are generating a greater amount of information on their own. These paraprofessionals will free professional programmers' time for more complex efforts.

"We predict that in the future there will be a smaller corps of elite programmers divided into two camps," Dell said. "One group will be responsible for supporting people and for dealing with systems that are not intended to last a long time — those are the so-called paraprofessionals. The second corps of professionals will be the programmers who design large systems with a view toward the reliability of those systems and the optimization of resources."

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Tandy chief ponders micro market's future

CW AT DPMA

ANAHEIM, Calif. — Which companies will survive the microcomputer shakeout? Who will determine how business microcomputers are used? Do multiuser micros have a future?

These questions and other issues were addressed by John V. Roach, president of Tandy Corp., in his keynote speech at the Data Processing Management Association's (DPMA) annual conference here last week. Among his comments were:

■ **Which companies will survive the microcomputer shakeout?** The deciding factor will not be technology, Roach said. "IBM proved a long time ago that distribution is more important than products or technology."

■ **With increasing competition among companies,** hardware manufacturers are "playing in a whole new ballgame" with regard to price, performance and after-the-sale support, he noted.

'If the computer professional is willing to accept micros as a serious alternative, [he] will control the system.' — John V. Roach, Tandy Corp.

■ **Users will continue to benefit** as the price/performance ratio of micros continues to improve, but some companies are shortchanging users on support, Roach added. "Many manufacturers are not providing the level of service and support they should."

■ **The introduction of microcomputers to the business world** has ensured that the "office of the future" will arrive sooner than many observers expected, he said.

■ **Networked micros would emerge as the winner** in the battle between networks and multiuser systems, Roach predicted.

Although a multiuser system has advantages in certain situations, microcomputer companies are adding features, such as graphics capabilities, that will make the machines more attractive to users. "Dumb terminals don't support graphics," he said, "and users are beginning to expect graphics-oriented systems."

Price will also be a factor. "The cost of microcomputers is approaching the cost of dumb terminals," he noted. "That will reduce the multiuser advantage."

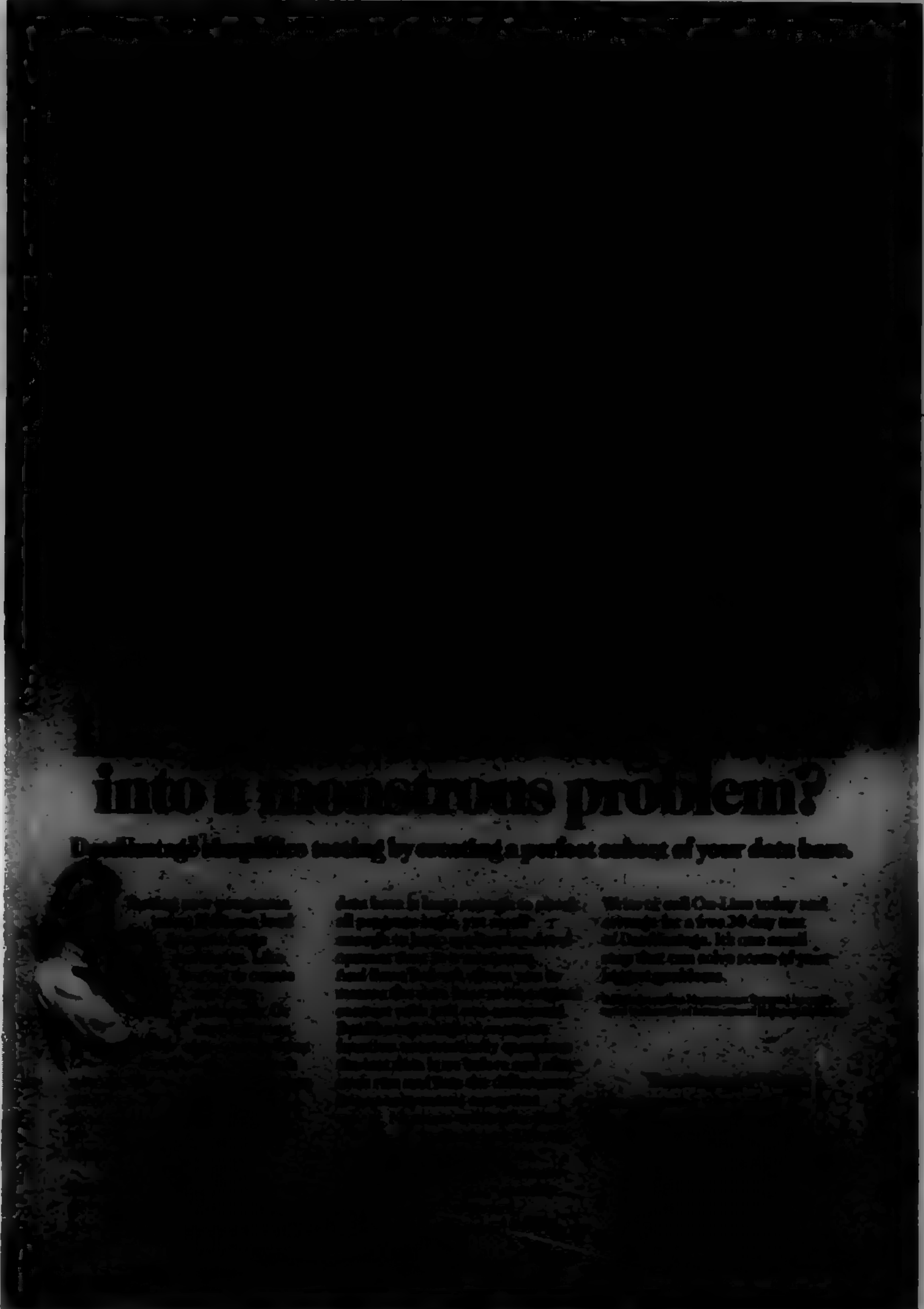
In the future, multiuser microcomputers will "simply become an adjunct to a network of personal computers in an office," he said, adding that a variety of networking schemes will be available.

■ **Who will determine how micros will be used** — the DP manager or the end user? That depends on whether the DP department recognizes the importance of the technology, Roach said.

"If the computer professional is willing to accept microcomputers as a serious alternative, [he] will control the system," he explained. "But if [he] refuses to recognize the just place of micros, the users will attempt to control the systems, because they must have the productivity gains made possible by microcomputer technology."

■ **Don't wait for the perfect system,** Roach warned. Instead, look for a system that answers most of your organization's needs and, at the same time, leave room to integrate new technologies as they emerge.

Roach



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Data processing to expand role via micro integration
DP managers anticipate corporate personal computing to relieve applications backlog

CW AT DPMA

By Kathleen Sullivan
CW West Coast Bureau

ANAHEIM, Calif. — Will the introduction of personal computers into the corporate environment help chip away at the applications backlog that has been steadily accumulating in data processing departments?

In interviews with DP managers here at last week's Data Processing Management Association (DPMA) annual conference, most respondents answered that question with a qualified "yes."

Personal computers will be used to meet many of the pent-up needs of users for applications programs, they said.

At the same time, however, personal computer users represent a new breed of users and they are placing new demands on the data processing staff.

Quicker response to users

James Boone, manager of data processing at Compressor Systems, Inc., a Midland, Texas-based company that manufactures natural gas compressors, said personal computers will help managers respond more quickly to many user's applications requests.

In addition, personal computers will help users devise some new solutions to some old problems.

"We have the ability to do things with microcomputers that we couldn't have done with a mainframe, such as remote billing," Boone said. "But at the same time, we want to integrate those systems into our information gathering process. So we are taking on a new job: making personal computers fit into the traditional data processing department."

> *'We are taking on a new job: making personal computers fit into the traditional DP department.'*
>
> — James Boone, DP manager at Compressor Systems, Inc.

Dan Shirey, director of information services for Perkins-Prothro Co., an independent oil and gas producer based in Wichita Falls, Texas, agreed, saying that personal computers had added an "entirely new spectrum" to the work of data processing managers.

"We are no longer just managers of people who write programs and collect data," Shirey said. "We have become the group that understands the information flow in a company."

Personal computers are introducing computing to a new audience of users, Shirey said. "People traditionally resistant to computers are now eager to automate their departments with microcomputers," Shirey said.

John C. Aldredge, manager of the information services department for the city of Lubbock, Texas, said that in the short run, personal computers would increase the work load of the data processing staff, because microcomputer users "require an extremely personal form of system development."

Aldredge's department now performs hardware and software evaluation for its personal computer users, in addition to maintenance and support. The city's information services department reassigned personnal to handle microcomputer support, he said.

H. Faye Booker, supervisor of systems analysis and programming at the U.S. government's Postal Data Center in St. Louis, said her agency was just beginning to use personal computers.

Because the agency's data processing staff spends much of its time maintaining its large systems, it has trouble meeting the needs of users, she said.

Booker said microcomputers will give users the ability to produce their own reports, which will help reduce the work load of the agency's systems and programming area.

The Postal Data Center will rely on a personal computer coordinator to handle microcomputer support, she said.

James J. Kilian, data processing manager of Templeton Kenly & Co., a Bensenville, Ill.-based manufacturer of heavy lifting equipment, said his company was also a newcomer to personal computing.

The company, which had been looking for a mainframe data base package to keep track of its fixed assets, recently decided to use a personal computer data base package instead of the mainframe one, according to Kilian.

Richard F. Gehrt, who is in charge of processing services for Employers Insurance of Wausau (Wis.), said his company is using personal computers in a variety of small, independent application areas.

When asked if he thought microcomputers would help cut into the applications backlog, according to Gehrt, "I should hope so. If they don't, we really have a problem on our hands."

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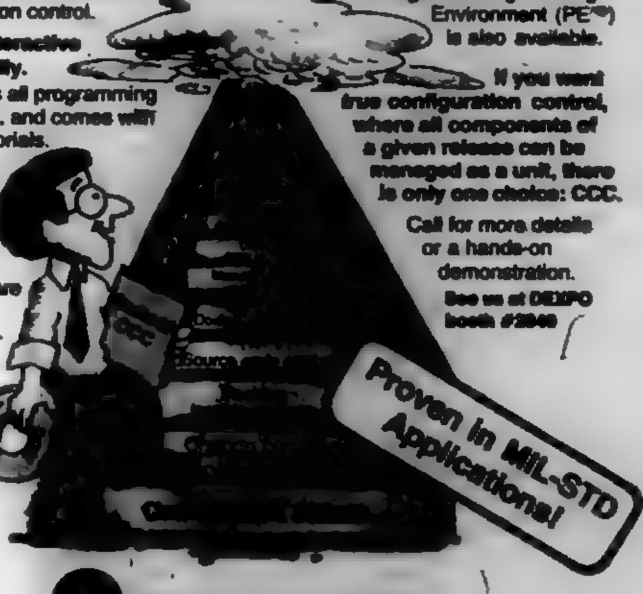

Networks won't become obsolete, consultant assures

Tells users to consider net upgrades to larger systems, warns of linkup penalties

CW AT DPMA

By Kathleen Sullivan
CW West Coast Bureau

ANAHEIM, Calif. — Is your company grappling with the issues related to installing a local-area network? If so, Linda T. Taylor, vice-president of Gaskell & Taylor Engineering, Inc., a Los Angeles-based consulting firm, offers some reassuring words.

"No matter what system you choose," she told a seminar audience at last week's Data Processing Management Association's (DPMA) annual meeting, "it won't become a throwaway system." Whatever a firm decides to use today will be usable in the future as a component of a larger system, she added.

Networks available today will become obsolete tomorrow only if the [redacted] cides to stop supporting its products, Taylor said. "Networks will not become obsolete just because something slicker comes out on the market," she [redacted]

However, there are some penalties users will incur when they link their present networks with later versions, Taylor said. The system will take longer to respond, she warned, and its increased complexity means problems will be harder to diagnose. In addition, a higher level of expertise will be required to support the system, and it will be more expensive to maintain, she said.

For some users, the most pressing question is whether their organization should install a local-area network or a private branch exchange (PBX), Taylor said.

Taylor said local-area networks provide an "inexpensive entry into office automation," are relatively simple to install and can be easily expanded.

In addition, most local-area networks include electronic mail and print-spooling capabilities and provide a hard disk capacity of between 10M and 256M bytes, she said.

What are the disadvantages of these networks? At present, they can only handle data transmission, Taylor noted. Coaxial cable is not only expensive, but it also requires a conduit in the walls, she said.

According to Taylor, too many protocols and standards are being worked on by various standardization groups. Thus, incompatibility remains a problem. And finally, gateways — protocol converters that link dissimilar networks — have been slow in coming to the market and are expensive as well, she said.

A PBX system offers several advantages, Taylor said. Fourth-generation PBXs, which integrate voice, data and facsimile transmission, are already on the way, she noted, and offer a "great deal of intelligence and features."

Users will be able to get those features in a single desktop unit that will combine the functions of the terminal and telephone.

In addition, PBXs use twisted-pair copper wire, which is relatively inexpensive, Taylor said.

PBXs have other shortcomings, Taylor said. For instance, second-generation PBXs, using a blocking architecture, can "busy out" users.

Although third-generation PBXs were announced three years ago, few products have arrived on the market, Taylor said. And vendors have provided only limited software capabilities for PBXs.

Eventually, Taylor said, the terms local-area network and PBX will disappear as the products converge into a single communications technology.

But Taylor said PBXs are not yet a "mature technology" and told users to wait another year and a half to two years before purchasing one.

"If you don't need to install a network right away, delay the decision at least eight months, until the next National Computer Conference," Taylor said, adding that she expects several product announcements at that show next July.

> *Networks available today will become obsolete tomorrow only if the local-area network manufacturer decides to stop supporting its products. 'Networks will not become obsolete just because something slicker comes out on the market.'*
>
> — Linda Taylor, Gaskell & Taylor Engineering, Inc.

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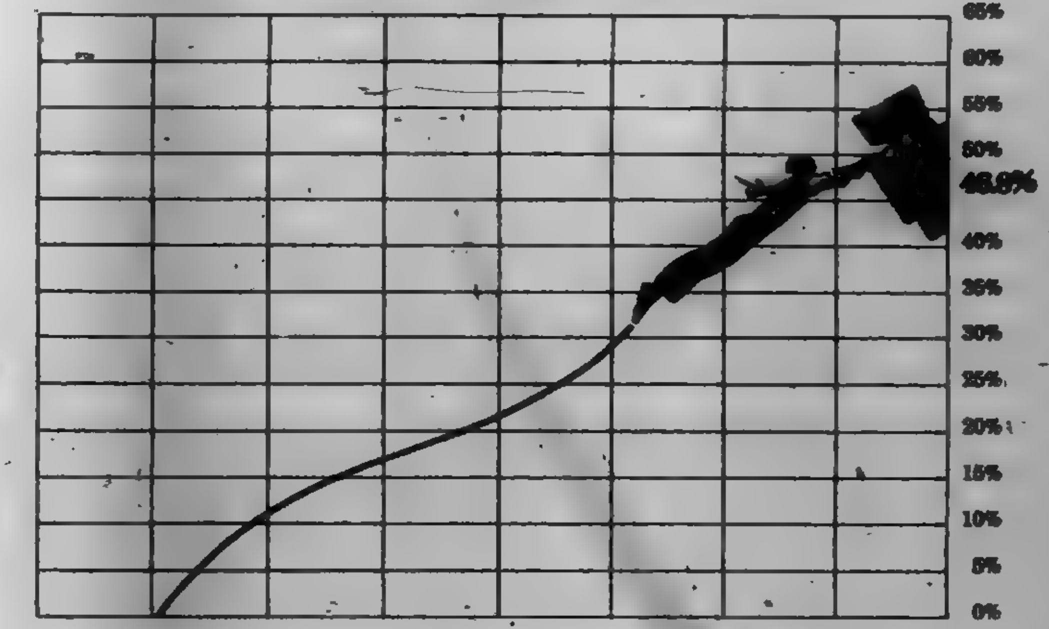

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*On-Line Software prepared a questionnaire for all InterTest users that was distributed under the control of Ernst & Whinney, one of the Nation's leading public accounting firms, who then received the questionnaires and compiled and tabulated the responses. Respondents were asked, assuming it would take 100 hours to test and debug a CICS application without InterTest, how long would it take using InterTest. According to the results tabulated by Ernst & Whinney, users claim it would take an average of 53.2 hours.
**Datamation, December 1983 issue.

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FBI seeks OK for white-collar crime suspect data base

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The Federal Bureau of Investigation is proposing to expand its National Crime Information Center (NCIC) data base with a new file of white-collar criminal suspects, including pertinent information regarding investigations of financial crime.

The FBI's Criminal Investigative Division, which initiated the request to have the NCIC establish a so-called economic crime index (ECI), said there was a "need for more efficient and effective fieldwide coordination of major white-collar crime investigations.

"Because of a lack of coordination," FBI state law enforcement and other regulatory agencies now frequently initiate their own cases that involve the same fraud scheme.

Jerry Berman, legislative counsel to the American Civil Liberties Union said the proposed ECI "raises significant privacy concerns. We've said many times that no new files should be added to the NCIC without specific legislative authorization that deals with automation and standards for the data."

Berman added, "We're at the point where either NCIC becomes a system of accurate records — right now it is 60% inaccurate on the average — or Congress should discontinue funding, because [NCIC] continues to disseminate inaccurate information."

The Advisory Policy Board of the NCIC last month recommended that the ECI plan be approved. Attorney General William French Smith and FBI Director William Webster must first approve the plan, which the FBI is seeking to finalize by mid-1985.

The ECI plan has caused the chairman of the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, Rep. Don Edwards (D-Calif.), to write a letter to Webster and Smith questioning both the establishment of the file without formal congressional approval and the methods by which the information in the proposed index would be verified and updated.

Additionally, last month Edwards accused the FBI of "appearing to violate" the Federal Advisory Committee Act by barring a subcommittee counsel from attending sessions of the Planning and Evaluation subcommittee of the NCIC's Advisory Policy Board. The counsel had attended similar board meetings in the past. The FBI said the decision not to allow John Briley, the counsel, to attend was "based on sound legal precedent."

The FBI has not responded to Edwards' accusations, according to a subcommittee spokesman. The Advisory Policy Board meetings were open to the public.

The FBI's plan would initially make the index available only to 11 FBI field offices and the Department of Justice. But within two years, approximately 64,000 federal, state and local law enforcement agencies now using the NCIC would have online access to the ECI file.

The ECI file would, according to plans, automatically determine whether the subject is already on any of the other 12 files maintained by NCIC. The file would include names, aliases, associates, telephone numbers, vehicle data, business phones, bank account numbers and miscellaneous information.

Congressional concern over the creation of a new file for the NCIC is not new. Last year, the FBI dropped plans to create a suspect file on terrorists and organized crime after objections were raised.

The oversight committees of Congress have questioned the methods of NCIC users to upgrade the accuracy of the files on individuals after their cases have been dispensed with by the justice system. The data accuracy issue has been acknowledged by top FBI officials.

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WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

IRS rules limit home micro business tax deductions

WASHINGTON, D.C. — The Internal Revenue Service recently issued temporary rules implementing legislation that restricts the availability of business tax deductions and credits for home personal computers.

The Tax Reform Act of 1984 [CW, July 2] states that business depreciation and investment tax credit benefits are permitted only if the personal computer is required for employment and is used at least 50% of the time for business. The temporary regulations, published last month, apply to all computers and peripheral equipment used outside a regular place of business, the IRS said.

To obtain business tax write-offs, the taxpayer must keep a log showing how much time the personal computer was used for business purposes.

"Each entry in the log, journal, diary or similar record shall be made at or near to the time the listed property is actually used," the IRS rules said.

GSA offers federal agencies help with planning, analysis

WASHINGTON, D.C. — The U.S. General Services Administration (GSA) recently announced a program in which the GSA's Office of Information Resources Management will provide planning assistance for other federal information management offices.

Sally Bennett, a planning specialist, said the office has prepared a booklet offering a "cookbook" approach to strategic planning and also offers on-site analysis for strategic, long-range and tactical planning.

Frank J. Carr, assistant GSA administrator, said the planning support program can be used to produce a basic plan, procedures to carry it out and a management system to sustain it. The GSA planning service is available on a cost-reimbursable basis, he said.

Carr said the planning procedure was developed and used by the GSA itself and subsequently was used by the Federal Aviation Administration, the Indian Health Service and the Bureau of Land Management.

Census Bureau to launch first count of U.S. robots

WASHINGTON, D.C. — Starting in January, the U.S. Bureau of the Census plans to count, for the first time, the growing population of robots in the U.S.

The first annual robot census survey will be mailed to about 100 robot manufacturers, which will be required by law to provide information about their 1984 products. It will be the first time the bureau's Current Industrial Report series will specifically cover robots, bureau officials said.

"The results of this survey will provide policymakers with an information base to assess the impact of the growth of robotics on our economy," the bureau said. "Data will be used in making trend projections, market analysis, product planning and so forth," it added.

More computer filing urged in Medicaid, Medicare claims

WASHINGTON, D.C. — The federal government should encourage hospitals and other health care providers to make greater use of computer media when filing Medicare and Medicaid claims, according to a new report from the U.S. Department of Health and Human Services.

Richard P. Kusserow, the agency's inspector general, said the Health Care Financing Administration (HCFA) could save an estimated $197 million a year with maximum use of "electronic media claims" such as magnetic tapes or disks or data communications. The report said the savings would result primarily from eliminating data entry costs.

Kusserow's report noted that the HCFA already supports the use of electronic filing by the health care industry, but said it needs to remove certain deterrents and especially encourage the use of electronic media by high-volume filers.

The report added that when replacing the paper forms with electronic filing, it is important to establish a reliable audit trail that permits prosecution of fraudulent claims.

Judge reduces damages awarded in Qantel fraud complaint case

By James Connolly
CW Staff

HAYWARD, Calif. — The trial judge, citing the jury's "passion," has reduced the punitive damages assessed against MDS Qantel, Inc. from $10 million to $1.5 million in a case involving a fraud complaint brought by a former distributor of Qantel products.

The distributor, Datapro Corp. of Detroit, recently accepted Alameda Superior Court Judge M.O. Sabraw's suggestion that $1.5 million in punitive damages is sufficient. Datapro's option was to retry the case, decided by a jury here in August, before a new jury on the question of punitive damages. Judge Sabraw let stand $2.69 million in actual damages that the jury said Datapro suffered.

In reducing the jury's punitive damage award, Judge Sabraw said it had been "at least suggestive of passion and prejudice."

Datapro to appeal

John C. Walters, senior vice-president for legal affairs of Mohawk Data Sciences Corp., Qantel's parent company, said, "We are pleased that the jury's punitive damage award in this matter, which we believe to have been totally irresponsible and unsupportable, has been drastically reduced by the judge. At the same time, we continue to believe that there is no factual or legal basis for the original award made in favor of the defendant [Datapro] in this action and we expect to appeal this matter in order to have the entire jury verdict reversed."

The case centered on Datapro's claim that Qantel's Solutions accounting software and other products were defective and that Qantel deceived distributors. Datapro attorney Thomas Christo claimed that Qantel "used the distributors as a shield while its products were defective." He said Qantel had planned to direct-market its products after the defects were removed.

Christo noted that his motion to have Qantel pay $3 million in interest and fees is still pending before Judge Sabraw.

Qantel had brought an initial suit in 1982, and Datapro filed a fraud counterclaim. Qantel won a $240,000 settlement on its original breach of contract claim. That settlement and any interest and legal fees that Qantel is awarded will be subtracted from the $4.2 million that Datapro won.

The California case is the second multimillion dollar setback for Qantel. In July, a federal appeals court in Boston upheld a $6 million contract fraud judgement won by a former Qantel distributor. That award to Computer System Engineering, Inc. of Burlington, Mass., included $2.3 million in actual damages, $2.3 million in punitive damages and $257,000 in legal fees.

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AT&T suggests rate hike; contingent on FCC action

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — While claiming it would prefer not to raise its rates, AT&T last week said it may nonetheless have to do so should the Federal Communications Commission grant rate increases proposed by local telephone companies. The AT&T comment came in the wake of the local phone companies' proposal to charge more for access to AT&T's Message Toll Service (MTS), Wats and competing long-distance services beginning Dec. 1.

Meanwhile, a spokesman for MCI Telecommunications Corp. said his company will absorb the increase if it is granted.

The proposed rates would add about 6.6% to the premium access fee levied on AT&T and about 6.8% to the access fees paid by other common carriers.

The tariff containing the proposed charges was filed Oct. 17 by the National Exchange Carriers Association (Neca), which represents the bulk of the nation's local exchange carriers. However, at least one carrier — United Telephone System — will file a separate tariff and has already announced it will charge less than Neca has proposed.

Separate access tariffs also may be filed by a number of other local carriers, including GTE Corp. and the divested Bell operating companies serving the mid-Atlantic states, the West Coast and much of the Midwest.

A few days after Neca's tariff revisions reached the commission, MCI asked the commission to reject the filing. On Nov. 1, MCI was joined by two groups representing corporate communications users and by AT&T. AT&T asked the commission to suspend the higher rates for up to five months.

Last May, when the FCC authorized the present rates for local access to MTS, Wats and the switched public long-distance services provided by the other common carriers, the commission said local carriers were entitled to a 12.75% rate of return. However, in a statement accompanying its Oct. 17 filing, Neca told the commission that the proposed rates were that time have not produced the prescribed level of earnings. The association added that the proposed rates were designed to eliminate the shortfall; they will increase local carriers' revenue an estimated $850 million per year.

MCI spokesman Gary Tobin said Neca's proposed rate increase, if granted, will only be temporary; a surcharge of $1 or $2 per month is likely to be imposed soon after on residential and single-line business users, he explained, and once that fee is in place, charges levied by local carriers on long-distance carriers will be reduced accordingly.

Linc users form group in California

SAN FRANCISCO — Users of Burroughs Corp.'s Linc language here have formed their own users group, known as Local Users of Linc and Lirc (Lull). Lirc is the reporting feature that comes with Linc.

According to Jan Terry, manager of systems development for Koret of North America, a subsidiary of Levi Strauss & Co., and one of the users group principals, Lull's goal is to exchange coding techniques and expertise to resolve programming problems. Although the group now consists of five companies, Terry said the group is open to all companies that use Linc to program Burroughs mainframes.

More information on the group is available from Terry at Koret of North America, 611 Mission St., San Francisco, Calif. 94105.

TELECOM BRIEFS
Phil Hirsch
CW Washington Bureau

Terminal liability under AT&T debated

WASHINGTON, D.C. — "The [divested Bell operating companies] and [AT&T Information Systems] may have agreed between themselves that the so-called fixed-term contracts [would] be reassigned; but in so doing, the [divested companies] and [AT&T Information Systems] could not bind customers who were never parties to such . . . agreements."

So said the North American Telecommunications Association (Nata) late last month in a statement to the Federal Communications Commission; the association represents independent manufacturers of private branch exchange, telephone and related equipment who compete with AT&T Information Systems, the telephone company's deregulated subsidiary. Nata's comment represented the latest round in an argument over terminal lease termination penalties. The specific issue is whether users who leased terminals from the divested Bell operating companies before divestiture are still liable for those charges now that ownership of the equipment has passed to AT&T Information Systems.

The phone company insisted the original contracts were made with AT&T, even though customers dealt only with the divested Bell companies; therefore, despite divestiture, the terms remain binding. Nata argued that the agreements signed between AT&T and the Bell operating companies at divestiture "specifically provided for the transfer of Bell operating company [terminal equipment] contracts to AT&T Information Systems. . . . If the [customer premises equipment] contracts really did belong to AT&T prior to divestiture, there would have been no need to transfer them."

Bruce P. Saypol, one of Nata's attorneys, said Nata is concerned about termination charges because AT&T reportedly is waiving the charges if customers will agree to buy or lease new terminal equipment from the telephone company instead of from competing suppliers. He added that although AT&T is telling customers that they are subject to the charges, "no one has been taken to court for refusing to pay them."

Divested companies seek FCC rule waiver

WASHINGTON, D.C. — "Will the public be better off if the divested Bell operating companies are allowed to perform end-to-end protocol conversion?" New Jersey Bell Telephone Co. posed this question to the Federal Communications Commission late last month.

Along with several other divested Bell operating companies, New Jersey Bell wants the commission to waive a provision of its Second Computer Inquiry Decision; the provision bars them from performing end-to-end protocol conversion except through separate, deregulated subsidiaries. The divested companies say that if allowed to offer protocol conversion directly, as part of packetized transmission services, they will charge far less than present vendors.

The vendors — notably Tymnet, Inc., GTE Telenet Communications Corp. and Uninet Telecommunications, Inc. — insist the divested Bell companies would achieve these lower prices by using revenue earned from other services to cross-subsidize the new offerings. The International Communications Association (ICA), a corporate communications users group, has raised the same issue. ICA said the commission should establish strict accounting procedures to prevent cross-subsidization; also, competing packet net service vendors should be allowed to install access concentrators in the divested Bell operating companies' central offices.

Late last month, in the final round of comments on the pending waiver petitions, the divested Bell operating companies insisted their packet nets would satisfy a presently unmet user need by offering network-based protocol conversion to those who cannot justify the cost of terminal-based converters. Tym-

See DC page 19

[illegible]

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See Intel at COMDEX in Booth 2167.

DC from page 17

net Telenet and other vendors currently offer network-based protocol conversion, admitted New Jersey Bell, but these companies serve a long-distance market, not the local market the divested Bell operating companies plan to tap.

Phone access rate-cut agreement reported

WASHINGTON, D.C. — Press reports have indicated that federal and state officials have agreed on an access charge for residential and single-line business users. Reportedly beginning next summer, these customers will pay $1/line monthly, and a year later, the charge will increase to $2. The new charge is important to larger companies because once it goes into effect, their rates are likely to be reduced.

The reported access-charge agreement was worked out by an advisory group to the Federal Communications Commission known as the Federal-State Joint Board. The group is scheduled to present its official recommendation to the commission on Nov. 15th.

The reported agreement would allow local telephone companies to reduce access charges up to 35% for a multiline business user who had clear-cut, documented plans for bypassing his local-exchange network. It is not clear, though, whether the reports would have to be approved by state and/or federal regulatory agencies, nor do reports indicate whether the residential and single-line business access charge would be increased after the end of the second year.

MIT names director of Athena

CAMBRIDGE, Mass. — MIT has announced that Dr. Jerome Saltzer, professor of computer science and engineering in the department of electrical engineering and computer science, has been appointed technical director for MIT's Project Athena.

According to a spokesman, Project Athena is a $70 million experiment to determine if the computational and graphics power of microcomputers can be used to enhance the way courses are taught at MIT.

Saltzer will be responsible for the design and implementation of the computer systems environment that Project Athena will create on MIT's campus.

IEEE offers '85 catalog

SILVER SPRING, Md. — The Computer Society of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) said that its 1985 publications catalog is now available.

The catalog features 200 recent titles on a variety of subjects and applications in computer science and engineering. The 28-page publication also lists 45 of the top-selling tutorials available and nearly 60 conference records and proceedings.

The catalog is available free from the IEEE Computer Society Press, Suite 300PR, 1109 Spring St., Silver Spring, Md. 20910.

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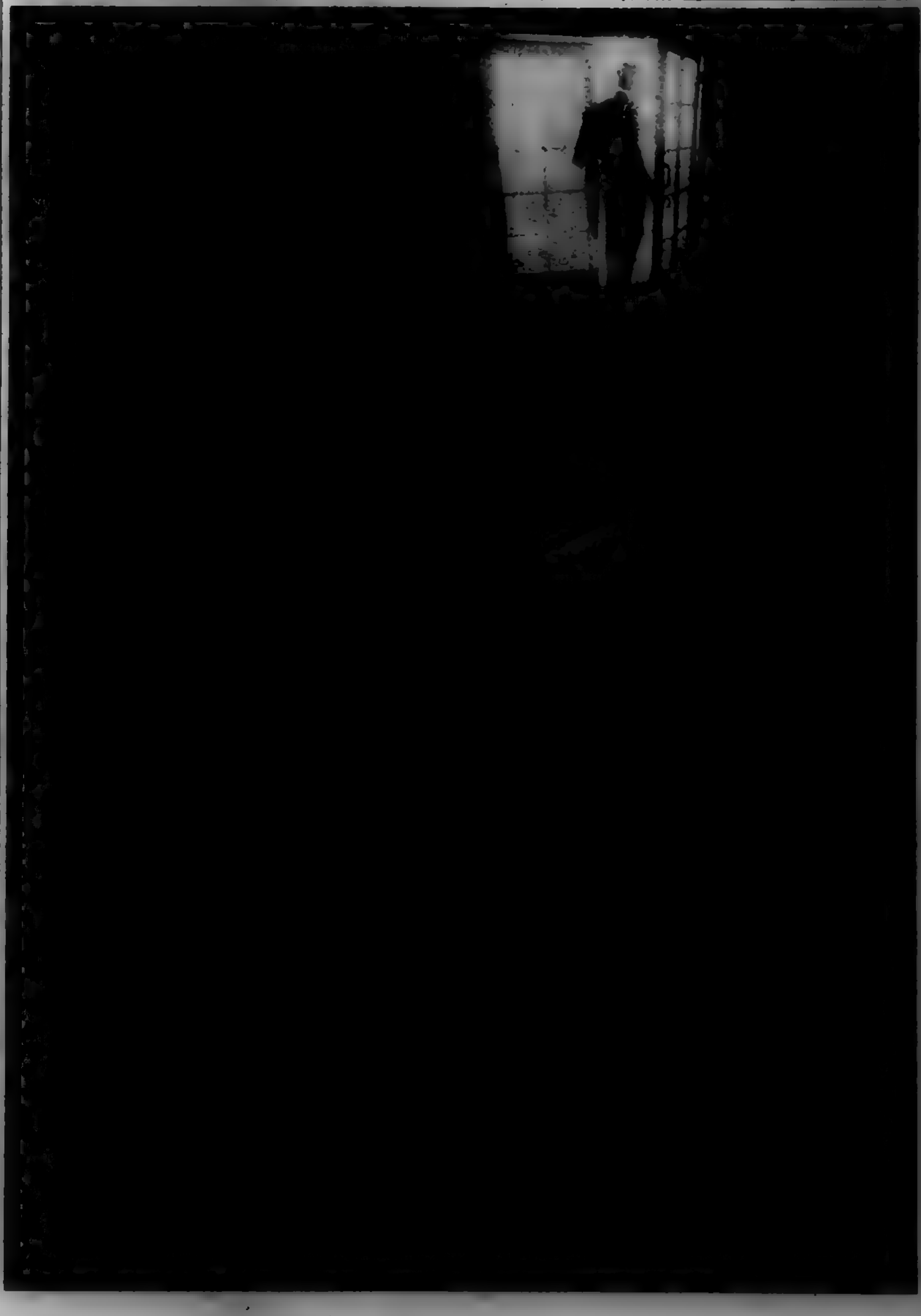

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TANDEM

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Computer use coming of age in medical profession

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C.— It appears that doctors are becoming converts to the computer age. The medical industry already makes extensive use of information processing technology and is now poised to introduce new data base applications software that can be commonly used by the medical community.

This was the thrust of the recent eighth annual Symposium on Computer Applications in Medical Care (SCAMC) held here. Dr. Duncan Newhauser of Case Western Reserve University in Ohio told attendees of the conference that the simple application of popular microcomputer-based decision support systems (DSS) is desperately needed for doctors. Noting that information processing is assuming an important place in medicine, Newhauser criticized the lack of computer literacy training being offered by the nation's universities.

"As far as I know, there is not one medical school that requires its students to use or to become familiar with the computer. It is a real shame," Newhauser said.

Newhauser added that the trend toward diagnostic-related groups under recently passed laws and regulations, which are designed to control costs and to require peer group review before operations are performed, have resulted in a situation where information technology is aimed more at the business side of medicine rather than at its practice.

"Hospitals are spending millions on [diagnotic-related group] analysis programs instead of on decision support software that will help a doctor isolate the causes of an illness," he added.

While there is a relatively small supply of efficient DSS programs for physicians, the interest doctors display in the technology is rapidly increasing, according to Dr. George Collins of Buffalo, N.Y., and a member of the American Medical Association (AMA) who also addressed the plenary SCAMC session.

Approximately one in 10 doctors currently has a micro at home. Two in 10 have them in their offices, while micros are easily available in a hospital setting, Collins quoted from an AMA survey.

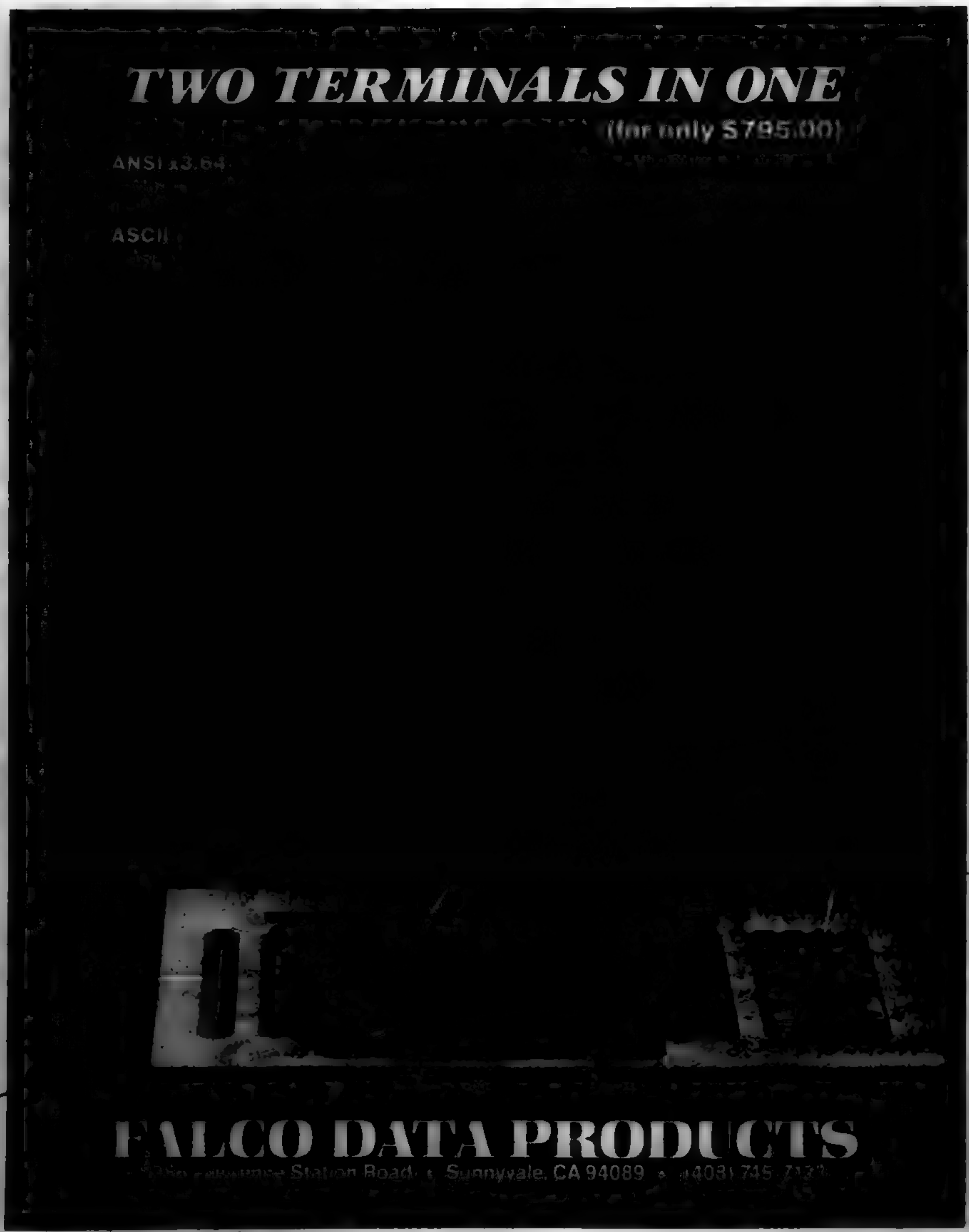
DBMS highlighted

A exhibit floor at the SCAMC conference highlighted the rapidly growing supply of data base management system (DBMS) programs for the management of patient records, data upgrades and statistical analysis for the medical community that are already available in the office environment.

In the medical profession, a DBMS program that has already attracted wide vendor support is Mumps, a general-purpose interpretive, high-level programming language.

A skeptical view of the role of computers in future medical delivery systems came from Dr. David Rodbard of the National Institutes of Health who said, "Implementation of a computerized approach almost of necessity involves factors such as patient selection, enhanced motivation of patient and staff and the placebo effect of any new or highly touted system."

Other observers noted that development of natural language and artificial intelligence-based programs to aid diagnosis will continue to be produced, but computers will most likely be used in the administration of hospitals and in the handling of patient and statistical data by clinical researchers.



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Successful information center starts small, thinks big

Specialist says series of pilot programs paves route to full-fledged center

By Paul Gillin
CW Staff

BOSTON — To gain management approval to build a successful information-center, it is necessary to start small, but have clearly defined procedures as to what is expected from both the information center staff and the end users it serves. That was the message from John Mele, product support specialist at K-Mart Apparel Corp. in North Bergen, N.J., who spoke at TSI International's Information Exchange conference held here recently.

Mele said K-Mart Apparel had successfully built its information center over the last four years by starting with pilot projects in carefully targeted areas and then expanding in scope primarily through word of mouth.

K-Mart Apparel, which does not allow its employees to use microcomputers at work, today supports more than 100 information center users on its mainframe with a staff of five specialists. Mele outlined some dos and don'ts for companies that are planning to set up information centers.

> *K-Mart Apparel, which does not allow its employees to use microcomputers at work, today supports more than 100 information center users on its mainframe with a staff of five specialists.*

He said an information center should:

- Focus on developing end-user training and education programs to make users as self-sufficient as possible.
- Provide direct support to help users code their own applications.
- Act as a buffer to help users better define their requests to MIS.

According to Mele, an information center should not:

- Directly maintain or support applications developed by end users.
- Replace traditional responsibilities. The information center should not attempt to usurp MIS' traditional authority.

Users need to provide certain commitments, too, Mele stressed. Users who want to develop an application using the information center should:

- Promise to provide the personnel and business knowledge necessary to complete a job.
- Commit themselves to completing the required training.
- Take responsibility for cost-justifying the effort.
- Develop, maintain and document their applications.
- Use the available information center software.

Users should promise not to:

- Attempt to breach security regulations.
- Develop major operational systems in the information center.
- Become specialists for other departmental users.

Staff selection should be a top priority, Mele said. Staff members must be patient, diplomatic, organized and possess good communication skills. They must also have a working knowledge of the business and a broad understanding of the tools to be used.

A pilot project for the fledgling information center should be identified, he said. Ideally, the project should be in an area in which automation can provide tangible and measurable benefits. Look for a department that is swamped with work, has mostly manual systems in place and is receptive to the idea of computerization. Too many promises should not be offered at the outset, he stressed.

It is important that MIS understands and approves of the activities of the information center, Mele said. It should be emphasized that the center is working to reduce the application backlog, not to infringe upon MIS territory.

The information center initially needs a statement of purpose, he added. Some of the guidelines outlined above can be used as a start. It should also be determined what services will be offered, what the staff requirements will be and what physical requirements are needed.

Personnel, hardware and software should be in place before the pilot project is undertaken. During the pilot phase, standards and procedures should be developed, user guides written and results of the project measured. Capacity planning and job accounting are necessary parts of the initial activities. The measurements taken at this point will help in planning future projects and further expansion.

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Info center hailed as harness for corporate micro growth

By Edward Warner
CW Staff

BOSTON — Establishing a corporate information center is the largest single step a firm can take to implement microcomputers strategically, an IBM representative told a group at the East Coast Computerfaire, a personal computer show held here last week.

The information center, according to IBM Marketing Support Representative Nancy Proctor, could function as a "Computerland [store] in your organization" by distributing hardware, software and training to those who need it. It should also provide consultants to users with special applications demands and seek to learn users' needs, but should not stifle creativity, she said.

To accomplish this, Proctor added, the information center will require the commitment of the firm's top leadership. Firms must establish a line of accountability in microcomputer implementations, she said, "so that someone is in charge of what's going on."

Currently, she observed, "if you think of how personal computing has been addressed [in your organization], you may have just thrown up your hands." The users, meanwhile, have been "going out and using their petty cash fund to buy personal computers," she said. Proctor later asked the approximately 30 attendees who heard her speak if their corporations had already established information centers. Three raised their hands.

Top managers, she continued, must show "that they believe productivity is going to be gained" by the implementation of personal computing. To illustrate, she noted that executives in her office schedule all meetings on their terminals — a system so pervasive that those who revert to paper calendars and telephones to set meetings face the ire of their coworkers.

The information center itself should not be staffed with applications programmers, she cautioned, because they cannot talk to users. Instead, Proctor suggested hiring former teachers who, she said, do not think that any questions are dumb and "don't have to achieve [training goals] within an eight-hour time schedule."

Financial justification will need to be tied to any microcomputer implementation, she said, adding that such justification is a problem because improved information flow and decision making "[have] no hard dollars attached to [them]."

An alternative approach to cost justification, she said, might be to "take 5% out of their [office] budget for the year," assuming that amount to be the minimal productivity gain expected. The 5% could then be used by that office for personal computer equipment purchases.

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Office systems conference set for Feb. 2-3

ATLANTA — Author and lecturer Hal B. Becker will deliver the keynote speech at the Fourth Annual Office Systems Research Conference Feb. 2-3 at the Omni International Hotel here.

Becker, a Phoenix-based information management consultant, will speak on "Artificial Intelligence: A Fourth Revolution?" His presentation will reportedly explore the early efforts in AI and the transition from expert systems to true AI.

The conference, sponsored by the Office Systems Research Association, will cover computer security, ergonomics and office systems education. Preregistration costs $60 for members, $85 for nonmembers. Registration at the conference costs $70 for members, $95 for nonmembers.

The Office Systems Research Association is located at 574 University Center, Cleveland, Ohio 44115.

Expo to explore agriculture, DP

CHICAGO — The first International Conference and Exposition on Agricultural Automation, sponsored by the Society of Manufacturing Engineers (SME) and the American Society of Agricultural Engineers (ASAE), will be held Feb. 25-28 at the Palmer House Hotel here.

Sessions will cover trends and needs in agriculture, basics of today's food system, basics of robotics as applied in agriculture, automation of food processing, control systems for water and energy management, measuring tools for agriculture and automated harvesting. Automated systems will be exhibited as well.

The registration fee is $350 for nonmembers and $280 for members of SME, ASAE and affiliate organizations. More information can be obtained from either SME at One SME Drive, P.O. Box 930, Dearborn, Mich. 48121; or ASAE, 2950 Niles Road, Saint Joseph, Mich. 49085.

Expert systems seminar set

PROVIDENCE, R.I. — CPMS Expert Systems, Inc. has announced that its seminar on expert systems is scheduled for Dec. 9-12 at the William Penn Hotel here.

The seminar is designed for MIS managers who may know of expert systems but may not understand what they encompass. Seminar chairmen are Saman Hong of RCA Corp. and Kenneth [illegible] of Interface Design Associates, Inc.

Prof. Herbert Simon, Nobel Prize laureate, will present a talk on the partnership of artificial intelligence and operations research and management science. Richard Cyert, former president of Carnegie-Mellon University in Pittsburgh, is scheduled to speak on AI in the corporation of the future.

The registration fee is $950.

CPMS is located at 200 Westminster St., Providence, R.I. 02903.

Meet to discuss benefit plan DP

ORLANDO, Fla. — An educational program for those involved in employee benefit plan data processing will be held at the Buena Vista Palace here Dec. 10-12.

The 1984 EDP Institute, sponsored by the International Foundation of Employee Benefit Plans (IFEBP), will include an introduction to data processing, computer concepts and terminology, development of software, minicomputers, on-line claims adjudication, word processing, auditing DP operations, computer systems control and security, legal ramifications, evaluation and selection of hardware and using computers to communicate benefits.

Registration fees are $420 for IFEBP members and $495 for nonmembers.

More information on the employee benefit meeting is available from IFEBP, P.O. Box 69, Brookfield, Wis. 53005.

International meet to cover micro software

KAUAI, Hawaii — The International Microcomputer Industries Association will hold its International Software Update II at the Waiohai Resort here Feb. 16-20.

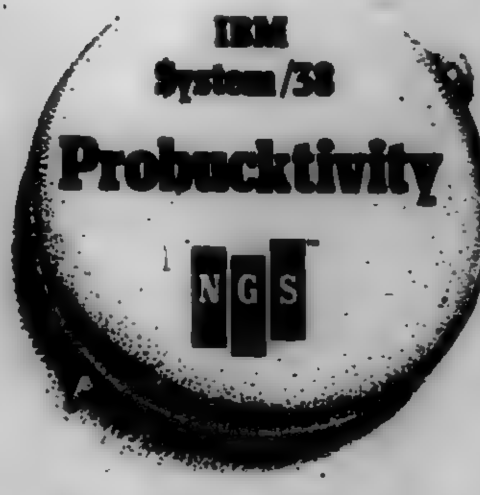
Targeted at executives of micro software publishing and developing firms, the conference will include sessions on international vs. domestic standards in software as well as product introduction on an international scale.

Other conference sessions will discuss international product support, success stories in international software sales, the future of silicon software and the impact of IBM's software strategy on international markets.

Scheduled speakers for the international software conference include John Elkins, vice-president of the Naisbitt Group, which performs social forecasting and was founded by John Naisbitt, author of *Megatrends*; Edward Esber, president of Ashton-Tate; Esther Dyson, president of Edventure Holdings, Inc.; and Bill Bowman, chairman of Spinnaker Software Corp.

The full conference fee including accommodations ranges from $1,595 to $1,795 for single occupancy; the fee without accommodations is $995, the sponsor said.

More information can be obtained from International Microcomputer Industries Association, Suite 175, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.



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Comdex/Fall '83 floor scenes

[illegible]

Apple exec's speech to start sixth edition of Comdex/Fall

Organizers expect 1,400 micro, mini vendors to exhibit for an estimated 100,000 attendees Nov. 14-18

LAS VEGAS — More than 100,000 attendees are expected to flood into this desert city for the sixth annual Comdex/Fall '84 small-computer show, opening here Wednesday. The Interface Group, organizers of the show, predicted that over 1,400 vendors will exhibit in more than 7,000 booths during the show, which runs through Nov. 18.

Displays will sprawl across six major facilities: the Las Vegas Convention Center, the Convention Center West Hall, the Las Vegas Hilton, the Riviera, the MGM Grand and Caesars Palace.

A universal draw

Targeted toward computer resellers, the giant show also will draw thousands of people from every other part of the computer industry.

Comdex officially kicks off with a keynote address by John Sculley, president and chief executive officer of Apple Computer, Inc., who will discuss marketing challenges in the hotly competitive small-computer arena. Following the address, which begins at 9:30 a.m. at the Las Vegas Hilton, all exhibit halls will open their doors by 10:30 a.m.

Opening three months to the day after IBM unveiled the Personal Computer AT, Comdex/Fall '84 is expected to feature the first AT-compatible systems.

A tremendous flurry of microcomputer and minicomputer products arrives each year at Comdex. Among the crop taking their first public bow at Comdex are the Graphics Environment Manager (GEM) operating environment software from Digital Research, Inc., Microsoft Corp.'s MS-DOS networking software and the Wordstar 2000 line from Micropro International Corp.

A no-show

Another package in the spotlight, the Lotus Development Corp. productivity software for the Apple Macintosh, which is scheduled for announcement today, will be shown privately, as Lotus decided against a Comdex exhibit.

Other vendors, meanwhile, will display the growing choices in Macintosh packages now available for sale.

At other software exhibits, showgoers will be able to examine several integrated productivity packages running under versions of AT&T's Unix. New graphics software products for the IBM Personal Computer family also should draw high interest.

Opening three months to the day after IBM unveiled the Personal Computer AT, Comdex/Fall is expected to feature the first AT-compatible systems. In the wake of another August IBM move, the introduction of the PC Network, local-area networks also will maintain a high profile at Comdex, with new network system software supplemented by multiuser network applications from a number of vendors.

In another move toward distributed data processing, several suppliers of time-shared multiuser systems will introduce methods to link single-user microcomputers or intelligent workstations to their larger systems, with the single-user machines acting either as local-area network nodes or as terminals.

Also on the multiuser front, enhancements for the Personal Computer AT that extend the system's capability beyond three users will surface at the show, as will a host of new time-shared machines from established vendors such as Altos Computer Systems, Inc. and Plexus Computers, Inc.

Microcomputer hard disk storage capacities keep creeping up, with one example being the 30M-byte drives now available for Compaq Computer Corp.'s Deskpro series. A host of new external hard disk drives and tape storage systems for single-user or multiuser systems will be unveiled at Comdex, including several 3½-in. Winchester disk drives.

Comdex should feature dozens of printer and plotter introductions, including a desktop eight-page per minute laser printer from Digital Equipment Corp.

In the add-on category

Among new add-on products designed for IBM Personal Computers and compatibles, Comdex is expected to showcase board products that convert a Personal Computer XT to a Personal Computer AT-compatible system.

Other add-ons will give enhanced communications abilities (with a trend toward voice-management features) and boosted graphics functions.

In addition to the exhibits, Comdex will feature 43 sessions covering marketing and technological aspects of computer reselling.

For more information, the Interface Group can be reached at 330 First Ave., Needham, Mass. [illegible]

Comdex/Fall four-day schedule of events

Comdex/Fall '84 opens Wednesday, Nov. 14, and runs through Sunday, Nov. 18.

Exhibits will be open at the Las Vegas Convention Center, Convention Center West Hall and Las Vegas Hilton from 10:30 a.m. to 6 p.m. on Wednesday and from 10 a.m. to 6 p.m. Thursday through Sunday.

Other exhibits will be open at Caesars Palace, the MGM Grand and the Riviera during the following times: Wednesday, 9 a.m. to 5 p.m.; Thursday through Saturday, 8:30 a.m. to 6 p.m.; Sunday, 8:30 a.m. to 5 p.m.

The fee for the full conference plus five days of admission to exhibits is [illegible]. [illegible]

[illegible]

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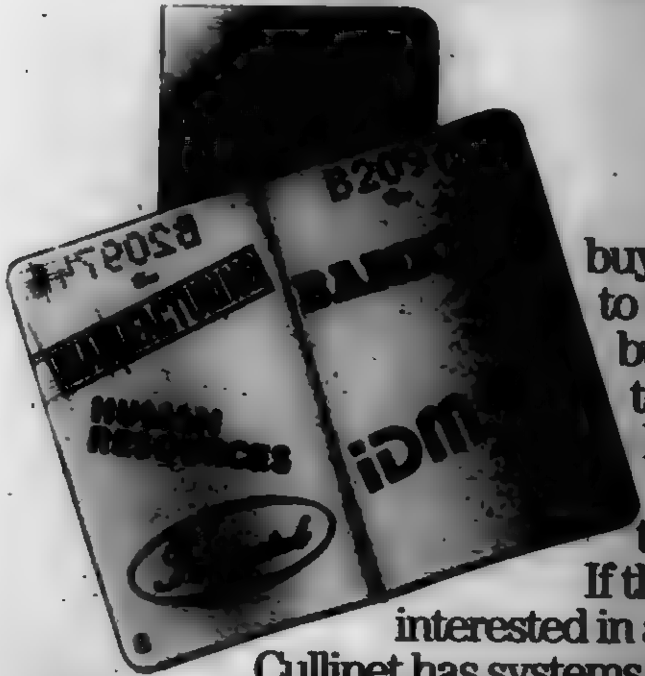

It's an all too common problem. Manufacturing buys an application, and data processing is expected to integrate it with the corporate database. Finance buys an application, and data processing is expected to integrate it, too. And so it goes. Three years later, the job still isn't finished. And the ideal of a *true* database management system is still just that—an ideal.

If this problem sounds at all familiar, you'll be interested in a way to avoid it altogether—Cullinet.

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Comdex/Fall '84

AMERICAN BUSINESS SYSTEMS, INC.
Booth 1579

American Business Systems, Inc., will exhibit Bacs Bridge, a report writer that is said to allow users to access data and transaction files in the company's Bacs accounting modules and transfer data directly to data base, spreadsheet and graphics packages.

The product offers up to 20 columns per report, and users can screen displays and print reports up to 160 char. wide, according to the company.

Bacs Bridge is available under PC-DOS. The price of the product is $900.

American Business Systems, 3 Littleton Road, Westford, Mass. 01886.

ANCHOR AUTOMATION, INC.
Booth M1118

Anchor Automation, Inc. will display its Volksmodem 12, an AT&T 103/212A-compatible modem designed for most computers and standard software.

Volksmodem 12 is designed for unattended 300 or 1,200 bit/sec operation and features serial command operation, full- or half-duplex operation, autodial and autoanswer, tone and pulse dialing, dial tone detect, busy detection and attendant headset jack. It costs $299.

Anchor Automation, 6913 Valjean Ave., Van Nuys, Calif. 91406.

ANDERSON JACOBSON, INC.
Booth 2124

Anderson Jacobson, Inc. will feature a desktop computer with one flexible disk drive and one 10M-byte hard disk drive.

The system is designed for integrated application programs written for the IBM Personal Computer XT and compatible personal computers. It is priced at $4,895.

Among other Anderson Jacobson products that will be displayed are a security modem with computer logon and two-level password security, an option board said to eliminate errors for asynchronous, full-duplex, two-wire, dial-up transmission at 4,800 bit/sec over the switched telephone network and a series of leased-line modems and multiplexers.

The AJ 1212-AD2 security modem is priced at $695. The error correction board is $595. The statistical multiplexers range from $1,850 to $7,050. The leased-line modem is $2,545 with autodial backup.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif., 95131.

AST RESEARCH, INC.
Booth W960

AST Research, Inc. will feature several new and existing products. It will unveil a single-slot board for users of Apple Computer, Inc. Apple IIe microcomputers priced at $235.

The company will also introduce its new line of mass storage subsystems, named Colossus and priced at $7,490 with a host adapter. A micro-to-mainframe package, 5252-11, will be displayed; it costs $995. Also featured will be a half-card modem called Reach, priced at $549, and a monochrome display card, Preview, which costs $390.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

CAL-ABCO
Booth 1442

Cal-Abco will introduce the Legend 1380 — the latest in the company's 80 Series of dot matrix printers. IBM Personal Computer-compatible, the printer is rated at 130 char./sec and includes a 2K-byte buffer. A dip-switch panel controls several features, including condensed print, line spacing and double-strikes.

The printer produces 96 downloadable characters using a nine-wire print head and 1/216 line spacing to achieve high-resolution graphics.

The Legend 1380 is priced at $379.

Cal-Abco, 6041 Variel Ave., Woodland Hills, Calif. 91367.

CDEX CORP.
Booths W968 and W1067

Cdex Corp. will introduce two additions to its Business Application series: Analyzing Sales Performance Using Electronic Spreadsheets and Building a Business Plan Using Electronic Spreadsheets.

Each package runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles, PCjr and Apple Computer, Inc. machines under IBM's PC-DOS, Microsoft Corp.'s MS-DOS, the UCSD P-System, Apple's Appledos 3.3 and Applesos and Tandy Corp. TRS-DOS operating systems.

Versions will be available for Lotus Development Corp.'s 1-2-3 and Symphony, Microsoft's Multiplan, Software Arts, Inc.'s Visicalc and Sorcim Corp.'s Supercalc. The packages, also available for the Apple IIe in versions for all of the above except 1-2-3, are priced at $69.95.

Cdex, Suite 200, 5050 El Camino Real, Los Altos, Calif. 94022.

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Borderless. ■ You've heard the word enough. And until now, that's all it's been. A word. Not reality. ■ But Management Science America has changed that for good. ■ Introducing Information Expert™ (I.E.). The new mainframe software tool that gives you the level of system integration that some companies have been promising. But not delivering. ■ I.E. is truly borderless. ■ It removes the barriers between systems. Between the individual user and accounts receivable. And accounts payable. And general ledger. And more. So that the individual user can retrieve information and design reports from several application programs at once, even if they aren't all MSA programs. Simply and quickly. At one online terminal. ■ And I.E. is designed to

Comdex/Fall '84

COMMON LANGUAGE SYSTEMS, INC.
Booth C1523

Common Language Systems, Inc. will introduce its Plain English programming language for computers operating under AT&T's Unix and Microsoft Corp.'s Xenix.

The language reportedly masks many of the technical aspects of Unix, allowing novice programmers to more easily develop applications software and enabling experienced programmers to more rapidly produce multiuser programs.

Common Language Systems will also display its version of Plain English for IBM PC-DOS and Microsoft MS-DOS-based microcomputers. The PC-DOS and MS-DOS version of Plain English is priced at $595. The Unix/Xenix version, which supports up to eight users, costs $1,295.

Common Language Systems, 100 E. Sybelia Ave., Maitland, Fla. 32751.

COMPUPRO SYSTEMS, INC.
Booth H7206

Compupro Systems, Inc. will introduce the Compupro 286 16-bit multiuser business system based on the Intel Corp. 80286 microprocessor and featuring 8-bit slave processing capabilities. The 286 comes standard with 512K bytes of main memory and a slave processing unit with Zilog, Inc. Z80 microprocessor, 64K bytes of random-access memory, one serial port, an 800K-byte 5¼-in. floppy disk drive, a 40M-byte hard disk, one parallel and one Centronics Data Computer Corp.-type printer port and four serial ports.

A four-user system costs $9,995.

Compupro Systems, 3506 Breakwater Court, Hayward, Calif. 94545.

DATACOPY CORP.
Booth H7517 (Hilton)

Datacopy Corp. will introduce its Model 700 Word Image Processing System office image processor. The company's Word Image Processing System and Character Image Recognition software integrates word processing and data base management capabilities with an image scanner.

The system allows office workers to process images, build documents and convert images or text to standard computer code for use with word processing software. The Model 700 features electronic half-toning, image editing and character-recognition capabilities. It costs $3,950.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

DIGITAL PATHWAYS, INC.
Booth 8326

Digital Pathways, Inc. will introduce two software packages for the IBM Personal Computer. The Soundware series of software is said to allow an IBM Personal Computer XT to perform intelligent telephone answering and management activities and other voice communications functions. A second package, Disk Preventative Maintenance (Disk P.M.) is said to perform preventive maintenance on hard and floppy disks for IBM Personal Computers and compatible machines. Disk P.M. is priced at $49.95, and the Soundware series is priced at $449.

Digital Pathways, 1060 E. Meadow Circle, Palo Alto, Calif. 94303.

EASTMAN KODAK CO.
Booth W606

Eastman Kodak Co. will introduce a line of floppy diskettes. The company will display its low-density 5¼-in. diskettes with storage capacities of 0.25M to 1M byte; its high-density 5¼-in. diskettes with storage of 1.6M or 3.3M bytes; and 3.5-in. diskettes with 0.5M bytes of storage.

The diskettes range in price from $3.85 each for the low-density models to $16.50 for the high-density models.

Eastman Kodak, 343 State St., Rochester, N.Y. 14650.

ERICSSON INFORMATION SYSTEMS
Booth M916

Ericsson Information Systems will announce the Ero-Intelligent line of IBM Personal Computer-compatible microcomputers based on the Intel Corp. 8088 microprocessor. The product has an ergonomic design incorporating enlarged alphanumeric keys, nonglare monitor and an adjustable display stand.

A 12-in. monochrome or color monitor is available. Interfaces include one RS-232 serial port and one Centronics Data Computer Corp.-type parallel port.

The price for the Ero-Intelligent micro with 256K bytes of random-access memory, monochrome monitor and dual-floppy disks with 360K bytes of storage is $3,295, the company said.

The price with 10M bytes of hard disk storage is $5,230, the company said.

Ericsson Information Systems, P.O. Box 2522, Greenwich Office Park 1, Greenwich, Conn. 06836.

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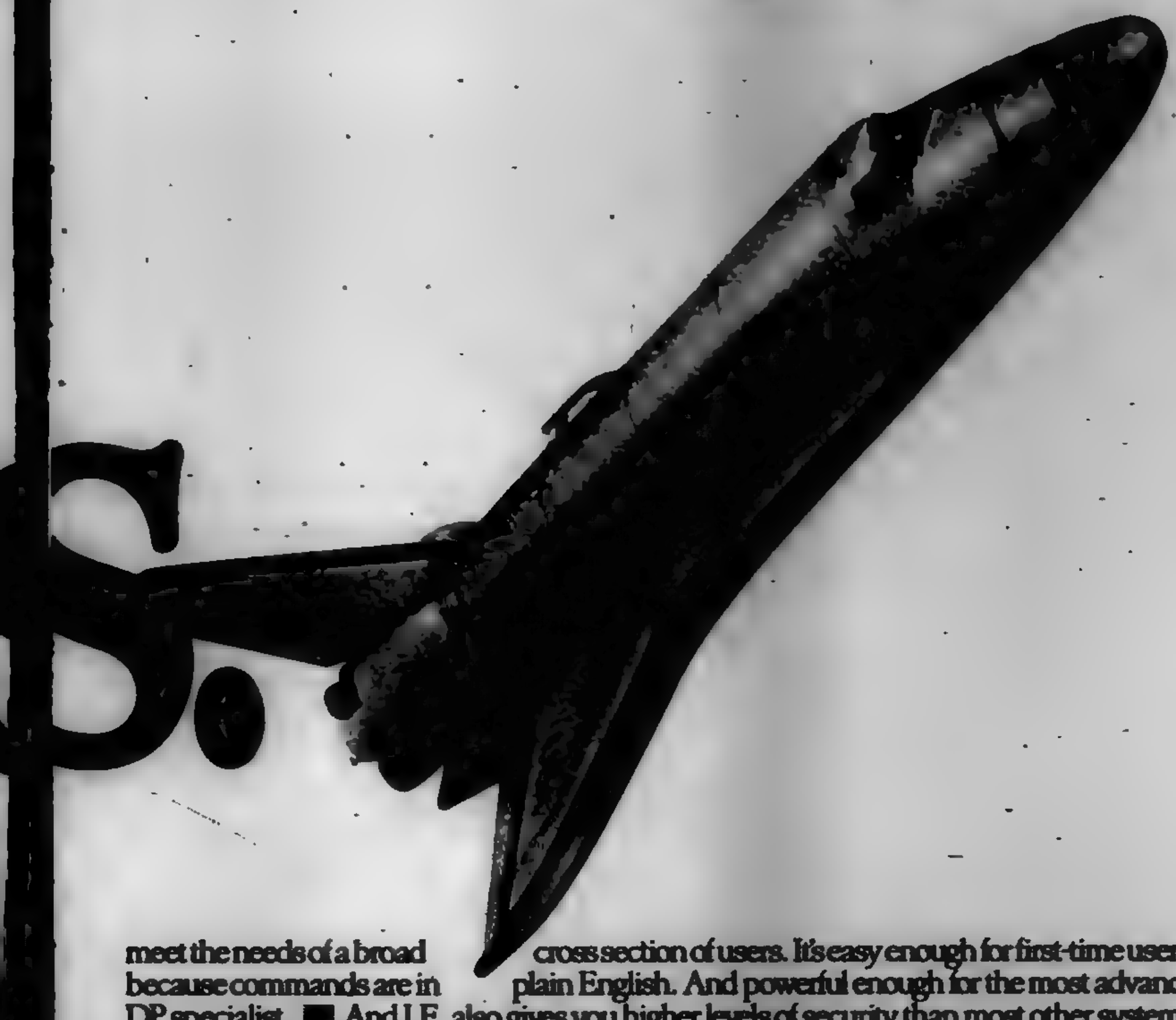

meet the needs of a broad cross section of users. It's easy enough for first-time users—because commands are in plain English. And powerful enough for the most advanced DP specialist. ■ And I.E. also gives you higher levels of security than most other systems. ■ Only MSA gives you I.E. ■ It's a giant technological step into the future from the company that has quietly led the way in application software development. It will now be a part of all software MSA provides. The result of 3½ years of intense research and development, it's the tool that has taken the concept of total "system integration" out of the realm of theory and into the realm of fact. ■ To find out more about I.E., contact Robert Carpenter at (404) 239-2000. ■ Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326. ■ I.E. from MSA. ■ It's one more way we're adding the genius to computers. ■ Today and tomorrow. ■ ©1984, Management Science America, Inc.

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FALCO DATA PRODUCTS, INC.
Booth 1301

Falco Data Products, Inc. will show its Fame II terminal with a Digital Equipment Corp. VT102 emulation option. The smart terminal is based on Ansi X3.64 standards with a 14-in. screen, IBM Selectric-style keyboard correction key, 50 nonvolatile user-programmable function keys and the ability to use double-wide and double-high characters.

Fame II costs $595.

Falco Data Products, 1286 Lawrence Station Road, Sunnyvale, Calif. 94089.

GENERAL POWER SYSTEMS
Booth 2365

General Power Systems will display its Memorygard II series of standby uninterruptible power systems. The series, said to feature 2-msec switching capabilities and internal battery times ranging from 15 to 18 minutes, includes 200W, 300W and 1-kVA models.

Pricing for the 200W model begins at $595 and for the 300W model at $695. Prices for the 1-kVA model begin at $1,295.

General Power Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

GOLD STAR ELECTRONICS INTERNATIONAL, INC.
Booth 4149

Gold Star Electronics International, Inc. will introduce eight new display monitors for a variety of home, hobby and office uses. Five monochrome models range from a medium-resolution, 9-in. amber composite signal input video display to a 12-in. amber, high-resolution (1,100 lines) transistor-to-transistor logic input video display.

Three color models range from a 12-in. low-resolution composite video display, to a 13-in. high-resolution (0.31mm dot pitch) model. Prices range from less than $150 for the basic monochrome model to less than $600 for the high-resolution color model.

Gold Star Electronics International, 1050 Wall St. W., Lyndhurst, N.J. 07071.

Not just graphics...
Genigraphics presentation power turns companies on.

GRAPHIC SOFTWARE SYSTEMS, INC.
Booth S8732

Graphic Software Systems, Inc. will show its chart-making software package aimed at the large corporate market. GSS-Plottalk runs on microcomputers under IBM's PC-DOS, Microsoft Corp.'s MS-DOS and most versions of AT&T's Unix operating systems.

The software features free-format English commands to create presentation-quality charts and produce all major data representation chart types.

It requires 256K bytes of memory and needs graphic support software drivers for device independence. The software is available to OEMs and costs $150.

Graphic Software Systems, 25117 Southwest Pkwy., Wilsonville, Ore. 97070.

ISOTRON, INC.
Booth CT716

Isotron, Inc. will display two new lines of its Ohio Scientific microcomputers, the 235 series and 345 series.

Both computers utilize 5¼-in. hard disk technology. The 235 can accommodate from two to four users, while the 345 series is expandable to eight users.

Prices begin at $6,695 for the two-user Model 235 G 2 and under $10,595 for the Model 345 I.

Isotron, 140 Sherman St., Fairfield, Conn. 06430.

I³ INTERFACE, INC.
Booth H7245

I³ Interface, Inc. will be exhibiting five new storage products for the IBM Personal Computer and compatibles market.

IBM-formatted storage capacities of 55.7M, 87.7M and 119.7M bytes in I³'s external disk systems series include a 5¼-in. Winchester disk drive, controller, cabinet, power supply, I/O adapter and cable.

The I³Inth10, a 5¼-in. half-height internal disk system, has a 10M-byte formatted storage space with a data transfer rate of 5M bit/sec. The final product is I³TAP, a 5¼-in. half-height cartridge tape system that gives the user from 10M bytes to 60M bytes of formatted storage and includes a connector, cable, floppy interface and host adapter.

The external disk systems range from $5,200 to $7,900; the I³Inth10 internal disk system is $1,095; and the I³TAP tape system is priced at $1,045.

I³ Interface, 21101 Osborne St., Canoga Park, Calif. 91304.

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LIBERTY ELECTRONICS CO.
Booth H7536 (Hilton)

Liberty Electronics Co. will introduce two graphics terminals — the Freedom 240 Graphics/Ansi VDT and the Freedom 210 Graphics/Ascii VDT. The Freedom 240 is Digital Equipment Corp. VT220- and VT100-compatible, and is compatible with Tektronix, Inc. 4010 and 4014 graphics terminals. The Freedom 210 is compatible with Liberty Electronics' Freedom 200 VDT and emulates the Televideo Systems, Inc. 950 and Tektronix 4010 and 4014 terminals.

Both products offer 14-in., 132-col. alphanumeric display standards and feature 665- by 288-pixel resolutions. The Freedom 240 is priced at $1,395 and the Freedom 210 at $1,295. Both are scheduled for limited shipment in December and general release in January.

Liberty Electronics, 625 Third St., San Francisco, Calif. 94107.

MATRA COMMUNICATION, INC.
Booth 3126

Matra Communication, Inc. will exhibit its Scanset line of executive voice and data workstations. Scansets are desktop terminals that provide access to internal or external data bases.

A Scanset model with a built-in telephone handset for simultaneous voice and data capabilities is priced at $1,400, according to a vendor spokesman.

Matra Communication, 20705 Valley Green Drive, Cupertino, Calif. 95014.

MCBA, INC.
Booth 2121

MCBA, Inc. will feature the first nine packages in its line of manufacturing, distribution and accounting software running on the IBM Personal Computer XT under IBM's PC-DOS operating system.

The packages include accounts payable, accounts receivable, bill of materials processor, customer order processing, fixed assets and depreciation, general ledger, inventory management, payroll and purchase order and receiving.

Prices for the packages range from $700 to $1,500 per module, the vendor said.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

NESTAR SYSTEMS, INC.
Booth 4758

Nestar Systems, Inc. will demonstrate features of its local-area network products, the Plan 3000 and Plan 4000 series, which offer microcomputer, minicomputer and mainframe computer networking capabilities and include IBM's Systems Network Architecture gateway technology.

Prices of the Plan 3000 range from $10,000 to $15,000 and for Plan 4000 range from $20,000 to $40,000, according to the vendor.

The company will introduce a print server in the Plan 1000, the newest member of the Plan family, which will be driving Hewlett-Packard Co.'s laser printer and HP's Model 7550A color plotter. The price of the Plan 1000 products will range from $1,000 to $3,000, and the exhibited print server costs $1,995.

The company will also exhibit enhancements to IBM's PC Network products — Nestar's broadband network with IBM broadband and IEEE-802 broadband-compatible nodes. The broadband network gateway hub in a six-port configuration is $1,000.

Nestar will show its Planpak Multiuser Applications for several packages: Ashton-Tate's Dbase II; Sorcim Corp.'s Supercalc III and Superwriter; Software Connections, Inc.'s LAN:Mail Monitor and LAN:Datastore, which are bundled in the Plan 3000 and Plan 4000 series; Micro Data Base Systems' multiuser MDBS III; Cosmos, Inc.'s Revelation; and Information Builders, Inc.'s PC Focus.

Nestar Systems, 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

NOVELL, INC.
Booth 3244

Novell, Inc. will unveil Advanced Netware 1.0, said to link separate local-area networks using multiple file servers and network bridges.

Advanced Netware reportedly allows simultaneous use of files from file servers on different networks, including Datapoint Corp.'s Arcnet, Corvus Systems, Inc.'s Omninet, Xerox Corp.'s Ethernet and IBM's PC Network, among others.

The product will support workstation access to as many as eight file servers simultaneously, according to the vendor. Advanced Netware is said to provide improvements in network functionality and reduced record locking. Pricing begins at $1,495.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

OKIDATA
Booth 3300

Okidata will exhibit two printers, the full-color Okimate 20, and the Microline 182 dot matrix printer. The

Continued on page 32

WHAT THEY CALL A PORTABLE, WE CALL A LOAD.

Today, almost everyone claims to have a portable computer. The problem is, almost no one does. Most portables have a separate data storage device, separate printer, separate modem, and some even require a separate monitor or bulky battery pack that can make them a liability on the road.

The Sharp PC-5000, on the other hand, is a true portable. It's a compact 16 bit, 128K microprocessor (expandable to 320K) with 192K of ROM, an 80 character display screen, removable bubble memory storage, built-in rechargeable power source and bundled software. It's also available with options like an integrated modem that lets you connect with your mainframe and an integrated correspondence-quality printer which doesn't increase the size of the system. And even with all these features, the PC-5000 fits neatly into a briefcase and weighs under 14 pounds. Almost 25% less than its nearest major competitor. At a price that's lighter, too.

Of course, there's one thing about the PC-5000 that isn't small. Its working capacity. It functions as a desktop computer. And is compatible with a wide variety of MS-DOS* software.

So if you need a truly portable computer, look into the Sharp PC-5000. The one that may be the smallest, lightest—and the best value for the money. In short, a computer that will lighten your work load. Not add to it.

For more information call 1-800-BE-SHARP or fill in the coupon.

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Okimate 20 uses a standard parallel interface and an IBM-compatible interface, allowing the machine to emulate the IBM 5251 graphics terminal.

The product is said to include a 24-element print head and works at speeds of 80 char./sec for draft type and 60 char./sec for correspondence-quality type.

The Microline 182 reportedly uses a standard Centronics Data Computer Corp. interface and works at speeds of 120 char./sec.

The Okimate 20 sells for $268, and the Microline 182 sells for $299, the vendor said.

Okidata, 532 Fellowship Road, Mount Laurel, N.J., 08054.

PLEXUS COMPUTERS, INC.
Booth 2388

Plexus Computers, Inc. will unveil its one- to eight-user Plexus P/15 32-bit supermicrocomputer designed to run on AT&T's Unix. The P/15 features two Motorola, Inc. 68010 microprocessors, a memory capacity of up to 2M bytes and eight full-duplex serial ports for terminals or other peripherals.

The P/15 allows for up to 54M bytes of disk storage in two Winchester-type disks, plus a single 5¼-in. double-sided, double-density floppy disk, and uses standard 115-Vac power. The I/O processor handles all character I/O to and from the eight serial ports.

The price of the P/15 is $10,950 with 500K bytes of random-access memory and 12M bytes of Winchester disk storage, plus a 1M-byte floppy disk drive.

Plexus Computers, 3833 N. First St., San Jose, Calif. 95134.

PRENTICE-HALL, INC.
Booth W906

Prentice-Hall, Inc. will display tutorial books and software published under a joint venture with IBM, as well as its Profit Center accounting software and Skiwriter II word processing software.

The tutorials deal with popular software packages such as Ashton-Tate's Dbase II and are priced from $29.95 to $39.95.

Three modules for the Profit Center will be introduced: Job Cost, priced at $695; Job Estimator, priced at $395; and Information Query, a general accounting report manager priced at $250. The Profit Center runs on the IBM Personal Computer family and compatibles, on the Texas Instruments, Inc. TI Professional and Wang Laboratories, Inc. Personal Computer.

Skiwriter II costs $99 and is designed for the IBM Personal Computer and IBM PCjr.

Prentice-Hall, Englewood Cliffs, N.J. 07632.

PRINTEK, INC.
Booth 1101

Printek, Inc. will display its Model 935 printer, which the company said will operate with most microcomputers.

The printer features a nine-wire print head and offers a high-resolution 36- by 18-char. matrix. It uses a dual-pass, single-return, unidirectional printing method with the head shifting on second pass to produce better quality in executive-quality or letter mode, according to the vendor. It features dual speeds, with both traction and friction feed, and it can perform medium and high-density graphics and data processing with spreadsheets of up to 220 columns and using up to 16-in. paper.

The Model 935 printer is priced at $1,695.

Printek, 1517 Townline Road, Benton Harbor, Mich. 49022.

QUADRAM CORP.
Booth [illegible]

Quadram Corp. will show several expansion products for the IBM Personal Computer, Personal Computer XT and PCjr.

Maxpaq is a memory expansion card for the short slot of the IBM Personal Computer XT. A 384K-byte card is $595.

Quadsprint, an enhancement board to upgrade the IBM Personal Computer and Personal Computer XT, is priced at $645.

The Quadmemjr expansion card for the PCjr provides an additional 128K to 512K bytes of memory at $275.

The Quadjr Expansion Chassis provides 360K-byte floppy disk drives for the PCjr and is priced at $895.

The Quadjr Memory Board, for use with the Quadjr Expansion Chassis, comes with 128K bytes of memory installed and is socketed for up to 384K bytes. It is priced at $275.

The Two Meg Card memory expansion card for the Personal Computer or Personal Computer XT provides 2M bytes of memory and is priced at $3,495, fully loaded.

Palette Master is a high-resolution color graphics adapter for photo-like images. It is priced at $695.

The Quadtape line of four internal or external streaming tape products ranging from 20M- to 60M-byte capacities is priced from $1,395 to $1,895.

Quadram, 4355 International Blvd., Norcross, Ga. 30093.

SOFTWARE SOLUTION

IBM/PC* or XT*| Plus Compatibles and Popular MS-DOS** Micros.

TEMPUS-LINK & TEMPUS-DATA

Tempus-Link and Tempus-Data are highly advanced, yet easy to use tools for corporate micro and mainframe computer users. Their synergy and flexibility meet the needs of both non-technical and expert users.

Tempus-Data's dictionary provides security and access management at the field level for all specified databases and mainframe files. This access restriction is personalized to each micro user.

Tempus-Data can be used on-line to provide quick response to your high-priority requests. Yet, precious mainframe resources can be conserved by deferring less pressing requests to batch mode execution.

Tempus-Link and Tempus-Data's Open Architecture allows DP experts to build complex micro applications where mainframe access is totally transparent to the micro user, and this from virtually any user-designed and packaged micro application.

Tempus-Link's unique virtual disk system gives Tempus-Data users direct on-line and batch access to files stored on their mainframes but written in micro formats such as CSV and DIF**. Information Management and Data Control suddenly becomes simplified to DP professionals because micro files are now read and written in micro format through existing mainframe resources and even without tricks.

Micro Tempus recognises that high-quality corporate information is a time-sensitive commodity. Its integrated approach assures that the data provided to the micro user can be kept in synch with the mainframe's version.

Tempus-Link and Tempus-Data from Micro Tempus – a modest investment in personal productivity – a cornerstone in developing the office of the future today.

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NEWS

Comdex/Fall '84

SANYO BUSINESS SYSTEMS CORP.
Booth 803, West Hall

Sanyo Business Systems Corp. has announced the MBC 775 Portable Computer, which is compatible with the IBM Personal Computer.

The MBC 775 features an Intel Corp. 8088 microprocessor, Microsoft Corp.'s MS-DOS operating system, 256K bytes of main memory, two 360K-byte, 5¼-in. floppy disks, a 9-in. monitor and Centronics Data Computer Corp.-type port. The price for the MBC 775 is $2,599, the vendor said.

Sanyo, P.O. Box 387, 51 Joseph St., Moonachie, N.J. 07074.

SEAGATE TECHNOLOGY, INC.
Booth 4206

Seagate Technology, Inc. will reportedly introduce a number of Winchester disk drives.

They will include a 10M-byte formatted, 3½-in. Winchester disk drive priced at under $450 in OEM quantities of 1,000 or more; and a 20M-byte formatted, half-height, 5¼-in. disk drive, priced at $525 in quantities of 1,000 or more.

Also featured will be the ST 4000 series of Winchester disk drives, ranging in capacity from 20M to 40M bytes and ranging in price from $730 to $975 in OEM quantities of 1,000 or more.

Seagate Technology, 920 Disk Drive, Scotts Valley, Calif. 95066.

SOFTRAN CORP.
Booth 932

Softran Corp. will feature a multiuser accounting system designed for IBM's Personal Computer AT.

The software, which consists of six modules — accounts receivable, accounts payable, inventory, payroll, sales order and general ledger — will run under Microsoft Corp.'s Xenix 3.0.

Price of the multiuser system is $795 per module.

Softran, 153 Pierrepont St., Brooklyn Heights, N.Y. 11201.

'Polly wants a password.'

STM ELECTRONICS CORP.
Booth A900

STM Electronics Corp. will unveil its upgraded portable personal computer that provides two-way communications between field personnel and their corporate data bases.

STM added an internal 1,200 bit/sec modem to its STM Personal Computer, which has a 25-line by 80-line LCD and is memory upgradable to 512K bytes. The machine weighs 17 lbs.

The price of the upgraded machine is $3,799, STM Electronics said.

STM Electronics, 535 Middlefield Road, Menlo Park, Calif. 94025.

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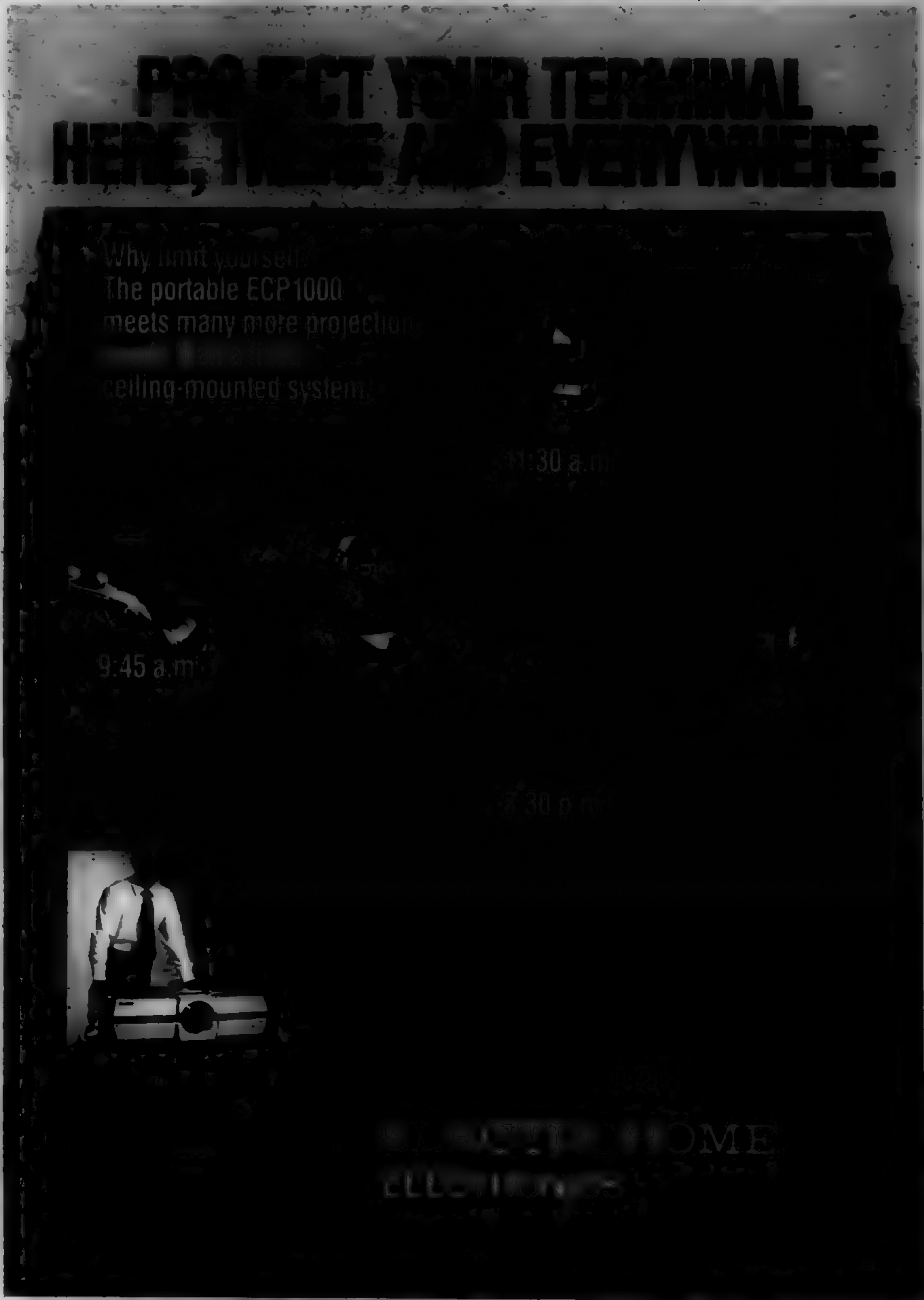

Comdex/Fall '84

SUPPORT SYSTEMS INTERNATIONAL
Booth [illegible]

Support Systems International will exhibit the full line of computer cables, desktop data switches and related computer products it manufactures.

Support Systems' product line incorporates a full range of interconnect hardware for microcomputers, minicomputers and mainframes, according to the firm.

The company will display its line of Federal Communications Commission-standard double-shielded cables, standard shielded cables and products for computer installations that include rack-mountable junction and patch panels, rack cabinets, breakout boxes, pocket cablers, bulk plenum and cable and connectors, a spokesman said.

Support Systems will also introduce Micro-Match, a product designed and updated by Command Computer Corp. of Philadelphia.

Micro-Match is said to provide instruction on interfacing microcomputers to printers, CRTs, modems and plotters; micros to minis; and micros to mainframes.

Micro-Match provides pin-to-pin cable designs, switch-setting diagrams and jumper configurations.

The price for the Micro-Match service is $690 per year, the vendor said.

Support Systems International, 150 S. Second St., Richmond, Calif. 94804.

TALUS CORP.
Booth C84

Talus Corp. will introduce the Talus Image Management System, which incorporates the T20/20 Personal Computer Image Scanner; the T20/22 Image Converter Board; and Talscan Image Management software.

The products are intended for use with the IBM Personal Computer, Personal Computer XT and compatible machines, the company said.

The price of the T20/20, which offers 200- by 200-pixel resolution, is $4,995, according to the vendor.

The T20/22 Image Converter Board is a standard-size, Personal Computer XT printed-circuit board that features direct memory access for disk storage of images. Approximately 200 standard-size pages can be stored on a 10M-byte Winchester disk, the company said.

The price of the T20/22 is $1,295, according to Talus.

Talus, 985 University Ave., Los Gatos, Calif. 95030.

TRW, INC.
Booth 873

TRW, Inc.'s customer service division will feature various service offerings to resellers and users of microcomputer products.

The company's latest service, named Product, is a mail-in program designed for the repair of Winchester drives and diskette drives, the vendor said.

The company will also demonstrate the features of its service programs designed for distributors and value-added resellers, according to a spokesman.

TRW, 15 Law Drive, Fairfield, N.J. 07006.

UNIFY CORP.
Booth [illegible]

Unify Corp. will demonstrate the recently approved Independent Software Information Standard (Isis). Isis is a standard software interface for third-party applications using the AT&T Unix operating system.

Developed in part by Unify President Nicholas Nierenberg, Isis has been implemented on AT&T Information Systems 3B2 microcomputers running on the Unix operating system. It reportedly gives users access to integration of applications software packages.

Unify, 4000 S.W. Kruse Way, Lake Oswego, Ore. 97034.

NTIS software directory out

SPRINGFIELD, Va. — Five-hundred programs developed by more than 100 federal government agencies are listed in the 1984 edition of the *Directory of Computer Software* published by the National Technical Information Service (NTIS).

The directory offers brief summaries that describe each program, the programming language the software was written in and its hardware requirements. Each entry is indexed by number, subject, source agency, hardware and language.

Federal agencies, including the Department of Defense, the National Bureau of Standards and the Department of Energy, make their programs and documentation available to users through NTIS. Available packages include applications and graphics software, a variety of software tools and modeling and simulation programs.

The 1984 *Directory of Computer Software* is priced at $40 from NTIS, 5285 Port Royal Road, Springfield, Va. 22161.

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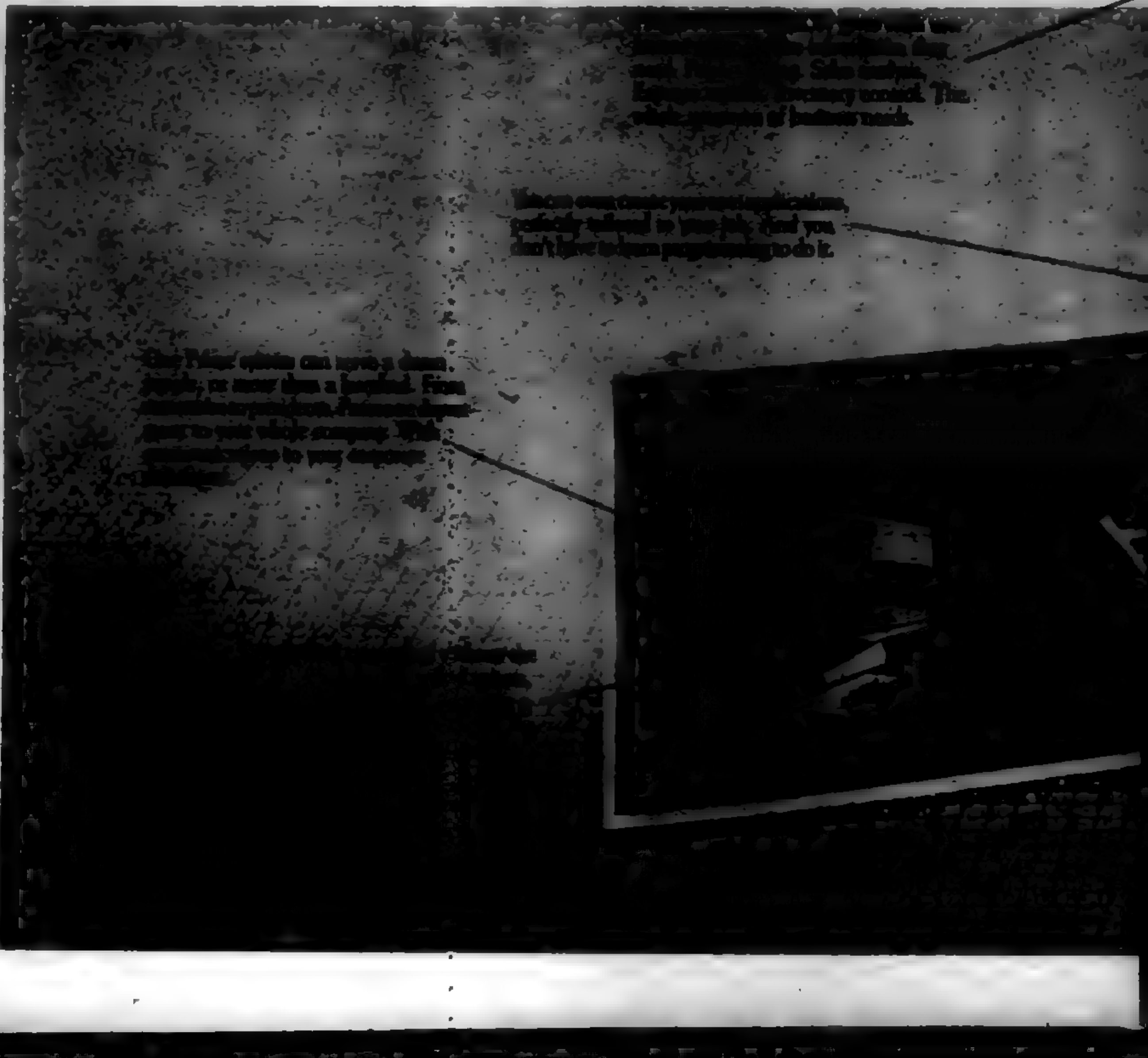
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[illegible] perfectly tailored to your job. And you don't have to learn programming to do it.
[illegible]

Voice system tunes up automaker's communications

DEARBORN, Mich. — Simple telephone communications did not do the job for Ford Motor Co. when it needed to stay in touch with a mobile sales force.

Field managers often were on the road and wasted time playing "telephone tag," when the people they needed at a district office were away from their desks and the traveling sales managers themselves were hard to reach. Even returned calls sometimes missed connections when the original caller became unavailable.

The automaker decided to try a voice messaging system and, after studying the proposals of three vendors, launched pilot programs at two sales offices in February 1983.

The successful pilot programs led to a permanent and growing system in which the company has 2,000 voice mailboxes and hopes to establish 30,000 mailboxes worldwide in the coming years.

Ford officials said the system produced by VMX, Inc. of Richardson, Texas, is saving the company communications costs and lost man-hours while improving productivity.

"We've reduced the amount of telephone calls and telephone tag in the field by installing the voice mail system. I think that in the long term, this will be the best way to improve our productivity," said Jim Soma, director of telecommunications services for Ford.

Soma said that while the voice messaging system is now used only in Ford's facilities here, it will be expanded nationwide and then worldwide.

He said it can help to overcome worldwide time differences — differences that leave Ford only a four- to five-hour business day "window" to communicate with its personnel in England and "virtually no window" in Australia and Japan.

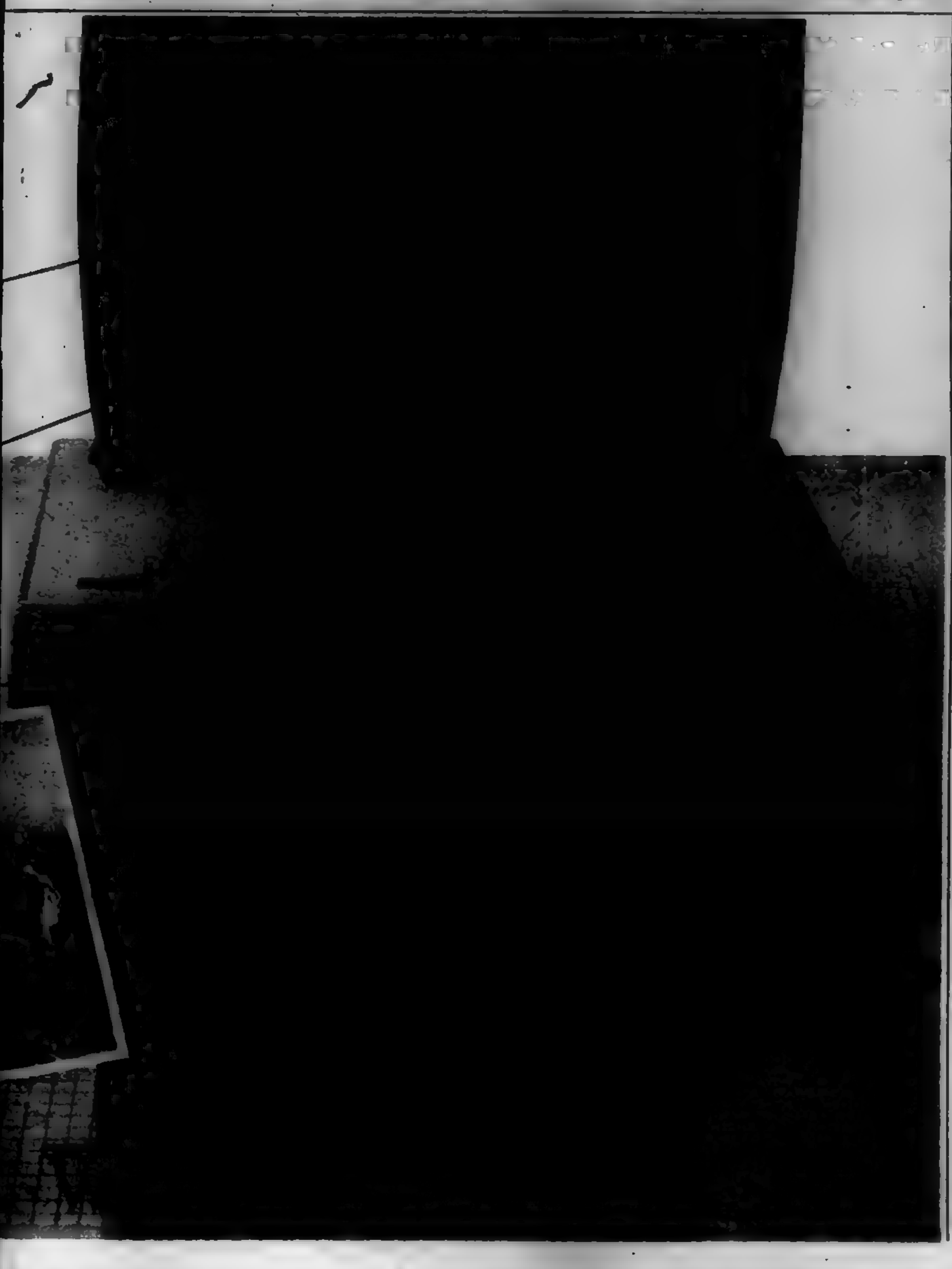
He said that the system will first be extended to the Los Angeles area in 1985.

The VMX system, Voice Message Exchange, uses a store-and-forward technology. Using an 800 number, an employee calls his office and, if the person he is calling is out, the employee leaves a message in an electronic mailbox. The caller also can check his own mailbox for messages and forward replies to others by pressing digits on the telephone set.

A Ford official said that advantages in the voice message system include eliminating interruptions of calls by incoming calls and the ability of the system to handle complicated messages with voice inflections and accents.

He said that equipment for the system was leased during the pilot phase, when 480 people had access to voice messaging, but that Ford began purchasing the equipment in January 1984. Four months later, the number of mailboxes had soared to 1,500.

One potential use for voice messaging, according to Ford, is in order processing, where dealers could call to order specific changes in cars scheduled for production. With the appropriate telephone lines frequently busy, the dealers could order changes at the touch of a telephone key.



DP conference to chart legal issues of micros

CHICAGO — Legal issues involving computers and the impact of the portable computer on corporate strategy are among the topics to be discussed at sessions scheduled for Info/Central: The Information Management Exposition and Conference, to be held Feb. 20-22 at the O'Hare Exposition Center here.

Info/Central will feature three days of conference sessions, with about 10 sessions each day. The show will concentrate on business applications of computers and communications systems.

The show's theme will be "Information Systems and the Executive Decision Maker."

Info/Software: The Information Management Exposition and Conference for Software will be held concurrently with Info/Central at the same location.

Cost of the exhibits for both Info/Central and Info/Software will be $5 for preregistrants and $20 on the day of the show. Info/Central and Info/Software sessions will cost $85 for a half day, $150 for one day and $295 for three days.

More information is available from Info/Central, 999 Summer St., Stamford, Conn. 06905.

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OA outlays see significant rise

NEWPORT BEACH, Calif. — Expenditures for office automation are expected to increase significantly over the next two years, surveys from a national accounting firm indicate.

The two separate surveys, while not identical, were both conducted by the Newport Beach, Calif., and Chicago offices of Price Waterhouse & Co.

In California, respondents represented 43 companies in a variety of industries, including financial services, manufacturing, food service and state and local government. Surveys were distributed to 200 Orange, Riverside and San Bernardino County companies with revenues of more than $10 million.

According to the survey, "within two years, approximately 75% of all the companies [surveyed] intend to have implemented all the [OA] applications included in the survey." Those applications include word processing, spreadsheet analysis, text editing, graphics, microcomputer data base management, scientific engineering analysis, document transmission, project management, electronic filing, electronic mail and executive calendar and scheduling.

Workstations doubled

The survey also said the companies are planning to double their number of workstations in the next two years. It noted a 210% planned increase in the use of micros at these companies. Word processing functions are expected to grow 144%, the survey said.

More than 50% of the companies studied in California had revenues of more than $50 million; of those, 23.7% had assets greater than $500 million.

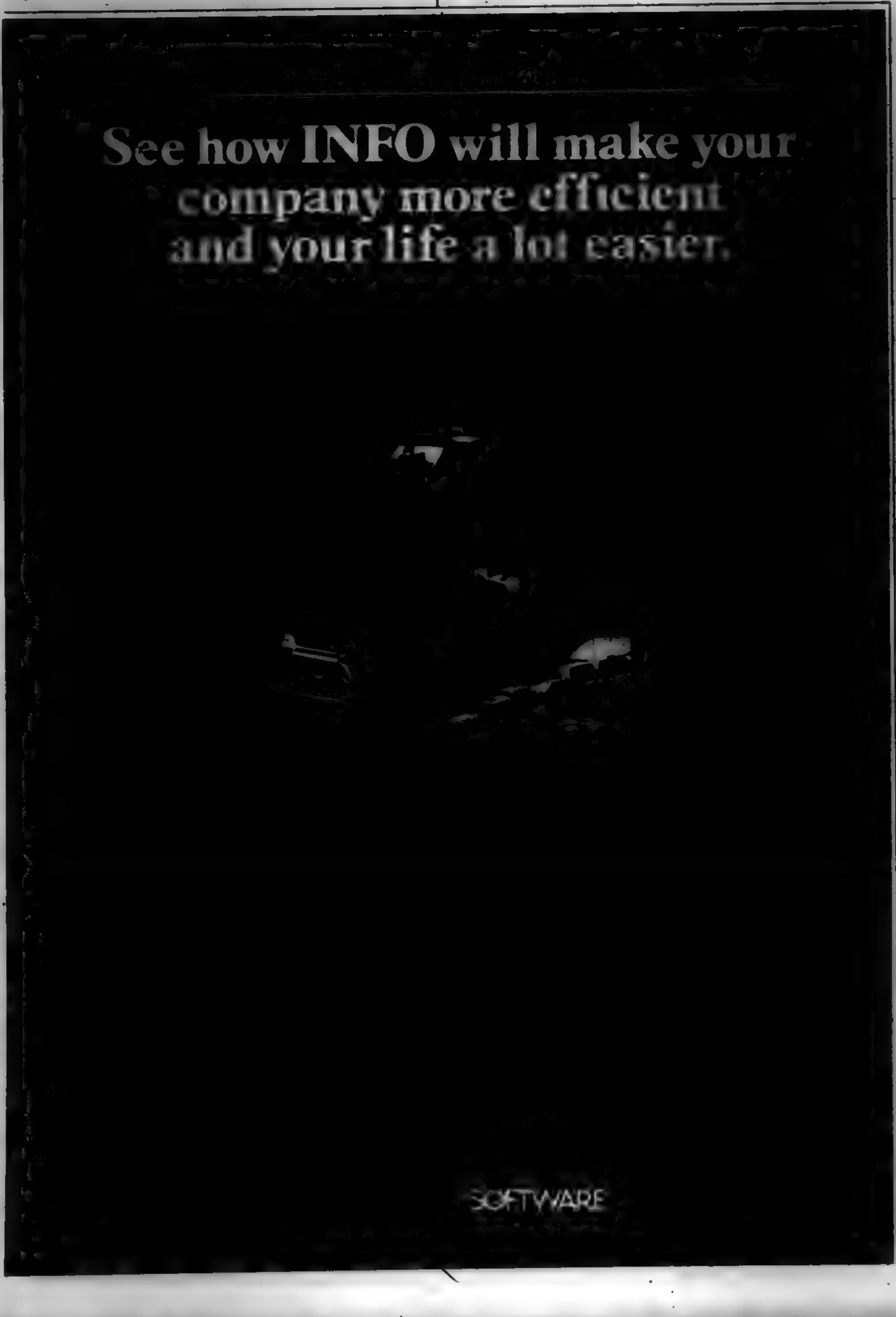
The Price Waterhouse survey of OA in the Chicago area found that 75% of those surveyed plan to expand their current OA department or open new branch offices within the next two years.

Twenty-six firms from a variety of industries, except law firms and government agencies, responded to the Chicago survey. Half of the companies with 1983 revenues of more than $50 million said they spend between $100,000 and $500,000 annually on their purchased and leased office systems equipment and software.

In the California study, the average investment in workstations per worker ranges from approximately $500 in large companies to $1,000 in small firms. The survey noted that the reason technology investments are higher for smaller companies could be because some smaller firms are buying more, less expensive micros.

The survey also found that there is approximately one workstation for every five white collar workers. In two years, the survey said, one workstation will accommodate two to three white collar workers. Investment in workstations will range from $5,900 per worker at large companies to $1,000 per worker at small companies.

Also in California, the survey found that word processing, text editing and spreadsheet analysis are the most extensively used applications in the office. Although about 98% of the respondents said they used automation for word processing, only 50% said it was "widely used" for these purposes.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SOFTWARE

NEWS

OA effort spans work force at national insurance firm

By Edward Warner
CW Staff

WORCESTER, Mass. — An office automation plan that puts workstations on the desks of secretaries and middle managers is not news. But one that brings computing power to 900 out of a firm's 1,200 employees — from chief executives to mail room clerks — is a bit out of the ordinary.

Such an OA implementation is currently under way at the Paul Revere Life Insurance Co.'s national headquarters here. The insurance and annuity firm, a subsidiary of Avco Corp. with 150 branch offices nationwide, is undertaking a $3.5 million project to put either personal computers or terminals, all linked to the firm's mainframe-based OA software, on the desks of employees who can benefit from them.

The OA plan, set for completion by the end of 1985, relies entirely on IBM equipment. In all, 110 IBM 3178 terminals, 130 IBM 3290 terminals and 50 terminals for development work will join the 450 to 500 IBM 3178 and 3278 terminals already in use by the firm. Also involved are about 50 IBM 3270 Personal Computers, the computer of choice for, among others, the firm's vice-presidents who usually can avoid dealing with computers.

Top management was one of the first groups within the firm to be brought under the OA implementation, according to Executive Vice-President for Operations Charles E. Soule, who now has a 3270-PC on a table near his desk in his expansive office. Soule said he uses the computer to access mainframe OA software — IBM's Professional Office System (Profs) running on an IBM 3033 under VM — for calendar and electronic mail features, and he uses those functions "to plan a meeting without having to get on the phone."

Some aren't ready

Among the top managers, the OA implementation — similar equipment is now on the desks of the heads of marketing, finance, human resources and legal departments — is still only in the trial stage, and Soule observed that, while most managers find OA useful, "I think we'll find some instances where they're simply not ready for it."

One executive who isn't ready to have a computer or terminal on his desk is the firm's president, Soule said. But, "when the monthly financial report is available one day earlier on the terminal, he may want one," Soule added.

At the other end of the work force hierarchy, employees not often considered knowledge workers, such as those working in the firm's mail room, will also be studied as the implementation progresses to see if they can benefit from access to Profs or the corporate data base.

Computer terminals in the mail room actually make a good deal of sense, according to Lois F. Heiniluoma, director of data processing administration and one of those spearheading the implementation effort. "That person [in the mailroom] is working with a lot of packages; that person needs to know what was ordered and the day it shipped," she said, adding that such questions can be quickly answered by accessing the corporate data base.

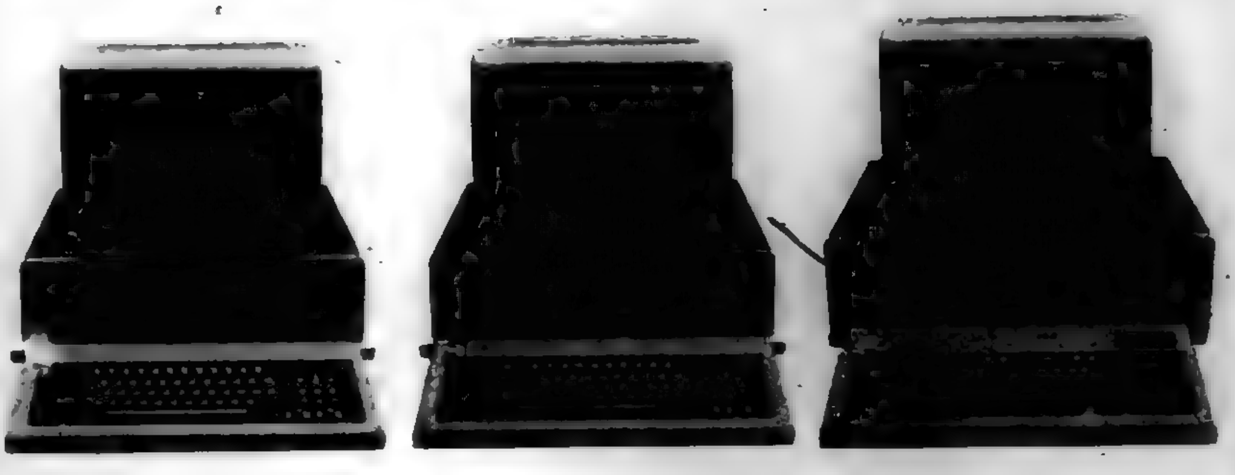
Not every mail room employee will get a computer or a terminal, Heiniluoma said, but at least the supervisor and one or two key coworkers will have them — a situation, she said, that will be replicated in the firm's shipping and receiving department.

Conventional wisdom had held that a firm's uppermost and lowermost employee levels offer the great-

See OA page 39

Domingo works with Profs.

PICK ONE.



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Users applaud PE superminis; software still an obstacle

By Charles Babcock
CW New York Bureau

> *'When we get into selling software, it's a liability to be on PE. We are still evaluating whether we want to be in that market. If we do, we would have to buy an IBM 4300 and make massive conversions of our programs.'*
>
> — Cynthia Jeness, Hazelhurst & Associates, Inc.

CHERRY HILL, N.J. — When Hazlehurst & Associates, Inc., an Atlanta employee benefits consulting firm, bought a computer system seven years ago, it didn't plan on selling software.

The firm bought Perkin-Elmer Corp. superminicomputers — two 3230s and a 3210 — for its Seattle branch. The move freed Hazlehurst from dependence on time-sharing and on an old Honeywell, Inc. mainframe that, according to the company, filled a room.

"At that time they [PE] were one of the few 32-bit producers [selling] at a reasonable price. PE did the best of the 15 vendors we tested," said Cynthia Jeness, consulting actuary and one of 300 PE customers at the Interchange '84 users group meeting held here recently.

Digital Equipment Corp. and Prime Computer, Inc. 32-bit machines were double the price of PE machines at the time, Jeness said. PE also had a good optimizing compiler for quick processing of Fortran code, she added.

Jeness and Lori B. Comer, Hazlehurst's Seattle systems analyst, said PE's relational data base management system, Reliance, was being updated regularly and functioned well for tracking and calculating employee benefits. PE's latest version of its OS/32 operating system, Revision 7.2, is "probably the best release they've put out," Jeness said.

So what's wrong with being a PE customer?

One of the new facets of Hazlehurst's business is selling employee benefit programs to clients who want to run them on their own equipment. Most of the clients are businesses, and most of their equipment is IBM.

"When we get into selling software, it's a liability to be on PE," Jeness said. "We are still evaluating whether we want to be in that market. If we do, we would have to buy an IBM 4300 and make massive conversions of our programs."

Robert L. Dalton, corporate manager of DP for the Frank Edwards Co., Burlingame, Calif., said he is happy with a new PE system that connects 45 terminals and 16 printers in an auto parts distribution network.

Dalton reviewed five superminicomputer systems before deciding on PE 18 months ago. "[PE] guaranteed a good response time and the system has lived up to it," he said.

Robert Wallace, a director of Cranfield Data Systems of Bedford, England, and Phoenix and president of the Interchange users group, said PE is noted among its customers for producing "exceptionally good, reliable hardware."

Wallace said the company's software has been the target of criticism, but "is getting better."

OA

from page 38

est resistance to adopting OA for themselves, but Heiniluoma said the implementation effort has not met with resistance from prospective users. "It's been more of a problem holding them back," she claimed.

One current user of the Profs system, Director of Value Analysis William J. Domings Jr., said he has become very dependent on his system. When a change of offices temporarily took him away from it, he said he "went nuts."

Heiniluoma said the implementation will succeed, if the managers of each department it will affect are convinced that improving productivity by as much as 30% to 40% — with no corresponding drop in labor costs — will still have an impact on their departments' bottom line.

Otherwise, Heiniluoma said, the OA implementation is going smoothly, which she attributes to the fact that "we've done our homework." That homework consisted of a two-year, preimplementation study, the pilot project of which gave 75 people access to Profs. Those workers made a 13% productivity improvement, she said.

If the firm only achieves a 5% productivity boost from its new OA system, the system will pay for itself in three years, she said. If the firm gets only a 2.5% productivity gain, she continued, it will still receive a return on its investment equivalent to having put the $3.6 million in a bank account — at 28.7% annual interest.

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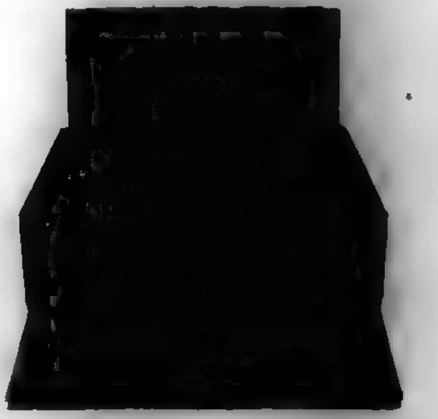

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Ireland seeking high-tech relief for unemployment

By Paul Gillin
CW Staff

DUBLIN — After nearly 150 years of steady population decline, the Irish Republic is facing an unaccustomed situation — a population explosion. The increase has been so pronounced that today 50% of Ireland's population is under the age of 25.

For the Emerald Isle, this new development is a mixed blessing. While Ireland now stands poised for its first period of steady economic growth since it became a republic in 1922, the specter of unemployment looms larger than ever. For example, the International Organization for Economic Cooperation and Development (OECD) estimated recently that Ireland's unemployment rate will increase to 18% in 1985 from its current level of 14%.

In contrast, neighboring Britain's jobless rate will fall slightly to about 11.3%, the OECD stated.

Like many countries, Ireland has watched its manufacturing industry sputter over the last 10 years. Now, in an effort to bring more foreign money into the country, the government has undertaken a dramatic and wide-ranging project to attract high-technology investment. By most accounts, the effort has succeeded admirably.

The basis of the new incentive is a maximum 10% corporate tax rate for manufacturing profits in Ireland through the year 2000. The duty applies to all goods manufactured in the country, no matter where they are sold. The tax benefits also apply to software and DP services.

In addition, the government offers a 100% depreciation allowance with accelerated depreciation provisions that can effectively reduce the net tax rate for many companies to zero during their first few years of operation. The government has also created the Irish Development Authority (IDA) and endowed it with a large budget to aid foreign firms in setting up shop in Ireland. The IDA not only cuts through bureaucratic red tape, but also helps companies find prime manufacturing locations and administers a nationwide network of technical training centers.

In terms of attracting businesses, the Irish government's strategy has seen impressive results. More than 100 high-tech companies have established manufacturing and development facilities on the island. The government estimates the output of the Irish electronics industry will exceed $2.5 billion in 1985. More than half the foreign investment in Ireland is from the U.S.

The favorable tax rate has been the prime impetus. As a member of the European Economic Community, Ireland offers tariff-free access to nearly 300 million consumers. That, combined with the low taxes, has prompted several high-technology companies to base their European manufacturing and distribution centers on the island.

However, the investment has not translated into relief for Ireland's burdensome unemployment. High technology has added only about 20,000 new jobs, most of them among skilled workers. The IDA acknowledges that high tech will never provide significant opportunities for Ireland's unskilled and semiskilled work force.

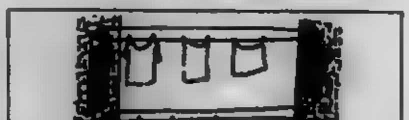
Rather, the country hopes that electronics will create a stronger service sector to handle the infusion of foreign money onto the island. And in the near term, the government is concerned with retaining its stock of skilled workers before they seek employment elsewhere.

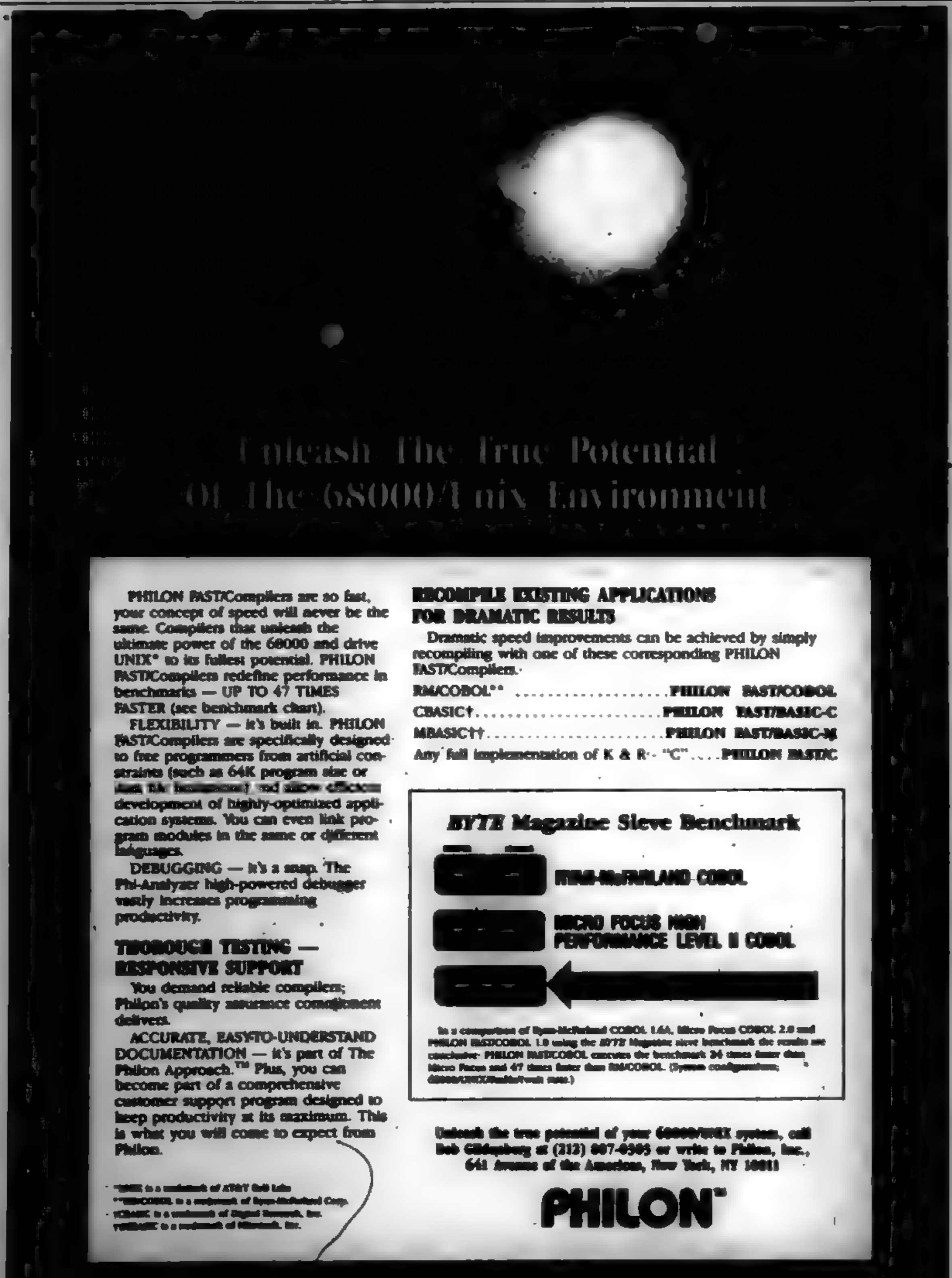
Education is Ireland's trump card. The youth of the country's population offers a motivated and energetic work force that is also increasingly well versed in the sciences. Major institutions like University College, Dublin, University College, Cork, Galway University and Trinity College have been beefing up their technical education offerings with government help. According to government figures, 61% of the institutions now offering degree and diploma or certificate programs were established in the last 15 years. Equally important, the government has taken steps to open up the traditionally rigid university system to a larger number of students.

The National Industrial Training Authority also administers a network of 17 training centers around the country. These heavily subsidized institutions offer introductory and continuing education to workers in technical fields and are another source of trained local talent.

Despite its success in attracting high-tech companies, Ireland is still worried about the flight of skilled young professionals from the country. Salary levels for computer professionals, for example, are about half to two-thirds as high as those of their American counterparts and lower than salaries in continental Europe. However, the government believes most of those professionals are

See RELIEF page 41

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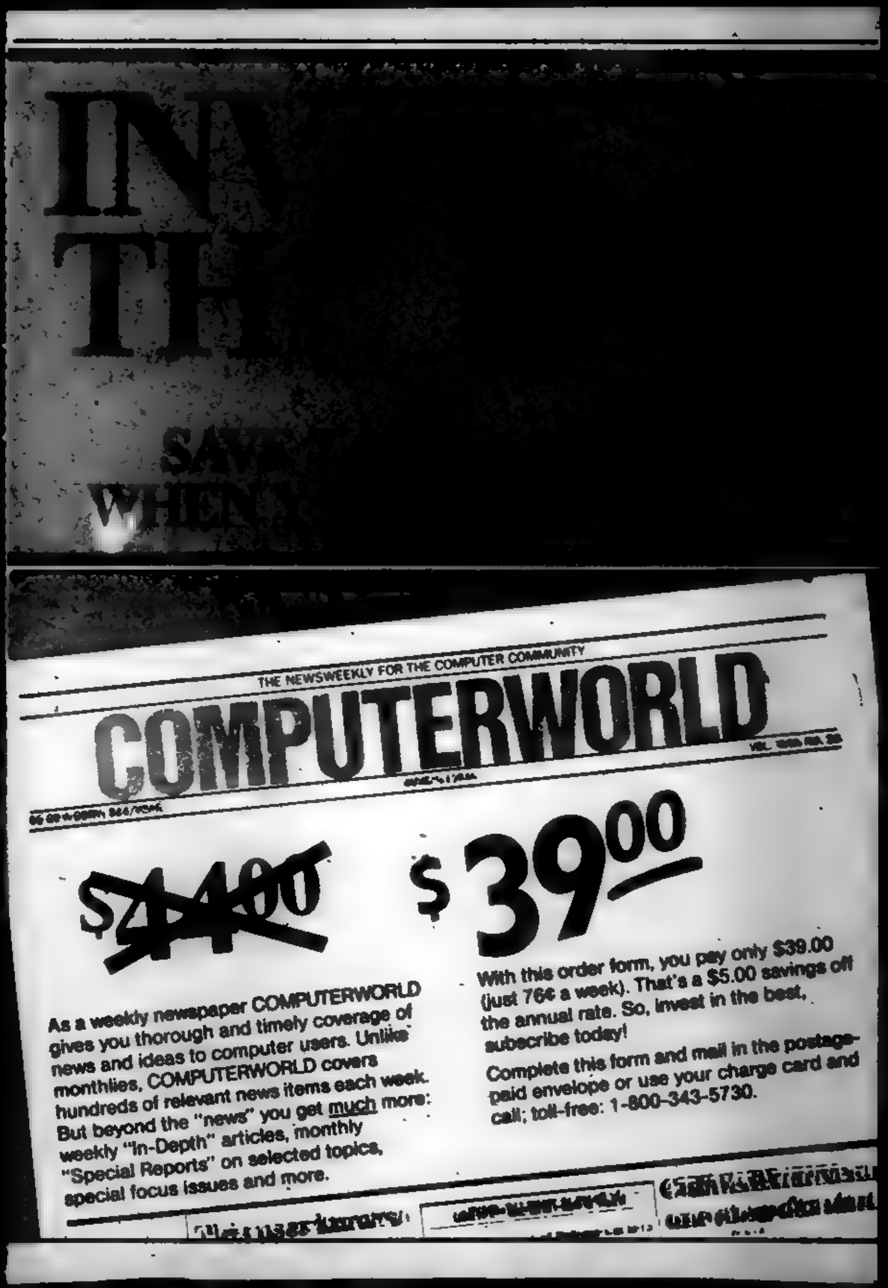

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End Users

- 10 Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30 Medicine/Law/Education
- 40 Wholesale/Retail Trade
- 50 Business Service (except DP)
- 60 Government—State/Federal/Local
- 65 Public Utility/Communication Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining
- 75 Other User ____________

Vendors

- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
- 85 Computer Service Bureau/Software/Planning/Consulting
- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 95 Other Vendor ____________

2. **OCCUPATION/FUNCTION (Circle One)**

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/MIS Services
- 22 Director/Manager of Operations/Planning/Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
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- 38 Data Comm Network/Systems Mgmt
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- 51 Mfg Sales Reps/Sales/Marketing Mgmt
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- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other ____________

3. **COMPUTER INVOLVEMENT (Circle all that apply)**

Types of equipment with which you are personally involved either as user, vendor or consultant

- A. Mainframes/Superminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

CW-182

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RELIEF

from page 40

willing to stay in the country if they can find meaningful employment.

The challenge for Ireland is to continue to draw high tech to its verdant shores at an even faster rate than it has in the past. The country seems to be well on its way to doing that. However, some observers believe the level of commitment from many companies is too tentative to promise any long-term relief. Because firms are required to invest so little to get their operations started in Ireland, they are less inclined to keep them running if times turn bad, they argue.

The Irish government believes exactly the opposite is true. Because it is so cheap to run a business here, it maintains, companies will be more inclined to fortify operations in Ireland and close down more expensive plants elsewhere. They point to the fact that Atari, Inc. continued to operate its Irish facility at full strength even as the company was laying off more than half of its Silicon Valley work force.

For now, the people of Ireland seem to be willing to give the government the leeway it wants to attract players in this fledgling industry.

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Software helps airline reach new highs in efficiency

Application tools allow tie-in to worldwide passenger, cargo reservation system

HONG KONG — One of Southeast Asia's largest airlines has officially inaugurated two software application systems to increase efficiency in its operations and improve customer service.

Founded in 1946, Cathay Pacific Airways, Ltd. serves Hong Kong, Japan and China, Australia, India, Europe and Canada. Cathay's data processing operations rely on Sperry Corp.'s 1100/83 and 1100/62 multiprocessor systems running Sperry's Univac Standard Airline System.

The two recent software acquisitions — one to expedite passenger reservations, the other to expedite cargo shipments — are Sperry's Advanced Seat Reservation (ASR) facility and Cubic — Sperry's computerized cargo system.

The two packages are used in tandem with Sperry's Cupid worldwide reservation system. According to Donald Birch, manager of data processing operations, the ASR passenger system handles bookings and flight confirmations, primarily for first-class and business-class passengers and passengers with special needs, such as those with babies requiring in-flight cradles. The ASR network has been added to the airline's worldwide reservation system, which links 450 VDTs in 27 cities.

Computerized seat plan

Passengers benefit from the upgraded ASR facility because it will allow them to pick the seats they want up to six months in advance from a computerized aircraft seat plan displayed on the travel agent's terminal, according to a Cathay spokesman.

Seats can be confirmed instantly, and any possibility of overbooking is eliminated because the seat map is automatically updated, Birch claimed. The seat map provides information including seat location, smoking areas, viewing angles and special requirements such as those for handicapped people, he added.

The Cubic computerized cargo system has facilities for such aspects of cargo operations as freight reservations, space control, shipment data capture, air waybill printing, goods acceptance, warehouse operation, manifesting, check-in at the import station and delivery to the consignee.

Robert Atkinson, Cathay Pacific's cargo manager, said the major benefits of the Cubic system will be in the area of customer services such as on-line reservations for packages, customs clearance and consignee notification.

Cubic will be implemented in two stages, Atkinson explained. The first phase will consist primarily of reservations and space control functions. Any of Cathay Pacific's offices equipped with the system will be able to access the available cargo space on-line and obtain instant confirmation of bookings. Functions to be implemented in the second phase, in January, will cover everything related to cargo handling and routing.

Cathay Pacific is presently using the Cubic cargo network in Tokyo and Osaka, Japan; Taipei and Kaohsiung, Taiwan; as well as London and Frankfurt.

How to be in 16 places

Netherlands slow to catch high-technology fever

Low-key Dutch climate, export of R&D efforts hindering acceptance of new technologies

By Hans Braggaar
Special to CW

ROTTERDAM, Netherlands — Europe is condemning itself to a role as the world's recreation spot instead of a high-technology market contender, according to experts here.

"The dynamics of the Netherlands' infrastructure for small- and medium-size enterprises are not [synchronous] with the dynamics of the electronics industry — [which] is in a period of strong growth," argued Ray Jursovich of the Department of Interdisciplinary Studies here at Erasmus University.

In a study titled "An Overview of the Major Issues Facing Small- and Medium-Size Enterprises in the Dutch Electronics Industry," Jursovich concluded: "The problem lies in institutionalizing a way of thinking and doing in working with information and building information networks which promote the creation of new market niches."

Jursovich maintained that while there is no shortage of aggressive Dutch entrepreneurs to develop high-quality products, most of the fruits of their research and development efforts are exported.

At the same time, certain aspects of the Dutch cultural climate — the lack of competitiveness in government, a history of low-risk behavior in financial institutions and an expensive welfare system that discourages self-initiative — make it difficult to set new ideas in motion.

Museum and discotheque

Jursovich's conclusion was echoed recently in a speech given by Philips Information Systems, Inc.'s Vice-President Gerrit Jeelof, who cited the Japanese scenario of a worldwide electronics market. "The Japanese scenario for long-term development around the world described the U.S. as a granary. The Far East, including Japan, will be the world vendor for all kinds of hardware. And Europe? . . . [Europe will be] a combination of a cultural historic museum and a discotheque."

But the picture is not totally bleak, Jursovich pointed out. In Holland, there are sociological indicators that the situation is changing:

- Unions have expressed a willingness to cooperate with the implementation of new technologies.
- A growing national interest in electrical engineering and computer science exists.
- Financial facilities have been improved for small and innovative firms.
- Big companies, including [Philips Information Systems], have made efforts to promote spin-offs and actively seek cooperation with small- and medium-size firms.

In spite of all this, the high-tech fever has simply not reached the heights that Jursovich feels necessary for a healthy high-technology future in Europe. He lamented, "The dynamics that you feel when you get off an airplane at Kennedy or San Francisco International Airport are just not here."

Braggaar is a senior editor at Computerworld Benelux, Computerworld's *Dutch affiliate and is a frequent contributor to* Computerworld.

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Major U.S. firms announce participation in Esprit

By Hans Braggaar
Special to CW

BRUSSELS — Three of America's technology giants — IBM, ITT and Digital Equipment Corp. — will formally participate in the European Strategic Program for Research and Development in Information Technology (Esprit).

Although originally confined to European companies, recent joint Esprit proposals have included one from DEC's German subsidiary to work with the French conglomerate, Renault Automation, along with Comau, a subsidary of Fiat in Italy, to pursue collectively a project on computer-integrated manufacturing. The plan has already been approved by Esprit officials, but a few details, such as funding, still remain to be worked out, sources said.

ITT actually became the first U.S. company to join the Esprit program. During Esprit's pilot phase last year, ITT's German and Belgian subsidiaries, Standard Elektrik Lorentz and Bell Telephone Manufacturing Co. (BTMC), were active participants. BTMC combined its efforts with those of a French company and the University of Louvain near here and produced a compiler for an advanced signal processor.

It is not yet clear what role IBM ultimately will play. It is generally held that Big Blue will join the European companies as a subcontractor in B-type projects. B-type projects are those innovations that are idea-driven, as opposed to A-type projects, which reportedly will account for 75% of all Esprit funding and will be system-driven.

Europe-wide network

Research on Open Systems for Europe (Rose) is a telecommunications project within the Esprit program. The participants within the Rose project will develop a Europe-wide network to connect research institutes, government bodies and the policy-making bodies of the European Economic Community (EEC) member states. Rose communications software will reportedly be developed using the AT&T Unix operating system and the Organizational Standards Institute (OSI) model standard for open systems interconnection created by OSI and the Consultative Committee on International Telephone and Telegraph.

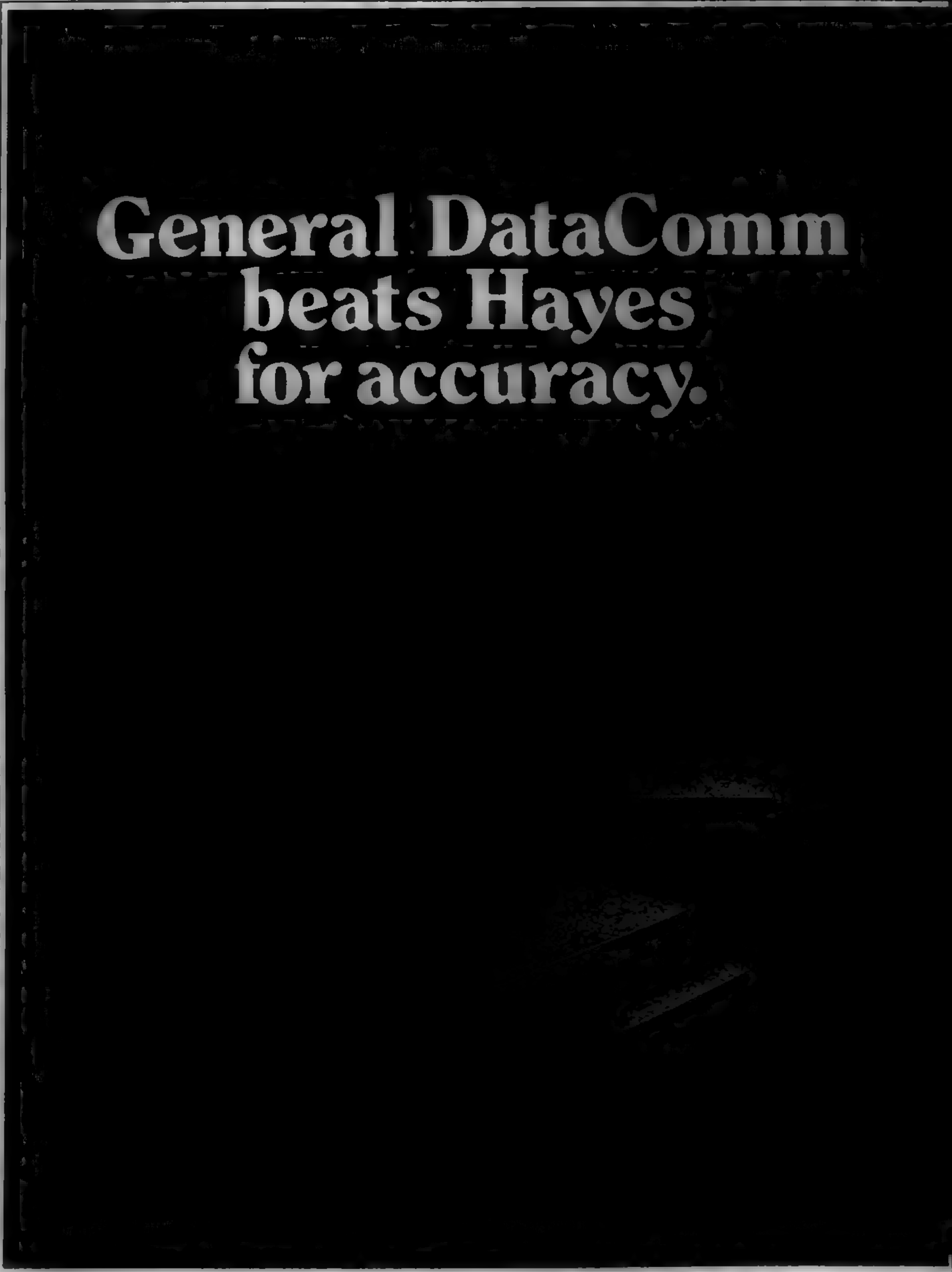
An Esprit Information Exchange System (IES) is the goal of Rose. The initial facilities made available in July 1984 consisted of the Eurokom computer-based conference; a mail and message system, which was installed at the computer center of the University College of Dublin; and a Unix-based facility giving the European Unix Users Group access to electronic mail, file transfer and other facilities.

In addition to the Esprit IES, a number of other research networks and information exchange systems are planned or are already in operation with the Esprit network. These currently include the DFN network in West Germany; Janet in the U.K.; Osiride in Italy; Centernet in Denmark; Eunet for the European Unix Users Group; and finally Hepnet, a network for High Energy Physicists.

Another Esprit project is Research and Development of Advanced Communications for Europe, which reportedly is intended to harmonize the European telecommunications market. European ministers in charge of industrial policy have been pushing for European communitywide standards for telecommunications systems and open procurement policies for some time.

Because telecommunications standards are badly needed, the ministers have agreed to homogenize all new communications services to be offered as of January.

Braggaar is a senior editor at Computerworld Benelux, Computerworld's *Dutch affiliate.*



INTERNATIONAL REPORT
CW International
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AUSTRALIA

MELBOURNE — The Victoria Police Department has been given the OK for the first phase of its $10 million computer system. The $4.25 million initial stage calls for an IBM 4381 with 8M bytes of memory and Software AG of North America, Inc.'s Adabas data base software. The system, which will replace the police force's Sperry Corp. V77 minicomputers, will support some 165 terminals.

JAPAN

TOKYO — Some 92% of 1,791 Data Show attendees claimed to use microcomputers. Such were the findings of a *Computerworld Japan* survey conducted during the recent trade show here. The respondents used products from the following vendors, in descending order of preference: 45%, NEC Corp.; 15%, Fujitsu Ltd.; 9%, IBM (up one percentage point from last year); 4%, Sharp Corp.; 3%, Hitachi Ltd.; and 3%, Toshiba Corp.

The companies that each held roughly a 2% share of the Japanese micro market included Sord Computer Corp., Mitsubishi Electric Corp., Apple Computer, Inc., Oki Electric Industry Co., and all others claimed the remainder, the survey said.

Findings also revealed that approximately 50% of users surveyed were not satisfied with hardware, software or services. Specific complaints included the lack of capabilities and quality of available commercial software.

■

TOKYO — According to a report from the Ministry of Home Affairs, the local government of Japan had an installed base of 2,273 computers as of April 1, 1984, a 16.5% jump from last year. The computerization of local government offices has been gaining in popularity here, and to cope with Japan's emerging "communications society," the country has been adopting on-line systems with Kanji-character systems.

Comdex not popular in Europe

By Luc Sala
Special to CWS

The recent Comdex Europe, held in Amsterdam from October 29 to November 1, showed healthy attendance figures with 7,300 visitors, but it still does not begin to approach the dimension of the 50,000 people who attend Comdex shows in the U.S.

Nor did this past show provide much news or many new attractions — unless you wanted to set up shop in Europe. Potential employers could have had their pick of lucrative spots at this year's show, where many trade boards from European countries were represented in hopes of attracting business investments to their regions.

AT&T's Unix was the focal point for most of the exhibitors on hand, with AT&T and Olivetti Corp. promoting it via their newly formed Unix Europe organization.

The other big draw at the show was the International Computers, Ltd. booth, which for the first time displayed the vendor's Clan multiuser Unix-based supermicrocomputer (2900 series). This Motorola, Inc. M68010-based system works with four to 16 workstations, each having access to all systems functions.

But the third annual Comdex Europe just did not rise to be the international OEM or dealer show that the Interface Group, Inc. wants it to be. Although more than 50% of the attendees were not Dutch, the total number of visitors was still a bit disappointing.

The Interface Group, however, does appear to have the stamina to go on and eventually turn Comdex Europe into a major event. All the right ingredients are there.

Sala is the editor of a Netherlands-based microcomputer newsletter and a frequent contributor to Computerworld.

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Tool condenses time for checking program changes

By Paul Gillin
CW Staff

PLEASANTVILLE, N.Y. — The syndrome is common: The program you recently brought in for maintenance is now showing an annoying bug, and you cannot seem to find where the error occurred. It could be the result of something as small as a dropped punctuation mark or an accidentally deleted line. The only solution is to examine the source code line by line.

Two DP shops that have experienced such problems in the past have taken steps to overcome them by installing a source code comparison utility for use in program maintenance. Although they report that the product is not for use by everyone, both said the $1,000 purchase price was well worthwhile.

Reader's Digest Association, Inc. here installed Maintenance Aid (Maid) from Data Aid, Inc. of North Granby, Conn., late last year. The product has helped to cut the time required to check programming changes by at least half, according to Elizabeth Adams, financial analyst.

Adams is part of a group of three analysts and 12 programmers who write and distribute program changes to Reader's Digest locations around the world. The department writes mostly in Cobol under IBM's MVS operating system.

Cut-and-paste process

Previously, the process of making maintenance changes had been a cut-and-paste operation in which changes were difficult to track, especially on the larger programs, Adams said. With Maid, the time required to track down errors has been substantially reduced, she said.

Maid basically compares two versions of a program and lists the changes that have been made. It produces reports showing the five lines of common code preceding and succeeding the changes, with any additions or deletions listed in the middle. The reports can be used to ensure that the required modifications have been made as well as to track down inadvertent changes, Adams said. "In one case, a programmer had accidentally deleted a paragraph of code, and we were able to pull it back up without rewriting it," she said.

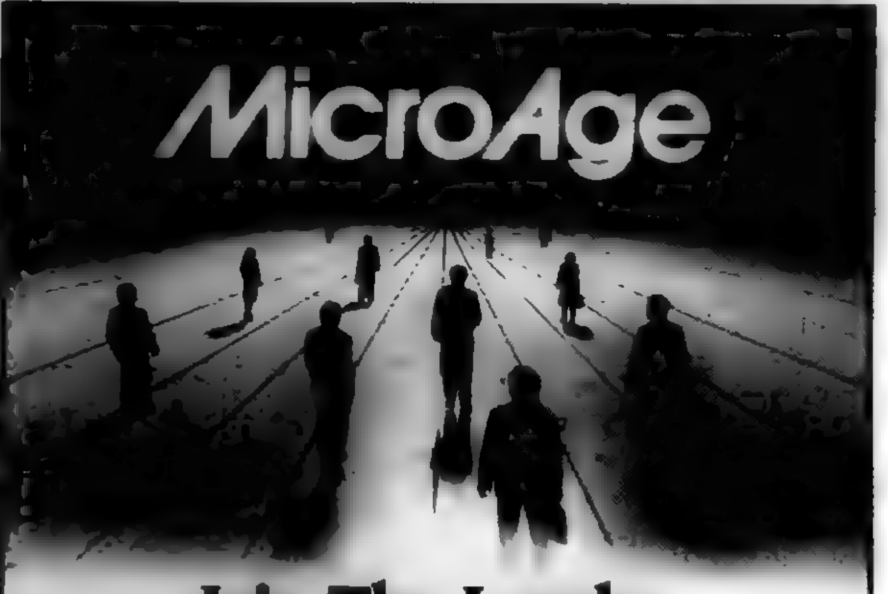
Documenting changes takes only about one-tenth as long as it did before Maid was installed, she said. The tool has cut supervision time by about one-third, she estimated.

Steve Merritt, a section manager for financial applications at Mead Corp. in Dayton, Ohio, was less enthusiastic about the product, but said that it was still worth the purchase price. Because Mead programmers are required to document changes heavily, Merritt said Mead uses the product only about once a month.

Mead uses Applied Data Research, Inc.'s ADR/Librarian for its source code library. Maintenance is done in partitioned data sets (PDS) under IBM's TSO. Only current versions of programs are maintained in the library, with previous versions archived on tape.

"We don't use the compare feature on Librarian, and occasionally we want to compare different versions of a piece of software," he said. To do that, the user creates two PDSs and loads the current and archived versions of the program. A Maid comparison can then be run to generate a list of lines that have been changed or deleted. "It's mostly used when we don't have the source code or when the programmers can't remember what changes they've made," Merritt said.

If Mead begins using the archival functions of ADR/Librarian, it would negate the need for Maid, Merritt said. Until then, he thinks Maid is a handy utility to have available. "I wouldn't be surprised if it comes along one day and really proves itself," he said.



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PBX market growth found a boon for large vendors

AT&T, Northern Telecom, Rolm expand market share; smaller firms pull out

NEW YORK — Growth in the private branch exchange (PBX) market helped large vendors such as AT&T, Northern Telecom, Inc. and Rolm Corp. in 1983, while at the same time causing other suppliers to lose market share or quit the business, according to a recent market research study.

The most significant development in the U.S. PBX market, the study by Northern Business Information, Inc. concluded, has been AT&T's ability to regain market share after more than a decade of losing ground.

The study estimated that AT&T, Northern Telecom and Rolm all made slight gains in their share of the market last year, with AT&T leading the pack with a 24% share. Northern Telecom was estimated to have a 16% share, followed by Rolm with 14%.

Shipments of PBXs increased 17% in 1983, compared with a 6% growth in 1982, the study found. That double-digit growth is not expected to continue, the study stated, noting that in 1983 many Centrex users bought PBXs because of worries about access charges and hefty rate increases.

Although 1983 growth rates are not expected to continue, "the PBX market will remain healthy," the study predicted.

AT&T's introduction of the System 85, the company's first digital switch, helped drive demand for all digital products in 1983, the report said.

The System 85, the report stated, "legitimized Rolm and Northern Telecom's approach to the market. AT&T's emphasis on digital PBX-based office automation systems is shortening the average life cycle of PBX systems; analog electronic switches are starting to be replaced with digital ones."

Established PBX suppliers, the study stated, are "fighting hard" to maintain their positions and to take advantage of a lack of networking products offered by IBM. Meanwhile, other major computer manufacturers are working with PBX vendors to develop interface devices to connect their systems with PBXs.

The volatile PBX market has attracted some new vendors, while causing others to quit the market. Recent casualties in the PBX market have included Datapoint Corp., Rockwell International Corp. and Telesciences, Inc.

The report, priced at $1,975, is available from Northern Business Information, Seventh Floor, 157 Chambers St., New York, N.Y. 10007.

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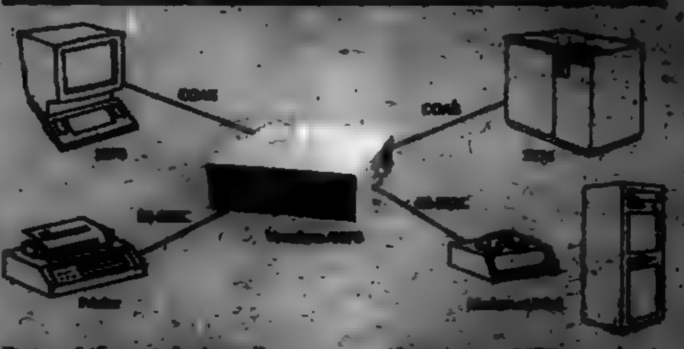
Equipped with an auxiliary RS-232C printer port, menu [illegible] keyboard control of [illegible] ASYNC mode, the [illegible]



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LOCAL DATA
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Seminar to stress microcomputer communications

WASHINGTON, D.C. — The first in a series of four seminars on personal computer communications, each led by J. Scott Haughdahl, will be offered here Dec. 3-4.

The seminars will focus on personal-computer-to-mainframe communications — particularly via gateways and communications servers — and on personal computer local networks, according to the sponsor, Architecture Technology Corp. Haughdahl is said to have considerable experience in simulation of multiprocessor mainframe environments and the design and implementation of specialized server software for personal computer local networks.

Other seminars will be held in Orlando, Fla., on Dec. 5-6; in Los Angeles on Dec. 10-11; and in Honolulu on Dec. 13-14.

Seminar registration is $645. Additional details are available from Architecture Technology, P.O. Box 24344, Minneapolis, Minn. 55424.

Meet to target audit, DP staff

BOSTON — MIS Training Institute, Inc. will hold a conference titled "Control, Audit & Security of Digital Equipment Corp. Systems," Dec. 3-5 at the Westin Hotel here.

DEC President Kenneth Olsen will give the keynote speech, touching on the impact of current and future software and hardware systems on management information and the role of the auditor and DP professional.

The conference will include sessions on VAX-11/VMS control and security, RSX-11M/RSX-11M-Plus control and auditing, networking and local-area nets, AT&T's Unix, VAX-11 audit packages, encryption and microcomputers.

The conference fee is $650. More information can be obtained from Beth Evans, MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

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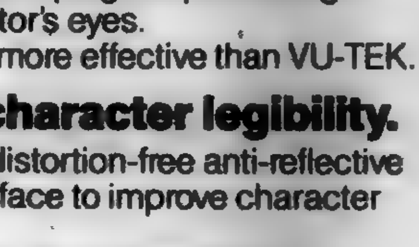

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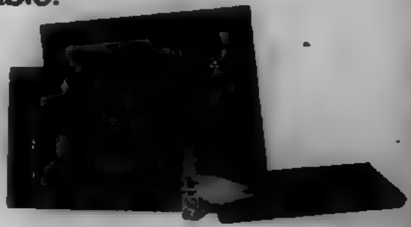

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VU-TEK is the result of research by American Hoechst, a member of the Hoechst Group of companies, with worldwide sales of $14.5 billion, and annual research expenditures of over $630 million.

*National Institute For Occupational Safety and Health Study, August 1981.

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Lawyers advocate LSInet to ease work in complex cases

By Donna Raimondi
CW Staff

BOSTON — A computerized legal network designed to make research materials and legal counsel in large, complex civil cases more accessible is under development here by a group of lawyers.

The system, called LSInet, will permit member law firms to store information on a central data base, electronically share files, refer work to each other and retrieve information using software designed by Programming Management, Inc. of Milton, Mass., said Charles J. Purelli, president and chief executive officer of Litigation Systems, Inc.

Scheduled to begin operations by the end of this year, LSInet will provide networking and storage of case files, instead of just access to case law, Purelli said. Fifteen major defense law firms across the country are currently members of LSInet, and Litigation Systems is actively recruiting insurance companies and self-insured corporations to join, he said. "With our network, an insurance company could keep track of all litigation being handled by its law firms across the country."

LSInet was the brainchild of William E. Bailey Esq., former senior vice-president and claims counsel at Commercial Union Insurance Co. and an authority on asbestos-disease litigation. Property-casualty insurers paid more than $4 billion in fees to outside legal counsel in 1983, Bailey said. Over the last several years, these costs have been going up by about 20% to 30% per year, he said.

Much of the expense is not for attorneys' hourly fees, but rather for developing and maintaining huge paper files, Bailey said. Realizing that automation had not been used to its fullest potential to control these ancillary expenses, Bailey set out to develop a network of computer, legal and insurance expertise to address the problem, he said.

[redacted] or compatible models or IBM-type terminals to connect via telephone lines to a data base that resides on an IBM 3033 mainframe, backed up by an IBM 3081, Purelli said. A password system protects confidential files, while public information such as court records and government documents can be shared, he said. The menu-driven programs were designed by lawyers to prompt in the same sequence a lawyer or paralegal normally uses, he said. Purelli said a paralegal researcher might overlook discrepancies in the testimony of an expert witness who has testified several times in different states. The computer system will not overlook such discrepancies, and the variations can be brought up at the witness's next appearance.

More information is available from Litigation Systems, 77 N. Washington St., Boston, Mass. 02114.

WHAT WE
BELIEVE:

Mini saves hospital time on tracking drug schedules

System helps pharmacy label intravenous solutions, monitor their dosage

FORT LAUDERDALE, Fla. — Holy Cross Hospital here needed a better way to track medication schedules and label more efficiently the 500 to 800 intravenous (IV) solutions administered daily to patients.

Approximately four years ago, the 600-bed hospital acquired a Four-Phase Systems, Inc. IV-70 minicomputer, and recently, the hospital upgraded to a Model IV-90. "We needed more memory," said Edward Propst, director of pharmacy at Holy Cross.

The pharmacy application, written in Cobol and part of the Four-Phase system's Multifunction Executive (MFE) software, schedules patient's medications and IV labels. A line printer is used to produce unit dose medication envelopes, medication records, management reports, financial reports and clinical drug monitoring. A character printer is dedicated to printing the IV labels, which, Propst said, saves valuable time. "To type all those IV labels each day would be an enormous job," he said. The pharmacy secretary uses the Four-Phase system for printing management reports, newsletters, labels and memos.

Files are structured in a way to make it possible to print the hospital drug list by American Hospital Formulary Service categories as well as alphabetically by generic name with cross-references to trade names.

Propst said the system is extremely reliable. "The system provides the pharmacy with the flexibility to schedule preventive maintenance, system and program upgrades and tests during slack hours. The system also supports unit dose and intravenous admixture distribution," he said.

Because the department work load slows down at night, the pharmacist on duty runs programs to print patient drug records, charges, discharge summaries, clinical drug monitoring and cost and revenue reports.

As a security feature, the MFE software requires a valid sign-on code for access to the system. This allows the application program to identify the pharmacist who reviews, approves and enters the physician's medication orders into the patient's medication record. By use of a priority indicator in the sign-on code, the pharmacy management program gives only authorized personnel access to certain functions.

For the future, Propst said, the hospital plans to write software that will make the system even more reliable.

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Small-computer meet scheduled

ARLINGTON, Va. — A three-day conference on small computers in [redacted] ton National Hotel here Dec. 10-12, 1984.

The Third National Conference on Small Computers in Government, sponsored by the Public Management Institute of George Mason University, is geared toward DP and office automation technical professionals, managers of small-computer users, small-computer professional end users and administrative management personnel.

Topics of the seminars and workshops revolve around management issues and concerns. A vendor showcase on small-computer products and [redacted]

Registration fee for the conference only on Dec. 10-11 is $455 for government registrants and $510 for industry participants. Workshop-only fee on Dec. 12 is $285 for government registrants and $310 for those in industry. Conference and workshop fees for all three days are $625 for government members and $700 for industry members. More information is available from USPDI, 1620 Elton Road, Silver Spring, Md. 20903.

IBM directory lists software

BOCA RATON, Fla. — IBM has published a catalog of software programs for its Personal Computer that includes entertainment, education, personal productivity and business applications.

The Directory of Personally Developed Software includes programs developed by IBM employees and individuals outside IBM. The first issue contains 36 new programs for the Personal Computer, ranging in cost from $14.95 to $149.95.

The directory is scheduled to be published three times a year. The first issue is being distributed free. Subsequent issues will cost $4 a copy; an annual subscription is $10. The catalog can be obtained at authorized IBM Personal Computer dealers.

• ADVERTISEMENT • ADVERTISEMENT •

Directory Lists 16,000 D P Users

NEW YORK - The 4th edition of the 1984 Directory of Computer Installations, lists 16,000 computer users in NY, NJ & CT.

Each site includes a profile of the hardware installed, software installed, (languages, databases, etc.), consultants used, future plans, applications and DP executives' names, titles, and phone numbers. An Index provides quick access to 133 cross references by hardware, software and industry. Price-$370. Call (212) 683-0606. Computer Management Research, Inc. 20 Waterside Plaza, NY, NY 10010. Act now and receive free vendors' directory.

• ADVERTISEMENT • ADVERTISEMENT •

Board protects accessible micro

Ensures use by acccounting personnel only

SCOTTSDALE, Ariz. — When the accounting department for a digitizer manufacturing plant here first considered buying a personal computer, its manager thought the machine would reside in a secured area.

But when the department bought its IBM Personal Computer XT, the machine ended up in a well-traveled spot. About 50 people from shipping, engineering, personnel, manufacturing and other departments at California Computer Products, Inc.'s digitizer division track by the machine daily.

"It's kind of a pathway they use through the building," according to Connie Grennan, accounting supervisor for the firm.

Grennan said she was concerned that an unathorized passerby might access the Personal Computer's operating system and wipe out financial files.

The digitizer division of Calcomp, a Sanders & Associates, Inc. subsidiary, manufactures components that are shipped to distributors and other Sanders facilities. The Personal Computer XT maintains the division's in-house financial records, handles management report generation, word processing and data base management.

When a user turns on the Personal Computer, its operating system comes up. With some computer knowledge, a user can access the operating system and erase it, Grennan said.

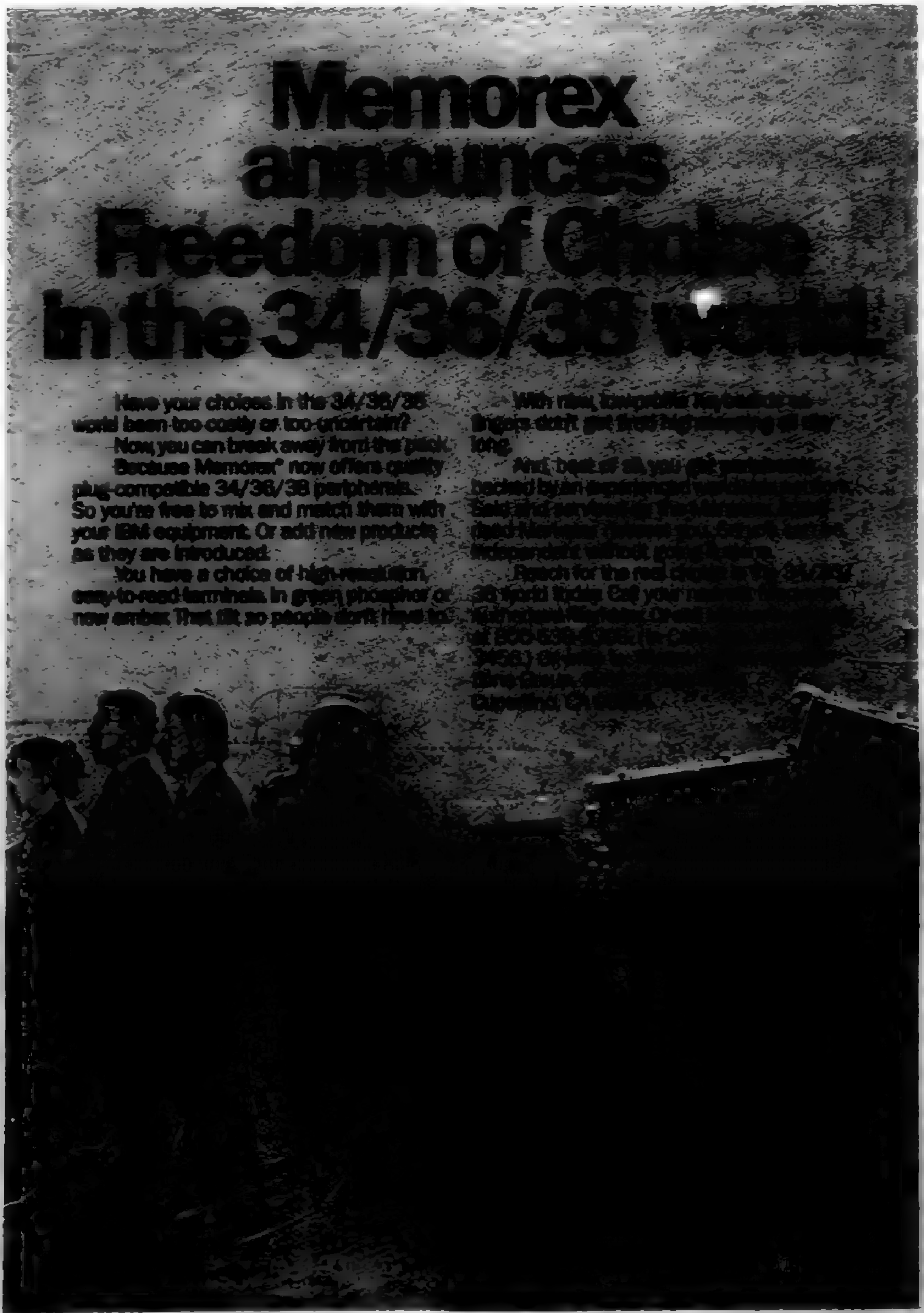
The digitizer division's accounting department keeps backup copies of all its files and could restore any deleted information if necessary, Grennan said. But instead of relying on this time-consuming, after-the-fact solution, she sought an alternative that would prevent unauthorized access in the first place.

Internal security

Grennan purchased an internal security board, Stoplock IIR from SDI, Inc., that uses passwords to prevent unauthorized micro use.

With the product installed in the micro, a user must type in a password to access the operating system screen. Only the seven members of Grennan's accounting staff have passwords.

The security board, a printed-circuit card, also provides an audit trail that records attempted accesses to the system for later readout. "Now I can go back and trace who's used the computer," Grennan said. "I feel more comfortable and safe with the security board installed since only accounting staff can enter and retrieve data."



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Reach for the real choice in the 34/36/38 world today. Call your [illegible]

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Cupertino, CA [illegible]

Application developer keeps insurance firm up-to-date

Stiff competition prompting need for increased flexibility from information services

LINCOLN, Neb. — Deregulation in the financial and insurance industries has introduced stiff competitive pressures to expand services, develop marketable products and respond quickly to opportunities. In order to avoid falling victim to the current shakeout in the financial services industry, a large insurance company here decided to adjust its information processing strategies to the hotly competitive environment.

Bankers Life Nebraska, a $940 million institution with headquarters here, is branching out in such areas as financial services, securities and other investment-oriented products. It is also in the process of revamping its information services capabilities as one key weapon in its search for optimum profitability.

"Making information more accessible and readily helpful to our users is a foundation of our continued success," said Michael Jaskolka, assistant vice-president of information services. Jaskolka manages a 14-person department responsible for supporting the growing information demands of headquarters and sales offices located in 42 states.

More accessibility needed

Given the intense competitive pressures of the industry, Jaskolka said he believes that the information services function must adopt a new flexibility, one which is more immediately accessible to users at all locations. To that end, Bankers Life has a network of close to 200 personal computers and a five-member technical group dedicated to developing micro-based, point-of-sale products for the sales force.

"We're committed to removing as many obstacles as possible to our users' ability to recognize and seize opportunities, because effective decisions are based on accurate, timely and meaningful information," he said.

In its effort to improve its information services, in mid-1983 Bankers Life began converting from a Sperry Corp. 1100 system to an IBM environment. In a parallel effort, it made a commitment to on-line processing. Last year, the firm installed an IBM 3083 and began the laborious process of transferring files. Simultaneously, it installed a fourth-generation application development tool to meet its on-line development requirements, Jaskolka said.

After considering other development tools by Informatics General Corp. and Pansophic Systems, Inc., Bankers Life selected Oxford Software Corp.'s User Files On-Line (UFO) program, which it now uses for all of its on-line processing requirements, according to Jaskolka.

"My primary selection criterion has always been vendor service," Jaskolka said. "In terms of vendor commitment to its product, as well as ongoing enhancements, UFO fit Bankers Life's requirements best. We determined that UFO is the most widely used applications development tool in the CI"S environment," he added. "That carried a lot of weight with us."

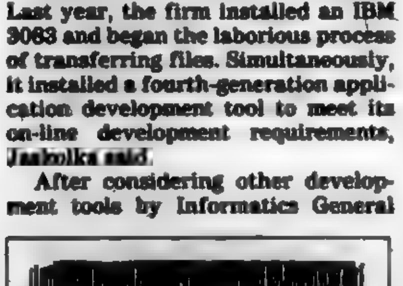
Until mid-1983, the Sperry 1100 handled virtually all of the firm's data processing requirements. Primarly a batch system, the insurance company's DP department was able to offer very limited on-line capabilities. Users and programmers alike were frustrated by slow turnaround in application development, Jaskolka said.

Almost immediately after the installation of the 3083 and UFO, Bankers Life noted a substantial increase in both the quantity and quality of information products, Jaskolka said. Applications that would have required two to three days to develop using traditional IBM CICS programming techniques could now be dispatched in as many hours using UFO, he said.

"Working as teams, programmers and users can work with UFO as a prototyping tool, modifying fields and data in real time to produce immediately useful products," he said.

"As far as shortcomings and problems, we haven't experienced any yet," Jaskolka said.

Future plans call for Bankers Life Nebraska to complete the migration to the 3083, making all information available to users at headquarters and sales offices, Jaskolka said.



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Close call with floodwaters convinces oil refining firm

OIL CITY, Pa. — Floodwaters that came too close for comfort to an oil refinery's computer center helped convince the firm of its need for a detailed disaster recovery plan.

On Feb. 1, 1982, water from Oil City's flood lapped at the door of Quaker State Oil Refining Corp.'s headquarters here.

In the data processing center — a few feet from the door — Al Tucker, manager of computer systems development, shut his equipment down and began moving tapes and forms to safety on the second floor. The water stopped rising a fraction of an inch short of the door.

If a similar disaster struck today, seven teams of DP employees would react according to a plan drawn up after the '82 flood that gives each team specific responsibilities for shutting down the system and moving the firm's processing to a commercial hot site.

According to John Rudolph, Quaker State's corporate security analyst, "We chose the team approach because it's simply impossible for one individual to perform all the tasks required."

> *'We kept the teams as much as possible within the DP function both for control reasons and because [DP staff members] are experts,'*
>
> — John Rudolph, Quaker State

Quaker State's seven disaster recovery teams are:

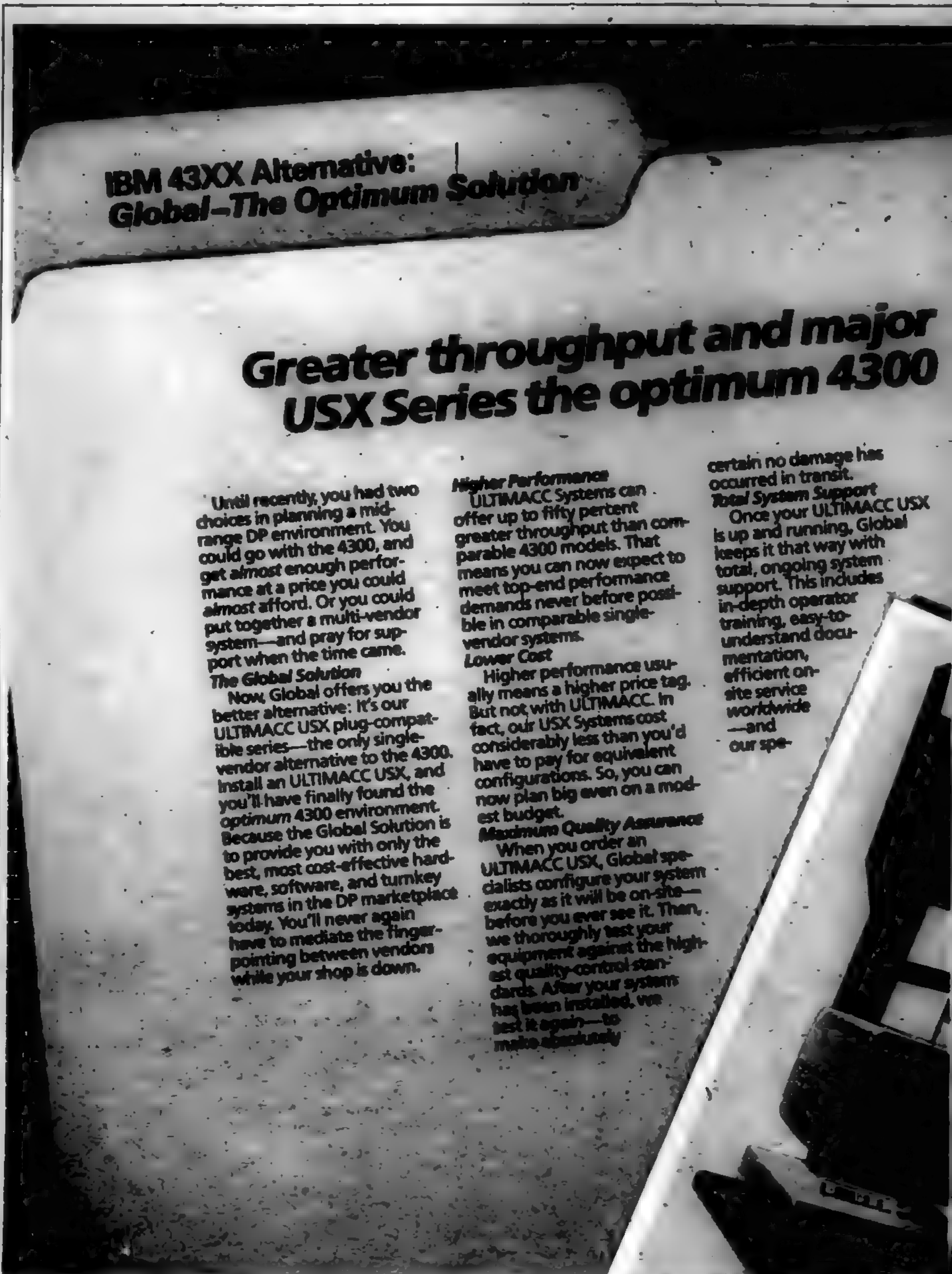
- The temporary processing center team, which performs operations functions.
- The software team, which ensures that the firm has an operating system at the hot site.
- The telecommunications team, which is responsible for establishing telecommunications and voice contact between headquarters and the hot site and among the various teams and all the firm's remote locations.
- The new hardware team, which evaluates damage to the equipment at headquarters and determines whether reconstruction or replacement is necessary.
- The application team, whose primary responsibilities are to get the systems up and running and work with users.
- The management administration team, which controls and coordinates all the activities and provides transportation, lodging and other necessary support.
- The salvage team, which assesses the damage, helps make recommendations regarding new equipment and salvages forms, tapes and anything else possible.

Rudolph said team members come from DP and are assigned to teams according to their areas of expertise. The software team consists of systems programmers and data base administrators; the applications team includes programmers and the firm's systems analyst; Quaker State's operations manager is a member of the temporary processing center team.

"We kept the teams as much as possible within the DP function both for control reasons and because [DP staff members] are experts," Rudolph said. "They know the terminology and the team breakdown is a data processing function."

A chart shows the teams steps that must be taken, in chronological order, to set up processing at the hot site. Each team meets with Rudolph quarterly to define its functions, put them into procedures and come up with planning requirements. All the plans are part of a disaster recovery manual.

If disaster strikes, some teams will relocate to the firm's recovery facility, RMI Co.'s Hotsite, in nearby Niles, Ohio. Some teams will stay in



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Total System Support

Once your ULTIMACC USX is up and running, Global keeps it that way with total, ongoing system support. This includes in-depth operator training, easy-to-understand documentation, efficient on-site service *worldwide* —and our spe-

# of urgent need for data center disaster recovery plan

Oil City, and some will be split between the two sites. In addition, Hotsite personnel will be on hand at the recovery facility to help correct hardware and software problems as they arise, Rudolph said.

According to the team recovery plan, disaster recovery will begin with the temporary processing center team, which will initiate a planned shutdown procedure at the DP shop. The management team will meet and decide whether to relocate operations to the hot site. If the decision is made to use the hot site, the management team notifies team members.

The management team will also establish a command post from which it can coordinate the recovery operation. It will notify the hot site to prepare for disaster processing and will arrange transportation for team members.

The temporary processing center team will obtain backup tapes and other material from Quaker State's off-site storage facilities. At the same time, the salvage team will coordinate security with civil authorities and begin to assess the damage on-site so it can advise the new hardware team on how to proceed.

Then the management, software, communications and applications teams will leave for the hot site. The management team will keep a representative at corporate headquarters and send one representative to the hot site. These representatives will coordinate site activities and handle contingencies and disputes as they arise.

At the site, the software team will restore the operating system. Concurrently, the applications team will work with the firm's users to establish a start-up strategy for disaster processing.

The software team will then run tests on the operating system. At the same time, the communications team will begin establishing links between remote sites and the backup operating system.

The temporary processing center team and the application team will then begin restoring the data base. They will run jobs to prepare the system to start operations.

The temporary processing center team will also schedule critical applications such as order processing, payroll and inventory according to the number of functional terminals the firm has available for use. Concurrently, the communications team will test data communications links and work out any bugs.

When all these arrangements are complete, the backup system will begin to process data. The temporary processing center team will take responsibility for normal operations. "We [will be] up, hopefully, and running just as we were at our own site," Rudolph said. The applications team will guide users through disaster processing procedures.

By the time operations are running at the hot site, the new hardware team at the headquarters will have begun contacting vendors for replacement equipment.

Continual checking

Throughout the recovery process, a checklist ensures that each part of the plan gets accomplished in its proper order, Rudolph said. "Each team contacts the management team periodically to inform them, 'I am ready to start point B.' If the other parts of the plan are in place, they will be told to continue; otherwise, they will wait."

Since the recovery plan was put in place, the Quaker State teams have performed one partial disaster recovery test. The firm plans to schedule a complete simulated disaster within the next three months.

One of the reasons Quaker State chose Hotsite as its recovery facility was the center's promise to grant unlimited disaster testing time during Quaker State's first year under contract, Rudolph said. Hotsite offered this benefit and reduced rates to all of its charter customers.

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Letter shop uses minicomputer to get its messages out

NEW YORK — Travel advertisements showing white sands, blue water and a sailboat are meant to make a viewer seek more information by mailing in the coupon clipped from the bottom of the ad.

The advertisements make it easy for the viewer to respond. This is part of advertising programs that depend on responses to define when, how and where to advertise. The potential customer's only concern is to send in the coupon and get back the booklet as soon as possible.

However, when the customer mails the coupon, they set in motion a chain of events called fulfillment.

Although the reply is to what appears to be an airline office, the airline will probably never see the inquiry. Between the customer and the airline is a letter shop — an organization that specializes in fulfillment of such information requests.

One such letter shop is Associated Litho and Letter Service, Inc. (AL&L) here, which handles fulfillment for a major European airline and other clients. Joel M. Weiss, who operates the letter shop, took over the 65-year-old business from his father 30 years ago.

"The advertising campaign begins with the need to promote a function of an airline," Weiss said. "It can be summer vacation travel, winter ski travel or executive business travel. It also could support cargo sales for the airline. When the advertisement is designed, a booklet or brochure to be used for inquiry response also is designed." The letter shop will keep a supply of the booklets in its inventory.

AL&L may keep 332,000 copies of 80 different pieces of literature awaiting inquiries from one client's advertising campaigns.

Inquiries are delivered directly to the letter shop, where a mailing label is prepared, the proper items are selected and packed in an envelope, the label, with information indicating which booklets are enclosed, and postage are affixed to the envelope and it is put in the mail.

"Timeliness is an important part of our function," Weiss said. "We try to mail a fulfillment within 24 hours of the time we receive a response. After all, if a person is interested in something, they want information as soon as possible. If it takes too long, they probably will lose that interest," he added.

"Although the functions we perform today are almost the same as they were 30 years ago, the way we perform them is constantly evolving with technology," Weiss said. "The latest is the addition of a minicomputer that we use to print labels and letters and to compile our reports."

Weiss noted that a computer works only as well as its programming and that only a few vendors had any software that could work in a letter shop environment.

"One package, including software and a Mentor minicomputer produced by Applied Digital Data Systems, Inc., fit our needs almost exactly," Weiss said. "The programming was written by Software Marketing Associates in Wethersfield, Conn. They know the letter shop industry well, and since our installation, they have sold four more systems in the New York area."

Before computerization two years ago, AL&L did everything manually. When inquiries were received, labels were prepared on a typewriter, and all reports were hand-calculated and typewritten. Repetitive letters were printed, with the name, address and salutation manually filled in by typewriter.

As long as volumes were low, this system was satisfactory. However, AL&L now processes over 100,000 inquiries a year just for one client. Its other clients add to that load.

"We still have to input the data through a keyboard much the same as we did with the typewriter," Weiss said, "But there the similarity stops. Once we have captured the data, there is almost no limit to the ways we can use it."

AL&L operates an Adds Mentor 4000 with 256K bytes of core memory and 300M bytes of disk storage. The system runs five CRT terminals and two printers, a 300 line/min line printer and a 55 char./sec letter-quality character printer.

One key report Weiss uses is the daily inventory report to keep count of all the pieces of literature. Before computerization, the letter shop often ran low on specific brochures before any shortage was apparent. Now, every piece of literature is deducted from inventory when the labels are processed. Literature is added to the inventory as it is received, and the daily report shows the balance on hand.

Another by-product of the data entry is the activity report, a tally of all inquiries, listing the source (ad coupons, responses from mailings, telephone calls), literature sent and other information.

"With our old manual system, it used to take hours to calculate and type this report," Weiss recalled. "Now it only takes a few minutes to compile in the computer and another 30 seconds to print. This is a tremendous time savings."

As a profit center, the system has contributed to a 50% increase in revenue with a corresponding 25% hike in profitability, he said.

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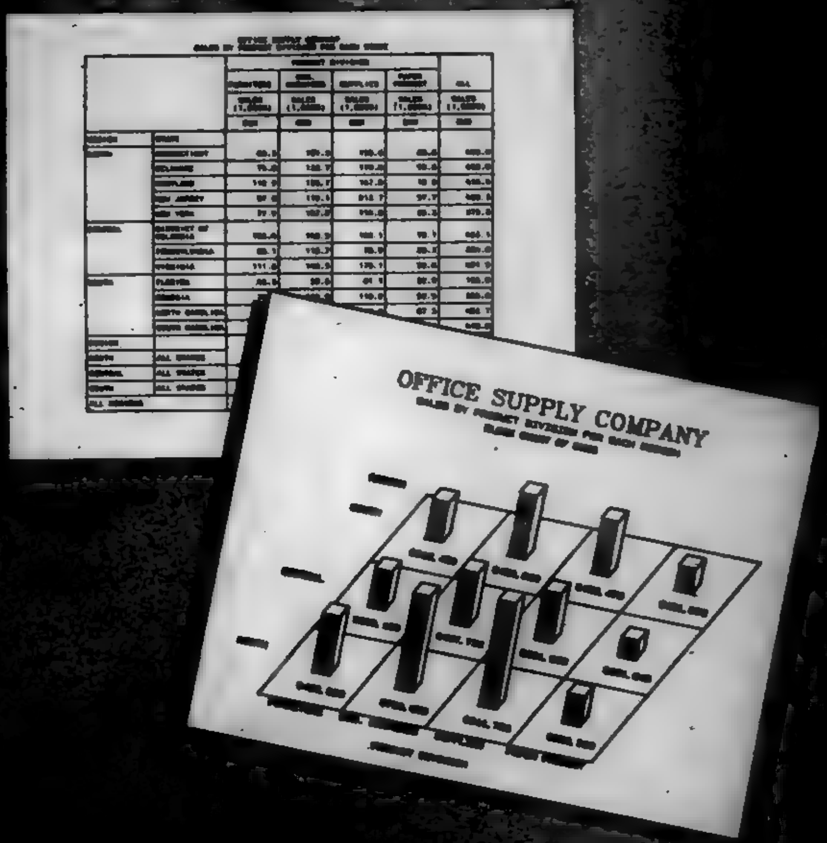


OFFICE SUPPLY COMPANY

OFFICE SUPPLY COMPANY

Dasd program eases daily backup for power company

HOUSTON — A power company here found it was gathering a multitude of problems backing up data for a nuclear power plant construction project.

Daily backup of a Houston Lighting and Power Co. (HL&P) data center here was smoothed through use of Dasd management software, according to HL&P senior programmer Robert Lauderdale.

The Dasd software allows the data center to back up its day's processing onto five tapes — instead of the 26 tapes needed by the previous Dasd software. It has also reduced backup time from "an eight-hour-a-day, five-day-a-week job" to one to two hours nightly, Lauderdale said. The data center using the Dasd software is the main computer center for the South Texas Project (STP), a nuclear power plant being built by HL&P 100 miles away.

The Dasd software, DMS/OS from Sterling Software Marketing, is also being used to keep track of Dasd usage in the data center, where data storage demands have required the facility's 20 IBM 3350 spindles to be replaced by 36 spindles of 3350-compatible Amdahl Corp. 6280s in this year alone. The center also has 16 spindles of IBM 3380 storage.

Lauderdale said it took only about 10 days out of the software's 30-day trial period before the data center was sold on it. "What really sold us on DMS/OS was that after we installed it, I had to leave for a day. I told one of our senior programmers that I had just installed a new system and that it ran under SPF. I told him to go through it to see what he could do with it and that when I came back, I'd give him another report on it," Lauderdale said.

"When I came back the next day, he had successfully completed nearly every function that DMS/OS had to offer, in the simulate mode, without ever touching the manual."

Among DMS/OS's features, Lauderdale praised its volume configurator, which provides the ability to move data between Dasd devices. He said the volume configurator was useful when HL&P-STP made its switch from 20 to 36 spindles. Lauderdale added that he was pleased with the product's ability to migrate individual data sets to selected disk packs. "We did a complete migration of all 20 spindles in about four hours," he said.

Lauderdale praised the product's Structured Programming Facility interface. "[It] generates the JCL for you, so you don't even have to save it every time — you can save it one time, and it's always there."

The software, he added, also aids disaster recovery. In December 1983, an operational error cost a week's worth of data in the backup. "DMS/OS came to the rescue and brought us right back up to tape," he noted. "Our recovery time was less than 24 hours from our disaster."

Meet to cover high-tech mart in China

NEW YORK — The outlook for market opportunities in the computer and high-technology industries in China will be among the topics discussed at the second national conference on doing business with China, Dec. 3-4 at Stouffer's Concourse Hotel in Arlington, Va.

Sponsored by the Energy Bureau, Inc., the program was created for executives and officials from industry and government who are responsible for trade agreements with China.

Presentations will describe the negotiations as well as the current economic, political, legal and regulatory climate in U.S.-China trade relations.

Speakers at the conference include representatives from China Energy Ventures; the Chinese Embassy; the U.S. China Industrial Exchange; Touche Ross and the U.S. Department of Commerce.

Futher information is available from the Energy Bureau, 41 E. 42nd St., New York, N.Y. 10017.

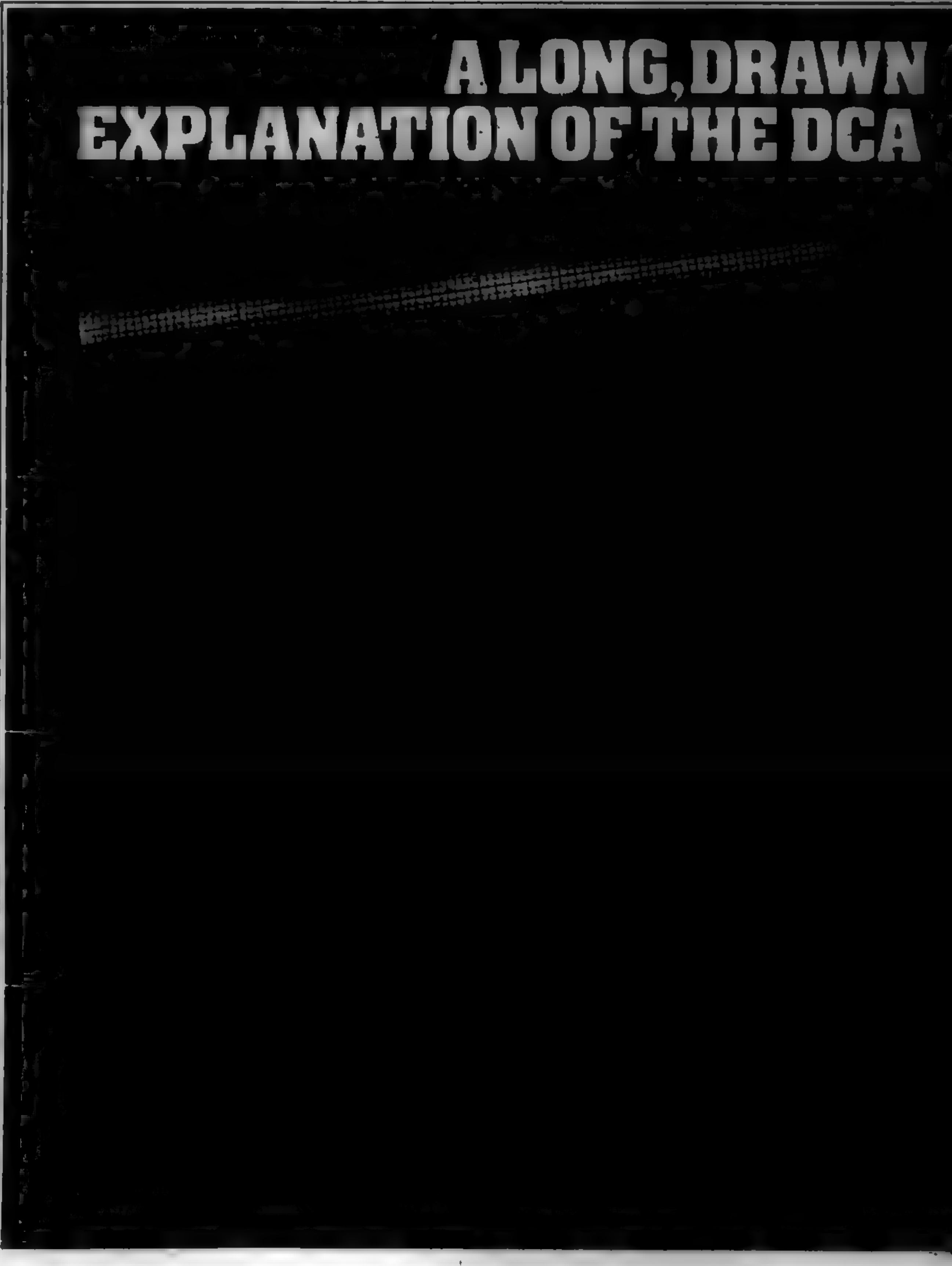
IBM micro role topic of seminar

SAN FRANCISCO — A one-day seminar focusing on the technology and market impact of several IBM microcomputer products will be held Nov. 29 at the Hyatt Regency Embarcadero here.

Sponsored by Future Computing, Inc., IBM products to be discussed at the meeting are the IBM Personal Computer, the Personal Computer AT, the Topview operating environment and the PC Network.

Future Computing President Portia Isaacson and other company executives and analysts will speak at the meeting. Registration is $600 — $480 for Future Computing clients.

More information is available from Future Computing, 8111 LBJ Freeway, Dallas, Texas 75251.



Citibank stalks software for data, user protection

NEW YORK — Concerns about data privacy kept some users from taking full advantage of office automation tools at Citibank here and posed a threat to one of the firm's technological goals.

"The thrust of our office automation effort is to enhance our management's capabilities, to integrate technology in a way that they can use it," according to Richard W. Coughenour, Citibank vice-president and director of office automation.

In line with this goal, Citibank connected more than 500 micros, mostly IBM Personal Computers, to its in-house EZmail telecommunications system, which operates under the firm's mainframe, a Tandem Computers, Inc. Nonstop-TXP. Citibank encouraged managers to use the personal computers for off-line report preparation and for on-line messaging via EZmail.

But, Coughenour said, some users worried about keeping their data secure and continued to process paper transactions. Managers expressed concern about open access to information in local storage, he said, because they said that they felt employees who were authorized for general access could also access confidential information.

Users also perceived problems with sending their private messages through electronic mail. "Some of our people kept even routine correspondence off the system because they were not quite sure who would see it," he said.

Citibank searched for a security system that would address these worries, Coughenour said. "I wanted to reassure people, to let them know that we recognized their concerns." But at the same time, he said, "I didn't want a solution that was so complicated it would keep people away from their [micros]."

Security system criteria

Citibank looked for a security tool that would provide:

- Privacy for local storage.
- Compatibiltiy with telecommunications.
- An easy-to-use format.

The firm looked at hardware solutions that required users to open boxes with keys in order to access communications lines. He felt these systems were too difficult for users to install and use, he said. "I didn't want to raise more obstacles to acceptance and use of our system."

The hardware solutions were also too expensive. Coughenour said an average lock-and-key system costs about $20,000 to secure three or four lines.

Citibank chose a software solution called P/C Privacy: Personal/Confidential from Mctel, Inc. that cost Citibank about $100 for every personal computer it wanted to secure.

P/C Privacy software uses an algorithm to encrypt files. Users encrypt their files using a key phase that they select. If someone who does not know the key phrase calls up the encrypted file in local storage, he will see a garbled message. All characters within the encryted file fall into printable Ascii range, allowing the encrypted file to be sent via communications lines. Data recipients can decrypt the file only if they know the key phrase.

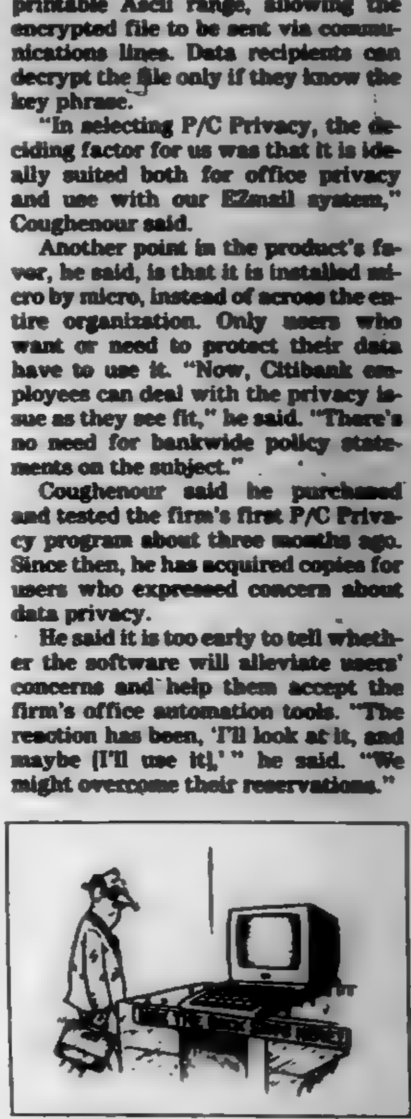
> *'The thrust of our office automation effort is to enhance our management's capabilities, to integrate technology in a way that they can use it.'* — Richard W. Coughenour, Citibank

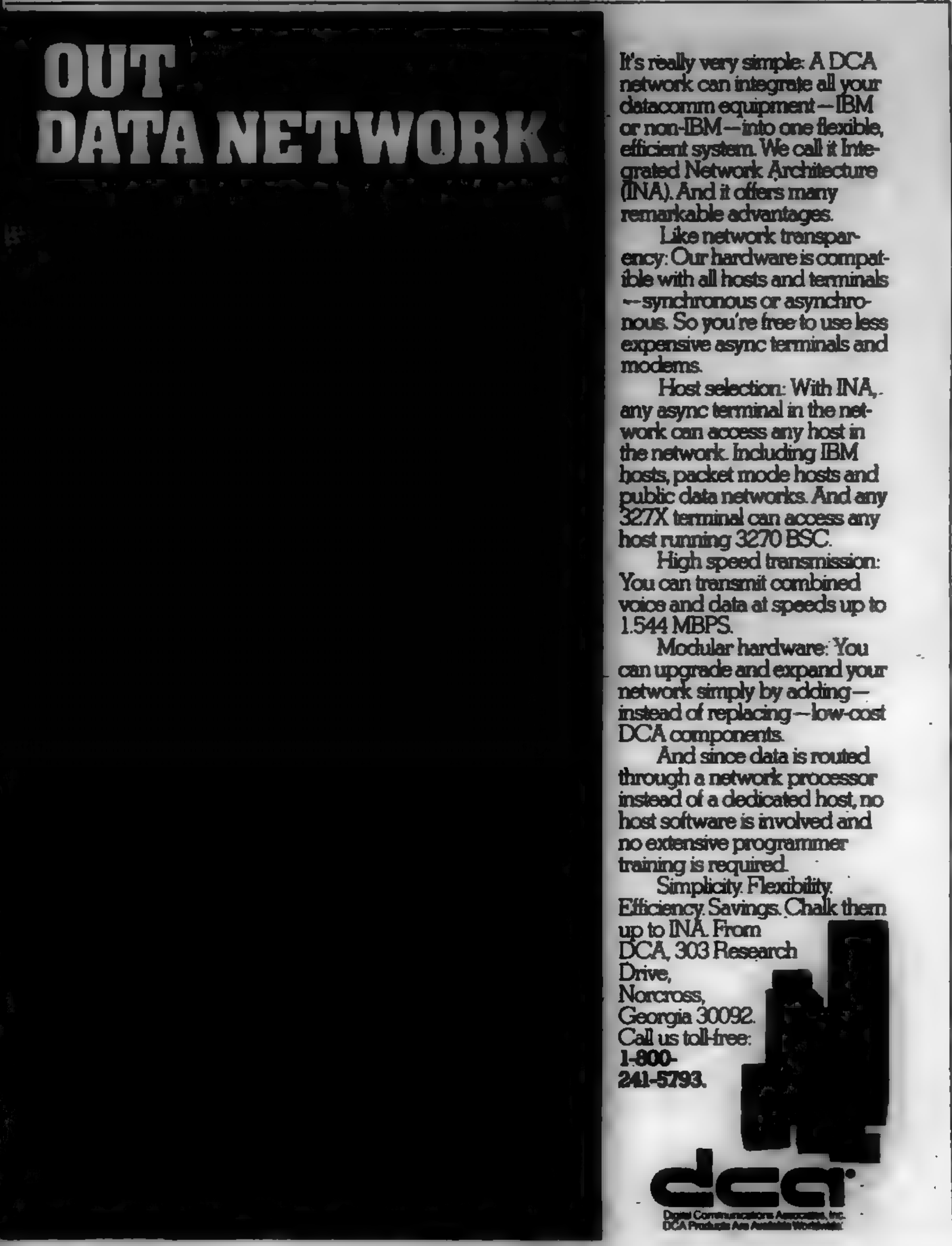
"In selecting P/C Privacy, the deciding factor for us was that it is ideally suited both for office privacy and use with our EZmail system," Coughenour said.

Another point in the product's favor, he said, is that it is installed micro by micro, instead of across the entire organization. Only users who want or need to protect their data have to use it. "Now, Citibank employees can deal with the privacy issue as they see fit," he said. "There's no need for bankwide policy statements on the subject."

Coughenour said he purchased and tested the firm's first P/C Privacy program about three months ago. Since then, he has acquired copies for users who expressed concern about data privacy.

He said it is too early to tell whether the software will alleviate users' concerns and help them accept the firm's office automation tools. "The reaction has been, 'I'll look at it, and maybe [I'll use it],'" he said. "We might overcome their reservations."





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Package cuts outstanding claims for water heater firm

KANKAKEE, Ill.— A leading manufacturer of water heaters improved its credit management control and reduced outstanding claims by more than $700,000 after converting from a manual card system to an accounts receivable software package.

Tom Van Himbergen, vice-president and controller of the Water Products Co. here, a division of A.O. Smith Corp., said that in 1980 he was given the task of strengthening the company's financial systems to make the company more profitable.

A primary concern was to tighten control of accounts receivable, Van Himbergen said. A.O. Smith had a manual system with 25,000 transaction cards, he said. The record-keeping system had not been updated in recent years, and audit trails were difficult to follow, he said.

The old batch system provided almost no customer history and had limited cash posting capability, Van Himbergen said. Some of the cards were unusable because they were so worn, he added. Van Himbergen decided that a new approach was needed if A.O. Smith intended to hone its competitive marketing edge in the future.

Expanded customer base

"When we added two plants on the West Coast and then one in South Carolina, we broadened both our shipping and our customer base," Van Himbergen said. After evaluating several software packages, A.O. Smith selected the accounts receivable system from Management Science America, Inc. (MSA) of Atlanta.

The system was installed at the company's central computer facility in Milwaukee on two IBM 3033 multiprocessors running under IBM's MVS/CICS operating system, said Russell Bordewick, manager of systems. "This was the first true on-line system on the hardware, and the technical people had some problems getting CICS up," he said. "But there have been no problems with the software."

The company needed quick, timely access to information, current credit inquiry capabilities, automatically generated audit trails, real-time cash posting facilities and price remittance audits, said Ken Larson, assistant credit manager and a member of Van Himbergen's project team. It also needed a system that could capture the full credit history of customers and manage claims and discounts, he added.

The team Van Himbergen set up to investigate accounts receivable packages looked at three or four other packages, but none of the other vendors could show the team a similar manufacturing company that was using its product, Larson said. They decided against building a system in-house because it would take too long and cost too much, he said.

"The system gives us immediate credit exposure on all our customers," Larson said. "With the on-line screens, we know what was shipped and billed as recently as the most current posting. We know what's been paid, how it was applied and what's still outstanding. We're able to make decisions based on trustworthy data."

The old batch system provided almost no customer history and had limited cash posting capability. Some of the cards were unusable because they were so worn.

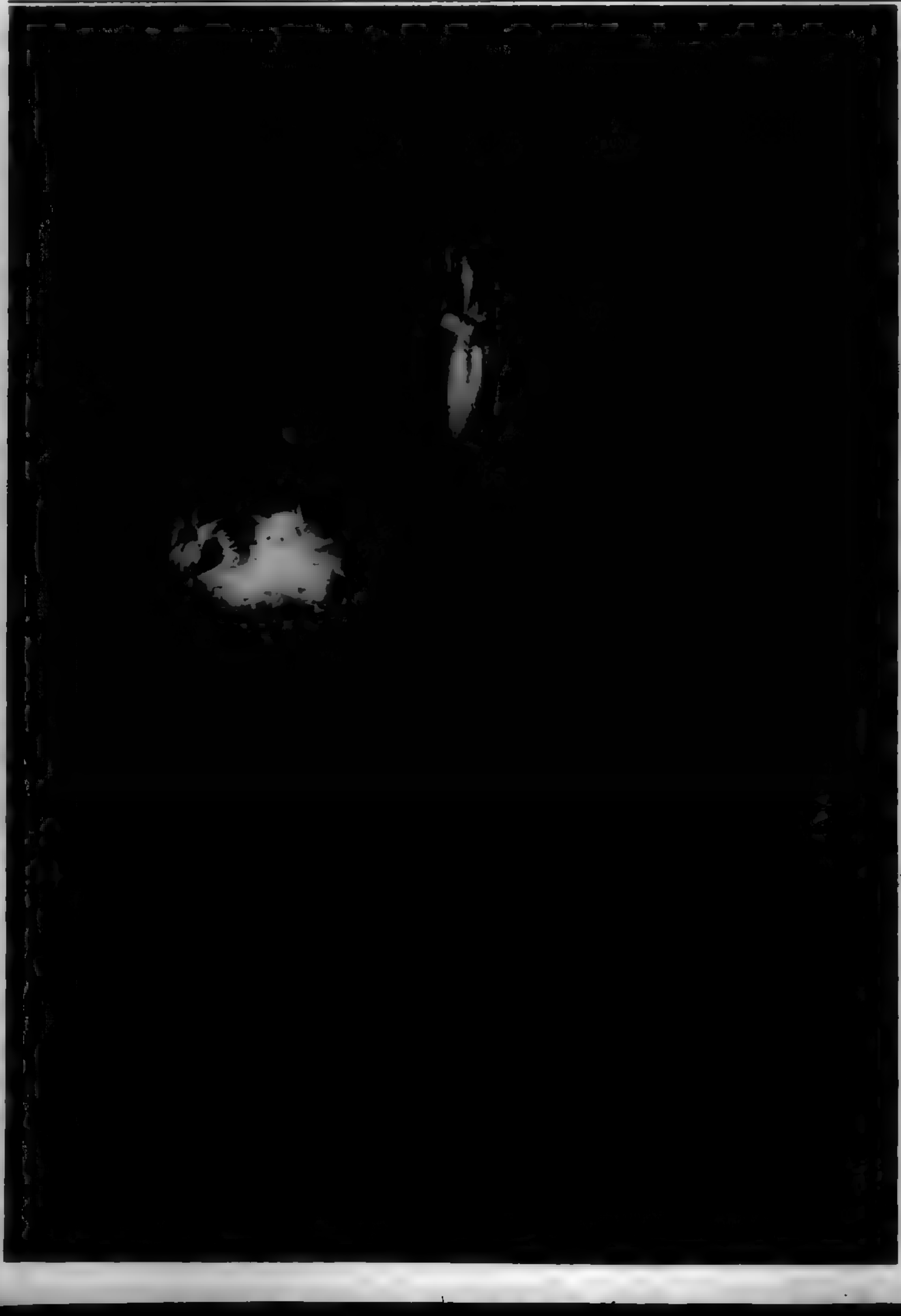
Before, when customers made claims for discounts or price reductions, there was no way of going back to determine if they qualified, Larson said. With the new system, discounts are monitored against time and amount parameters set up by accounting managers, he said.

If the claim does not fit the parameters, the amount is automatically charged back to the customer, Larson said. This saves A.O. Smith as much as $500,000 a year in unresolved claims that they once had no choice but to write off, he added.

The new system cut the average life of a claim in half and reduced the amount of outstanding claims from $900,000 to less than $200,000, Larson said.

The MSA accounts receivable system allows the user to get daily reports on audit trails, batch proof lists, proofs and balances, journals and closed-term histories, and four kinds of month-end aging reports, in sharp contrast to the two reports produced by the old system at the end of each month, Larson said.

Larson said he is looking forward to the next version of the package, which the company plans to install next spring, because it will give sorting options on aging reports or statements. Credit people like to review items by age, with the oldest items being on top of the page, Larson said. The MSA system sorts by reference numbers, which are not sequential at A.O. Smith because of multiple billing systems, he said.



Decision software gives firm's data lateral mobility

DALLAS — Zale Corp. here has grown from one jewelry store, opened in Wichita Falls, Texas, by brothers William and Morris Zale in 1924, into the largest retail jewelry operation in the world.

Unusual among retailers, Zale's operations are vertically integrated. Zale purchases its diamonds from De Beers and then cuts, polishes and mounts them for sale in more than 1,500 worldwide stores, catalog showrooms and other outlets.

At Zale, a broad base of end users, including divisional managers and vice-presidents, use Comshare, Inc.'s System W decision support software running on an IBM 3084 mainframe. Many applications are in the corporate planning area, which is responsible for the strategic and annual business plans, general financial analysis, checkpoint review of capital expenditures and coordination and control of acquisitions and divestitures.

"Right now," said Gene Morphis, senior vice-president of corporate development, "we are using System W heavily in our strategic planning process. We maintain a five-year forecast by business unit that is constantly updated and the results consolidated."

Morphis pointed out that Zale's hierarchy model is not a typical one because of the firm's financing division. This credit division is influenced by the sales in other divisions and, in turn, passes its expenses back to those divisions.

"Most modeling languages are built to pass data up a hierarchy, and those products are a dime a dozen. What they don't do well is pass data across the model, or sideways. System W's data base structure makes it simple and straightforward to model the relationships between our credit and other divisions," Morphis said.

Sales-demand forecasting at Zale uses System W's statistics and consolidation capabilities. "We use [Standard Metropolitan Statistical Area] data that must be consolidated and allocated any number of ways to form market estimates," Morphis explained. "The same data is rolled up many different ways, and System W handles that effectively," he added.

'Working tool for management'

Catalog sales are a rapidly growing jewelry market, and a model has been developed that Zale uses to optimize the return on catalog showroom floor space. "This is one of the more exciting things we are doing. It provides a whole new dimension in evaluating stores. It is more than a primitive pro forma based on percentage of sales figures. It is a working tool for line management," Morphis said.

In looking for a decision support package, only nonprocedural languages were considered. All concerned at Zale agreed that the time needed to write something in a nonprocedural language is a fraction of the time needed in a procedural language, according to Morphis. Also, the software had to perform rigorous simultaneous equations. The software selected had to be capable of implementing the models Zale had already developed since 1980 on a time-sharing service, he said.

All of the products were good, Morphis said, but he noted that System W's data handling and data base management capabilities made the difference. It was also important that System W could be used on IBM mainframes, IBM Personal Computers or on Comshare's time-sharing service.

"Putting professional tools in the hands of professional managers — that's the way I'd sum things up," Morphis said. "System W is a working tool in the mainframe, and we expect a larger community of users over time."

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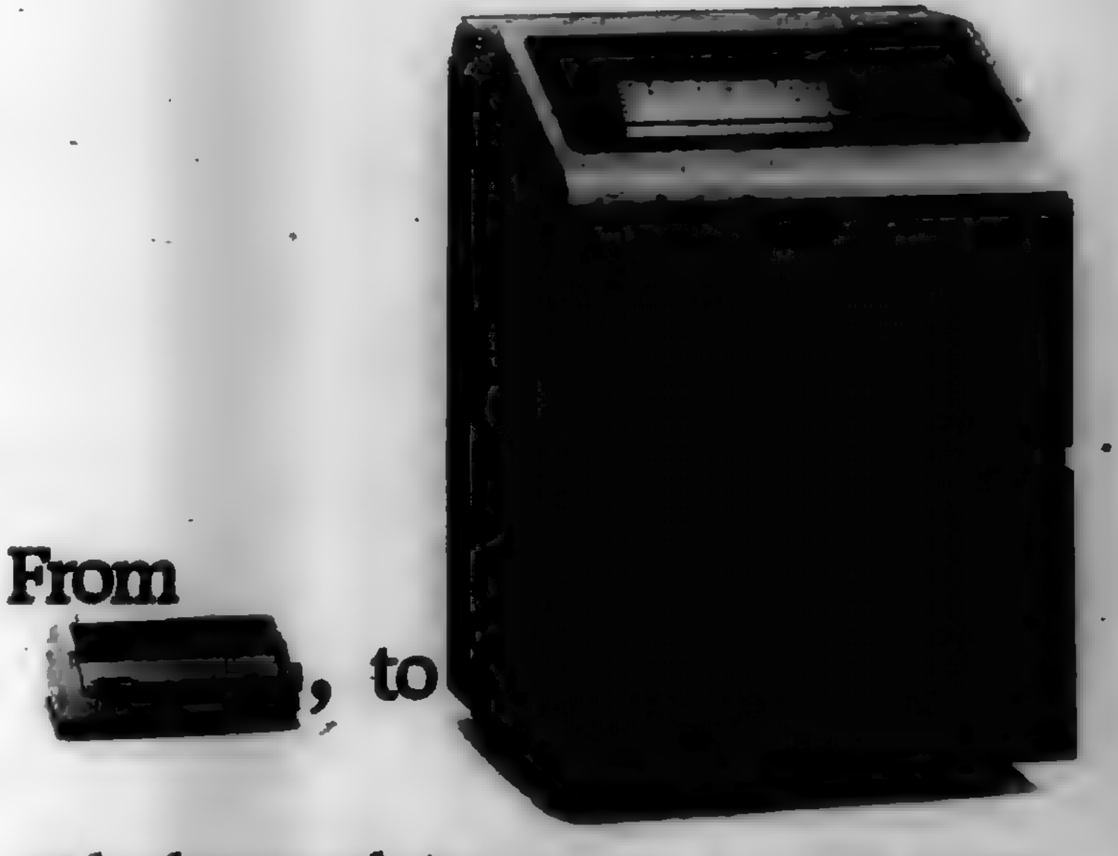

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MANAGERS ON THE MOVE

The Department of the Treasury's Financial Management Service has announced the appointment of RONALD A. NERVITT as assistant commissioner for information systems.

Prior to his Treasury Department appointment, Nervitt was Technical Director with the Naval Intelligence Command, where he managed the acquisition of major computer systems and provided support services to a broad range of U.S. Navy analysts and administrators.

Nervitt has more than 25 years of experience in the computer field, having managed organizations within the U.S. Navy, the General Services Administration and the National Security Agency (NSA) that were responsible for planning, acquiring and operating major computer, telecommunications and secure systems and networks.

At the Financial Management Service, he will manage a staff of approximately 370 employees and oversee a similar number of contractor personnel who together provide system support and services to financial managers govermentwide.

During his tenure at the NSA, Nervitt was responsible for conceiving, planning and programming a number of computer-based cryptographic systems now used in both the government and private sector.

He has published numerous papers on computers and cryptography and received the Meritorious Civilian Service Award for outstanding contributions to the NSA.

He earned undergraduate degrees from Pennsylvania State University and American University, majoring in engineering and physics, respectively. He also holds an advanced degree from Johns Hopkins University.

■

Griffin

DENNIS W. GRIFFIN has been named director of management information systems for Indian Head Industries, Inc. in Southfield, Mo. In this position, he will be responsible for all data processing and management information systems at Indian Head.

Prior to his appointment, Griffin had been the company's supervisor of programming and systems. He joined the company in 1977 as an analyst programmer.

He attended Oakland Community College and the Control Data Institute.

Indian Head Industries is the parent company of Detroit Gasket, a major manufacturer of gaskets and soft trim components for the transportation industry, and MGM Brakes.

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Micro series scheduled

MINNEAPOLIS — Architecture Technology Corp. has announced a series of seminars covering issues in microcomputer communications in local environments.

The seminars, titled "Personal Computer Communication Systems," will cover communications technology, micro-to-mainframe links, advanced micro local-area network features and IBM's Personal Computer network strategy. The target audience includes strategic planners, DP managers, micro system designers and office automation professionals.

Scheduled dates and locations for the seminars are: Dec. 3-4, Washington, D.C.; Dec. 5-6, Orlando, Fla.; Dec. 10-11, Los Angeles; and Dec. 13-14, Honolulu. Preregistration is priced at $645, and onsite registration costs $845. More information is available from Architecture Technology, P.O. Box 24344, Minneapolis, Minn. 55424.

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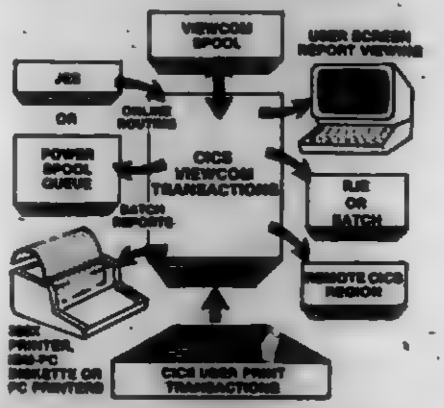
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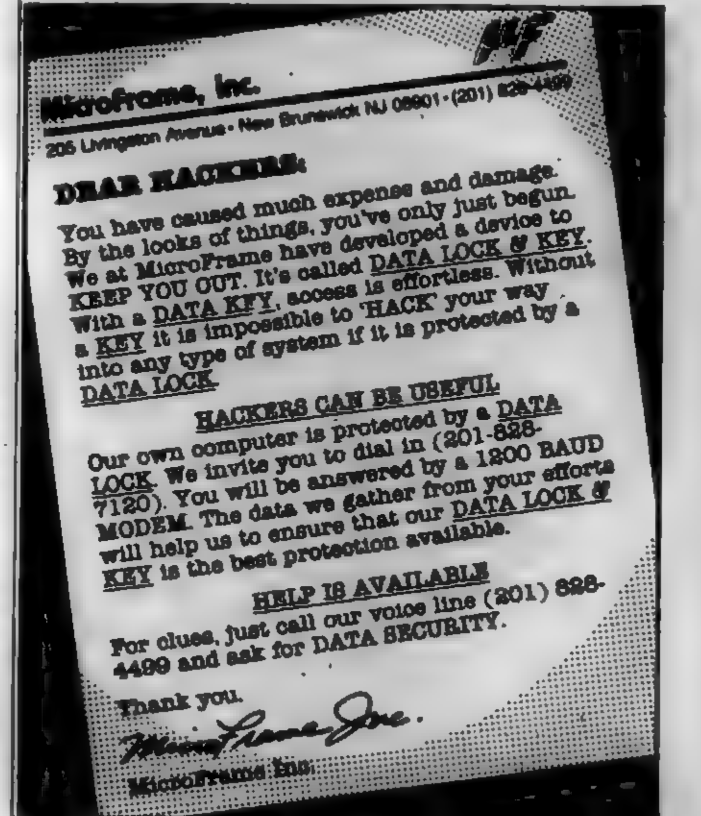
NEW YORK — The National Retailers Business and Equipment Exposition will be held Jan. 13-16, in conjunction with the National Retail Merchants Association's (NRMA) 74th annual convention, at the New York Hilton and Sheraton Centre here.

"Retail Directions '85" will feature information and demonstrations on operating technologies, equipment and fixtures as well as product and services for retail use.

The exposition is free to retail industry members. More information is available from Dan Soskin, NRMA Enterprises, 100 W. 31st St., New York, N.Y. 10001.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TURNAROUND TIME

Larry Long

Q In the last six months a great deal has been said and written about expert systems. I've been asked to assess the feasibility of developing or purchasing an expert system for our company. I've located a company that claims to be developing an expert system in our field, but refuses to release any information on it. What do you believe the staying power of expert systems to be?

As buzzwords go, "expert systems" reigns supreme. Expert systems are now moving through the "clever and interesting" stage to the "useful" stage. The inexpensive, powerful technology that is just around the corner will catapult these memory-intensive expert systems into the ionosphere by mid-to-late 1985. But, herein lies the problem.

Just as every piece of management software was labeled a decision support system (DSS) during the last seven years, everything from now on will be labeled an expert system. It was fine to call software "DSS" because it used existing technology. Anyway, DSS was just a new name for an old concept. But, "real" expert systems rely on radically different technology and ideas.

My fear is that we will see dozens, if not hundreds, of expert systems catering to every imaginable market over the next few years. Most will be no more than DSS that use traditional data structures. This will make it difficult for the novice consumer to distinguish between a knowledge-based expert system and a fraud. In the inevitable rush to get these systems to the market, I expect many to be released prematurely. Expert systems are here to stay, but during this shakeout period, test-drive a system from coast to coast before buying it.

Q I, along with 30 other middle managers, received a bluntly worded memo from the president of our company that encouraged us to become computer-literate as soon as possible. Details were omitted.

Because I am the only middle manager with any semblance of computer knowledge, at least 10 others have asked me for guidance. I consider myself to be computer-literate, but the president's memo did not define it, so I don't know. At what level of knowledge does one become computer-literate?

Companies promote it for their employees. Parents demand it for their children. Those who have it believe they have a competitive edge. Those who don't have it seek it out. "It" is computer literacy. Interestingly, in both business and academe, a fundamental question is often unanswered: What is computer literacy?

Is it social issues, technical concepts, programming, application skills and/or hands-on exposure? If so, what is the proper mix? I define computer literacy in terms of what an individual will have achieved upon attaining computer literacy (vs. identifying topics of study). The computer literate person will:

- Be comfortable in the use and operation of a computer system.
- Be able to make the computer work for him through judicious generation or use of software.
- Be able to generate input to the computer and interpret output from the computer.
- Be able to understand how computers are impacting society, now and in the future.
- Be an intelligent consumer of computer-related products and services.

I would welcome feedback on this concept of computer literacy.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

Videoconference to be broadcast via satellite

PISCATAWAY, N.J. — A videoconference titled "Integrated Manufacturing Systems" will be aired via satellite across the U.S. Dec. 4 by the Institute of Electrical and Electronics Engineers (IEEE).

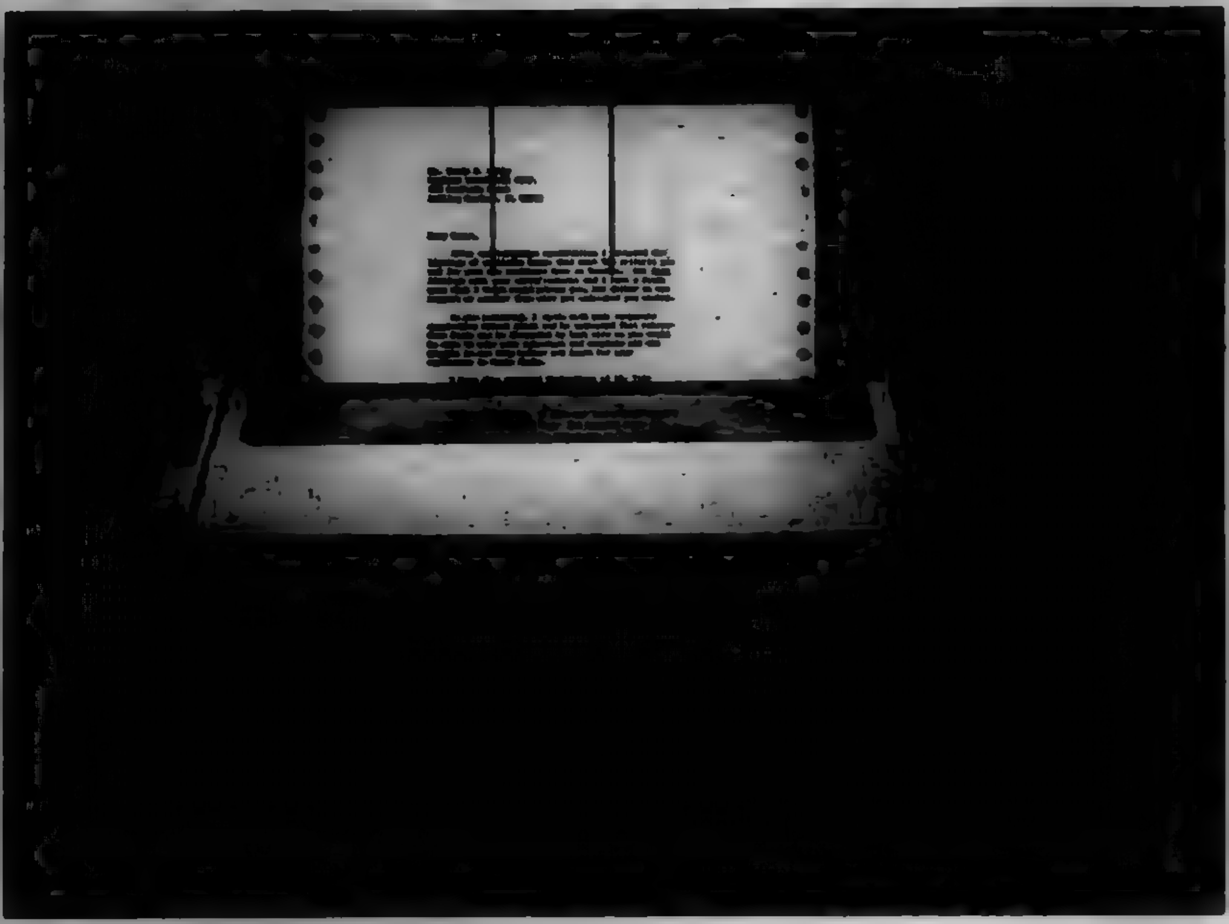
The videoconference will cover manufacturing product design; production systems design; manufacturing lines installation and operation; manufacturing management; and industrial systems education, said a spokesman for the IEEE.

The technical consultant for the conference is John Luber, of the Manufacturing Technology Institute, an internal corporate-level school of IBM.

Others appearing at the session will be William Beeby, a lecturer on manufacturing systems; Edward Holden III, director of advanced engineering for manufacturing at IBM; Samuel B. Korin, director, IBM Manufacturing Technology Institute; and Donald L. Sage, department chief, engineering and computer systems development, Richmond works, AT&T Technologies.

The videoconference will be aired to universities, companies and IEEE-sponsored locations.

The fee schedule and information for establishing a site may be obtained from the IEEE Continuing Education Department, IEEE Service Center, 445 Hoes Lane, Piscataway, N.J. 08854.



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Micro system keeps court cases at reporters' fingertips

WASHINGTON, D.C. — When the Reporter's Committee on Freedom of the Press, founded 12 years ago here, began to seek information through freedom of information statutes in the 1970s, the committee found it needed a fast, cost-effective method of tracking cases.

Under the direction of Newhouse Newspapers veteran reporter Jack Landau, the committee late last year acquired a microcomputer system that could trace court docket numbers, monitor the status of individuals involved in litigation or controversial journalism around the country and be learned with relative ease.

The system is the 32:16 from Fortune Systems Corp. of Redwood City, Calif. The committee first installed a 32:16 with 768K bytes of main memory and a 30M-byte hard disk, running AT&T's Unix operating system. After reviewing what its needs will be this winter, the committee acquired 1M byte of main memory.

The committee operates four terminals in-house and one at Landau's home. None of the users working with the system are trained in DP; two are lawyer/journalists and a third is a retired newspaper editor. All are picking up expertise in computers along the way, according to Robert Becker, a staff attorney with the committee.

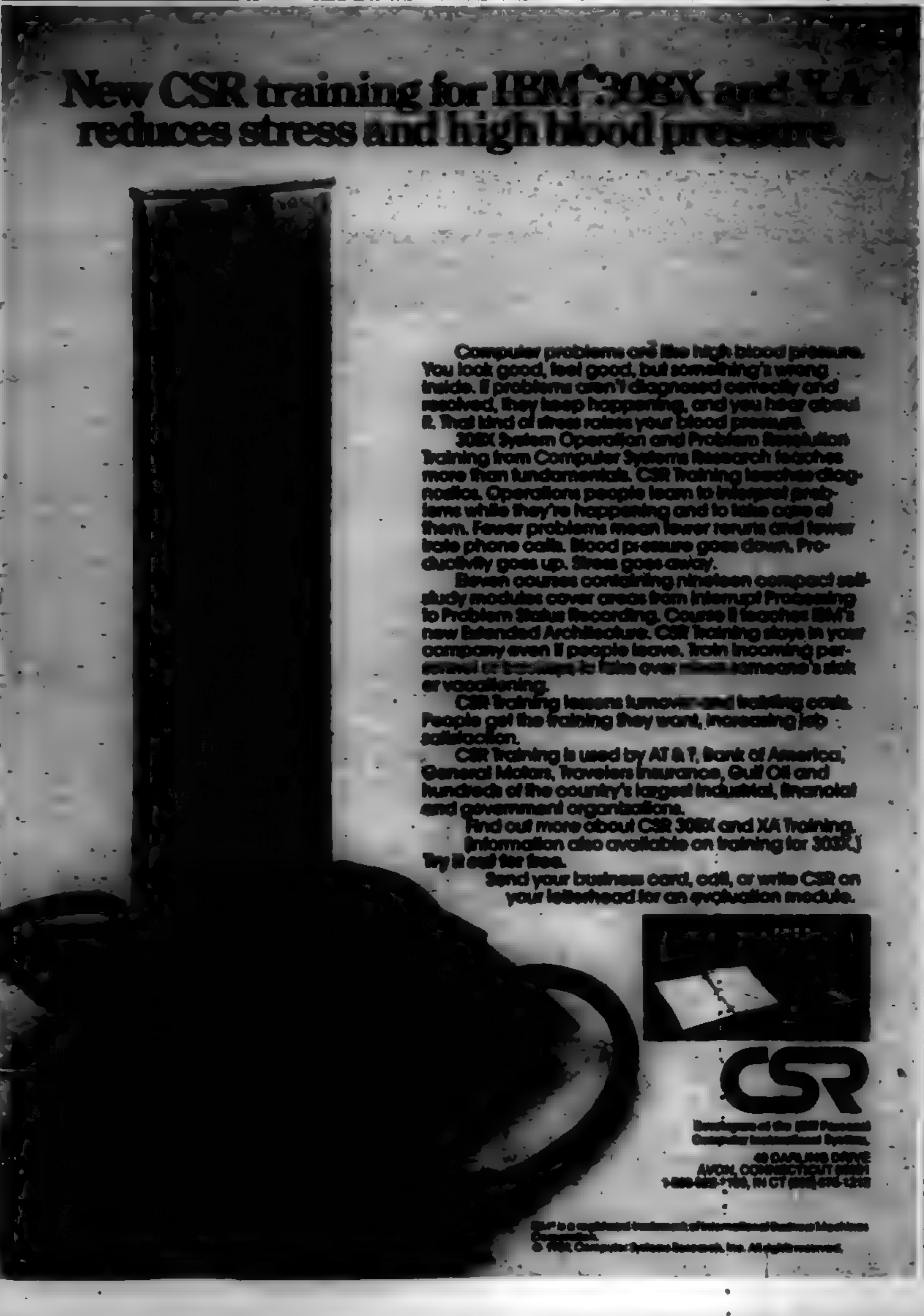
"This is the perfect network system for a small organization like ours, which needs access to a word processing system, a data base and a spreadsheet," Landau said. "We find it extremely easy to use, and we've been able to show law and journalism interns how to use it in a minimal amount of time."

Initially, the committee required a strong word processing program. One of the major functions of any organization that operates on a nonprofit basis, Landau said, is fund-raising and communications, and Fortune:Word — Fortune's proprietary word processing system — fit that requirement.

But shortly after the system's installation, Landau and his staff decided that a strong data base for tracking cases, along with a spreadsheet to permit more in-house budget estimating and data exchange, would improve productivity. "We've set up a single information inventory system using [Microsoft Corp.'s] Multiplan;" he said. "We can easily make entries using Multiplan's textual capabilities, then switch to Fortune:Word. It seems we've pushed the system pretty hard, beyond its usual functions, and it has responded well."

At present, the Reporter's Committee staff is tracking more than 800 cases around the country — most of them still pending. The staff is working on entering cases into the data base, however. "We are nowhere near getting 12 years of files into the system yet," Becker said. From the cases on file and in the data base, the staff responds to several thousand telephone calls each year from journalists and attorneys seeking information.

The range of functions that office automation has made available to the committee continues to increase, according to Landau. The Reporter's Committee now is preparing data bases of potential contributors and is processing mailings through Fortune:Word to individuals who support the committee activity. In addition, a series of legal dissertations and education programs for journalists around the country is being prepared with the help of the system.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Computer meet to feature law, communications

PHOENIX — Judge Harold H. Greene, who presided over the landmark divestiture of AT&T, will deliver the keynote address at the Third Annual Advanced Computer Law Invitational to be held at the Pointe Resort at Squaw Peak here Jan. 14-16.

According to the sponsors, the Arizona Law and Technology Institute and the Arizona State University College of Law, the event will be a conference and workshop on the emerging legal issues resulting from the convergence of the computer and communications industries and recent regulatory changes relating to telecommunications. The conference faculty is scheduled to include more than 30 national and international experts who will provide an advanced briefing for industry executives.

Scheduled speakers include J. David Hann, president of GTE Telenet Communications Corp.; Howard Aibel, senior vice-president and general counsel of ITT; Howard Trienens, vice-president and general counsel of AT&T; Hugh Barrett, senior vice-president of First City Bancorp.; and Kenneth Cox, senior vice-president of MCI Communications Corp.

The cost for the Invitational is $545.

Information is available from the Arizona Law and Technology Institute, c/o Arizona State University College of Law, Tempe, Ariz. 85287.

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COM generator eases microfiche duplication woes

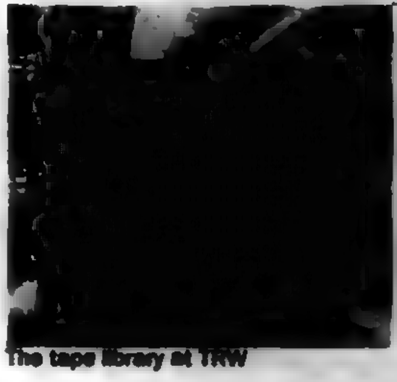
REDONDO BEACH, Calif. — When TRW, Inc. reorganized in 1981, company management emphasized the need to reduce data processing costs. As a result, the computer operations department of the company's Operations and Support Group closely examined its computer-output microfiche (COM) operation.

The company estimated the cost of an impact-printed original page at 12.5 cents; a high-speed laser-printed page at 3.5 cents; and a microfiche of 270 pages at $1.37, or 0.05 cents a page. Each duplicate microfiche cost 17 cents, according to Emanuel Valdez, manager of computer operations.

Valdez's department is responsible for all business data processing for five operating groups of TRW's Electronic & Defense sector here. The business processing needs include accounts payable, accounts receivable, inventory control, manufacturing systems and management reporting.

8.2 million pages a month

The department's DP equipment includes two IBM 3081 mainframes, an IBM 3033 mainframe, an IBM Series/1 minicomputer, four high-speed laser paper printers and two impact paper printers. The department produces some 8.2 million pages of output each month.



The tape library at TRW

"We realized that many departments wanted to use COM because of the potential cost and space savings, but they were not satisfied with the quality we were producing," said Dan Williams, a computer operations shift supervisor. "So we evaluated dry COM units that were reliable enough to go on-line, and the [Eastman Kodak Co.] Komstar 200 microimage processor was the best on the market. An on-line system substantially increases productivity."

"We had a lot of resistance when we were using the earlier, wet COM equipment, and with good reason," Valdez said. "We could not service the users as quickly as needed because the COM hardware was unreliable. Even if we did turn the work around fast enough, we frequently had to redo jobs because quality was inconsistent."

No operator intervention required

One advantage to the Komstar 200 unit, Valdez noted, is that it is an on-line device that requires no operator intervention. TRW's computer system sees it as just another high-speed printer.

The Komstar unit, like the other printers, functions as a computer peripheral, but prints on film rather than paper. The device has its own front-end minicomputer, so it functions on-line without requiring special programming by the host computer. Microfiche are exposed, cut and processed in an automatic, straight-line operation.

Users who need many duplicates realize the greatest savings. The payroll department probably benefits the most because it needs many precise duplicates, Williams said. Duplicates are produced by a Kodak Ektafiche duplicator, which can generate single or multiple microfiche copies from an original at a maximum rate of 1,000 copies per hour.

"We have reports that required 50 magnetic tapes, which an operator had to load onto the off-line, wet COM units," Williams said. "The process was not only time-consuming and labor-intensive, but it also created problems with tape drives and operator error."

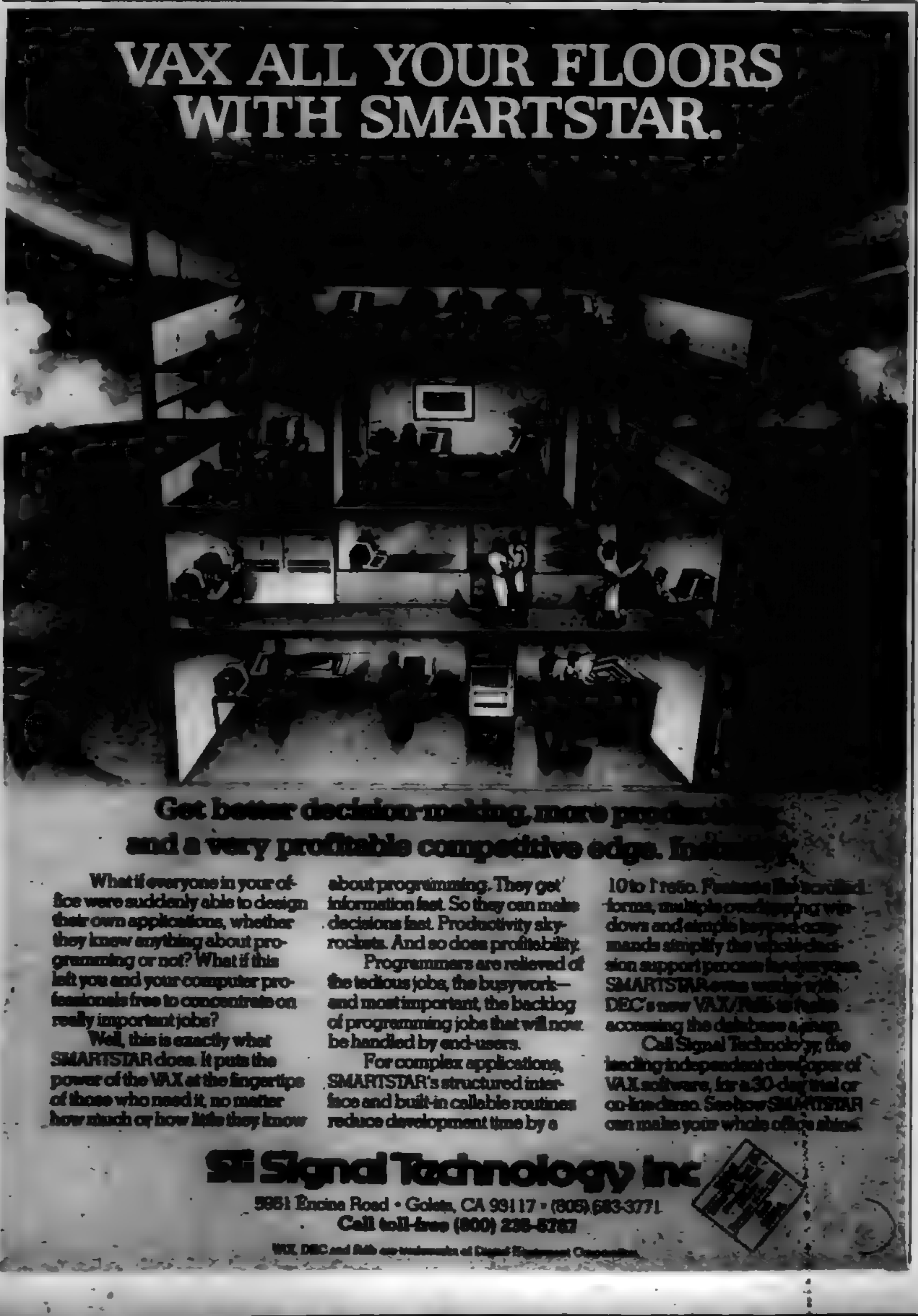
Direct transmission

Now, data can be transmitted directly to the on-line Komstar unit from the mainframe computer, eliminating operator intervention. Operators remove the finished, stacked microfiche from the receiving tray and load film.

The department presently generates more than 3 million frames a month on the Komstar processor and about 80,000 duplicate microfiche on the Ektafiche duplicator.

The computer operations department's COM volume has increased 500% since installation of the dry processing units, bringing the total COM volume to 40% of the department's total output, according to Valdez. The Komstar unit produces almost half the volume run on the four laser paper printers, he added.

The conversion to dry processing took three days. The department had some quality problems in the beginning because no quality control system was employed by the 40 operators who used the equipment. Valdez enlisted Kodak's aid in establishing a quality procedure. Now, a control microfiche is run at the beginning of each of three shifts. He said the equipment is also reliable — it was available 99.8% of the time in an 18-month period.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Government official to address telecommunications gathering

HONOLULU — David Markey, U.S. assistant secretary of Commerce for Communications and Informations, will be among the speakers at the seventh Pacific Telecommunications Conference (PTC), Jan. 13-15 in Honolulu.

The conference will be held at the Sheraton-Waikiki hotel and will address how digital technology affects the development of telecommunications services in the Pacific. Other scheduled speakers at the conference include Martin Fournier of Teleglobe Canada and Michio Nagai of United Nations University.

On Jan. 15, J.C. Delorme, president and chief executive officer of Teleglobe Canada, will discuss "Education in a Digital World." Also on Jan. 15, groups will meet to discuss problems and issues in teleconferencing, transborder data flow and training.

Richard Colino, director general and chief executive officer of the International Telecommunications Satellite Organization, will discuss international satellite service.

Registration for the conference is $360 for members of the Pacific Telecommunications Council and $395 for nonmembers. PTC is at Suite 308, 1110 University Ave., Honolulu, Hawaii, 96826.

Computer conference to cover applications in CIM technology

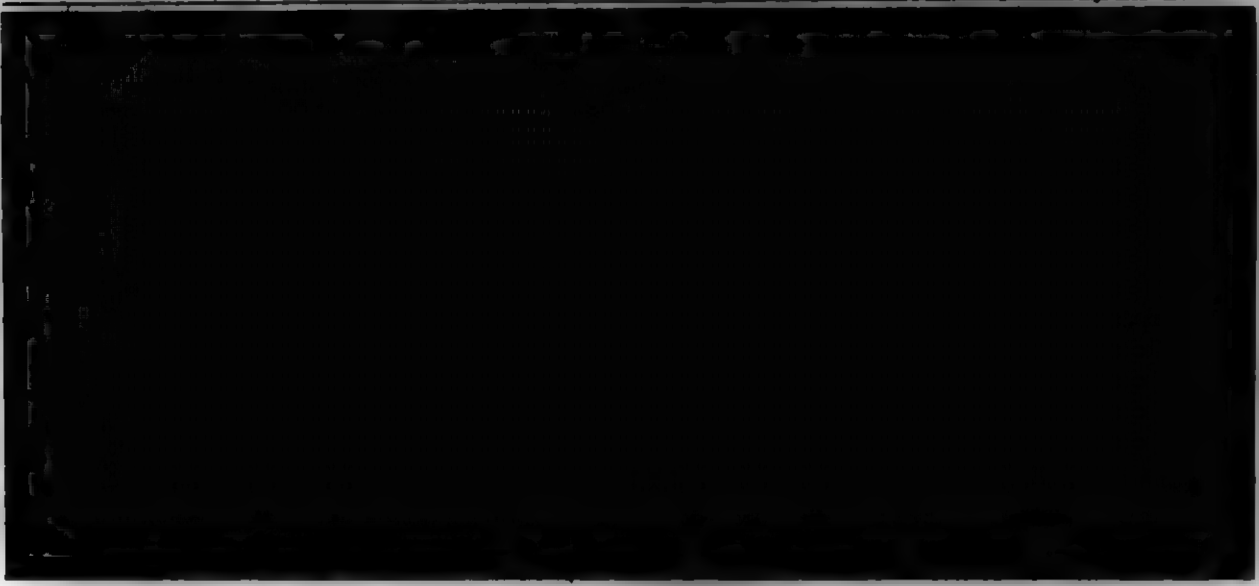
BURLINGAME, Calif. — George Meister, vice-president and general manager of McDonnell Douglas Automation Co.'s computer-integrated technology division, will present the keynote address at the Computers in Manufacturing conference Nov. 28-30.

The Computers in Manufacturing conference will focus on the application of new hardware and software and on communication and management techniques in Computer-Integrated Manufacturing (CIM), according to its sponsors, the National Institute for Management Research. The conference will also examine the integration of the data processing department in CIM and the uses of production control and materials handling.

All attendees will reportedly receive a 1,000-page reference notebook on CIM.

The conference will be held at the Hyatt Burlingame Hotel here. Registration is priced at $595 per person. Group registration is $295 per person.

Additional information on the conference is available from the National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.



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System licks candy maker's inventory control problems

OAKLAND, Calif. — Rapid growth of a candy maker here made inventory control and product tracking a time-consuming task.

According to Controller Glenn Casebolt of Herman Goelitz Candy Co., two years ago the company computerized its product inventory system in order to provide greater control over the company's candy manufacturing processes. Goelitz Candy makes Jelly Belly jelly beans, candy corn, Jordan almonds and bridge mixes.

When Casebolt joined Goelitz Candy, he knew just what he wanted in a computer system, having seen several companies go through the conversion process.

"Basically, I did not want to hire our own programmers," Casebolt said. "I wanted a package that was specially geared to the food industry."

Shopping around

A six-month selection process had Casebolt looking at quite a variety of products, including minicomputers from both IBM and Wang Laboratories, Inc.

A software package that was geared specifically to the food industry was of particular importance in his selection, according to Casebolt. "I bought the software first and then bought the hardware to go along with it," he said.

In May, Goelitz Candy completed installation of a Management Associates, Inc., MAI 8010 hardware/software package.

The company's system encompasses both its Oakland, Calif., and Chicago offices. It includes a 1M-byte memory, a 144M-byte disk drive, a magnetic tape streaming drive, 10 VDTs (four for each office), five printers and three IBM Personal Computer interfaces.

Casebolt now uses a Personal Computer, but, according to the controller, the company is planning to expand its number of Personal Computers in the future.

According to Casebolt, before the installation of the computer system, the company used a service bureau to process its product orders, sales analyses and accounts receivable. All invoices, bills, sales analysis recaps and accounts receivable recaps would be back at the candy company in about 48 hours, Casebolt said.

Instant updates

With the new system, Casebolt said, members of the order department receive instant information updates on any sales, billings and accounts receivables.

"We can, in a much easier fashion, keep tabs on dated [candy] products — when they were produced and when they went to market," according to Casebolt, "Plus, the more efficient operation of our offices" means less overhead, and as a result, "candy prices probably won't be rising as rapidly as they might without the system."

"The system provides for almost every type of transaction, including marketing, manufacturing, cost and inventory controls" of finished goods, he said.

THE CHAIR RECOGNIZED RALPH CLAX FROM RESEARCH
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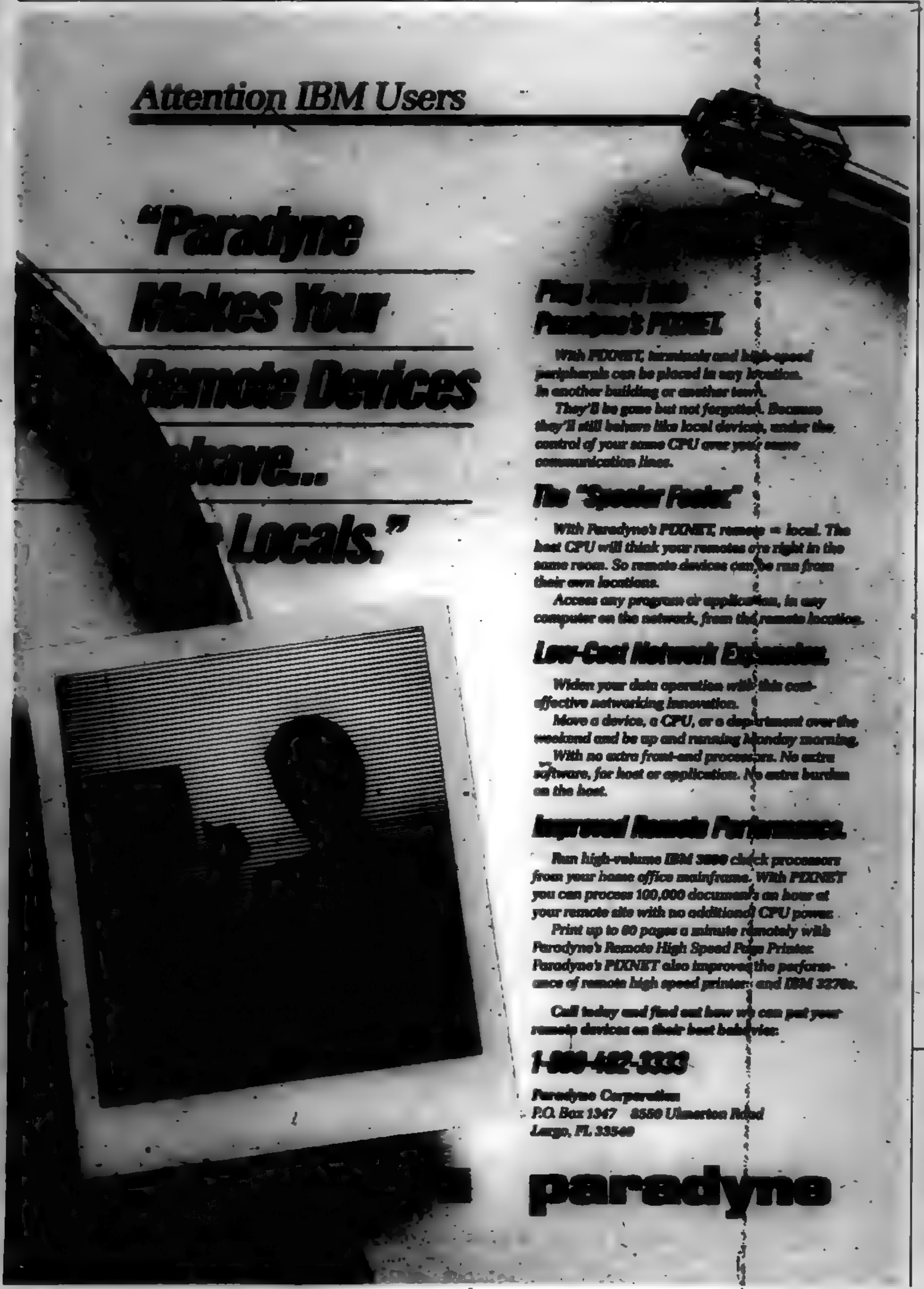
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OFF THE PRESS
George Harrar

BOOK REVIEWS

DATA ADMINISTRATION
By William Durell

The author makes the case for the data administrator as the person to "plan, document, manage and control the information resources of an entire organization." Analysts and programmers typically manage the data for the systems and programs directly under their control. The data administrator takes the larger corporate view and uses data dictionaries and data bases as his tools of control.

Durell argues for data dictionaries, describing them in much more glowing terms than their current usage in DP departments would seem appropriate. Data dictionaries are just one area where the worlds of the data administrator and the data processor diverge in practice and theory. Data processors tend to dislike rigid data definitions forced on them; they think in terms of systems, not data; they resist the use of data formatted and defined by someone else.

Data administrators are advised to seek out the authority from management to prescribe data standards on the independent-minded DP workers. Of course, the active cooperation of those in DP or end-user departments would further the data administrator's goal. There are two questions: Can he get this cooperation? And does he deserve it?

Hardcover, 303 pages, $32.95, ISBN 0-07-018391-0. McGraw-Hill Book Co., 1221 Avenue of the Americas, New York, N.Y. 10020.

HOW TO WRITE PAPERS AND REPORTS ABOUT COMPUTER TECHNOLOGY
By Charles Sides

If you did not foresee writing as much as you do on the job, then you probably are not prepared to do it well. Writing proposals, specifications and documentation may be the most unexpected and irritating part of a computer professional's work. Writing may also be the most important, according to the author.

The first lesson is a maxim for all writers: Write to your audience. That means judging what level of detail and jargon your readers can take. Writing over or under the heads of readers will lose their attention quickly.

Next, analyze the document's purpose. Here you determine the problem, the technical issues and exactly what the paper will do for the reader.

A working structure is necessary — what the author calls a Visual Organization System, which is known to everyone else as an outline. Getting organized leads to getting information and then to explaining the subject. This section is the book's best. Six types of definition techniques are discussed: formal/informal, metaphorical, stipulative, contextual, operational and divisional. The words sound pedantic, but the book clearly shows how each specifies a type of sentence commonly found in documentation.

A divisional definition, for instance, is reflected in this sentence: "[Digital Equipment Corp.'s] Decmate is a stand-alone personal computer which is comprised of a [CPU], a video display screen and a keyboard terminal." The writer must understand that when a reader sees a divisional definition, he expects to read next about each part mentioned in order.

There is a good deal more in this slim book, with much of it presenting good writing techniques. Some of the discussion is linked to the specific problems of communication in the computer industry. More would have been better.

Paperback, 148 pages, $14.95, ISBN 0-89495-036-3. ISI Press, 3501 Market St., Philadelphia, Pa. 19104.

ART AND THE COMPUTER
By Melvin Prueitt

If you are, by chance, in the midst of the practical problem of coaxing business graphics from computer to slide or paper, take a moment to rest your eyes on an arresting gallery of images. No graphic will seem too difficult to produce after leafing through these 300 striking examples of what the computer can do, given time, software and an artist in control.

Note particularly Picture 147, "Foggy Chessmen," where the pieces are reflected in the board and softened in fog; Picture 168, "Down the Drain," a sphere falling into a gray and purple-striped vortex; and Picture 282, "Sunflowers Watching the Sun," where each flower is angled slightly differently toward the light.

A short, preliminary section discusses animation and computer-aided design. Next to each color picture, a caption tells who created the image and where. Sometimes the author tells how the picture was made. More such explanations and in greater detail would have added to the appreciation of the art and the difficulty of its creation.

Paperback, 246 pages, $29.95 (hardcover, $39.95), ISBN 0-07-050899-2. McGraw-Hill Book Co., 1221 Avenue of the Americas, New York, N.Y. 10020.

BOOKS OF NOTE

THE SOFTWARE CATALOG: BUSINESS SOFTWARE lists 5,000 programs for all major micros and minis produced from the International Software Database. Paperback, 696 pages, $35, ISBN 0-444-00934-5,

See REVIEWS page 75

Insurer upgrades sales system with training, printer

SPRINGFIELD, Mass. — When a large insurance company here decided to upgrade the sales support system in its agency offices across the country, 13 manufacturers were in the running to become the dot matrix printer supplier.

Massachusetts Mutual Life Insurance Co. developed Respond III-PC, which consists of the IBM Personal Computer 3270 running under IBM's DOS 2.0, printers, in-house-developed sales applications software, Multimate International, Inc.'s Multimate word processing and Lotus Development Corp.'s 1-2-3, according to Richard Coburn, second vice-president of Mass. Mutual. The system was designed to bring the home office's Amdahl Corp. mainframe computer capabilities into the widely scattered agency offices, he said.

The company reasoned that by capitalizing on the computer's ability to produce sales illustrations, complicated spreadsheets, annual review letters and other kinds of routine correspondence quickly, the Mass. Mutual agent can spend more time providing service to current policyholders and seeking new ones, Coburn said.

In February 1983, the company announced its push to put Respond III-PC in place, Coburn said. It organized two- and three-day training programs for its clerical staff and agents in the use of the system's word processing package and in the 1-2-3 package, he said.

Most of the software was written in-house with a high priority on user friendliness, Coburn said. Programs use prompting, menus, error messages, validity checking and come with reference manuals so users can train themselves, he added.

The company had thoroughly researched sources of hardware and software by evaluating selected materials for at least 30 days in-house, Coburn said. It also arranged for quantity purchases at high-discount prices by dealing directly with vendors and committing to high volumes to take advantage of quantity price breaks, he said.

Thirteen dot matrix printers were reviewed prior to selection, Coburn said. Nine of those were put through an extensive evaluation for more than a month, he added, while the remaining four were given cursory examinations.

The company's technical staff did hands-on evaluations to determine features such as speed, reliability, noise level and clarity of characters, he said. They also contacted other users as reference checks and investigated the reputation and size of the vendors. One guideline was to stay away from small manufacturers to avoid buying machines that would not have support in the future if the small business failed, he said.

Rugged system

Mass. Mutual decided on the 3024 model, manufactured in Waynesboro, Va., by Genicom Corp., Coburn said, because it was "rugged enough to take high-volume, eight-hour-a-day usage." Mass. Mutual performs its own maintenance, so a primary consideration was reliability, he said. "There are less expensive dot matrix printers on the market, but nothing comparable on a price/performance basis," he added.

Other features important to the company included its speed (200 char./sec draft and 40 char./sec near-letter-quality), its quietness, the readability of the near-letter-quality print style, the long ribbon life and its ease of operation, Coburn said.

The company uses the printers with about half of its 500 installed systems, Coburn said. Mass. Mutual originally purchased Genicom's Model 3184 printers, the only suitable type available at the time, he said. It switched to the Model 3024 when it came out at $300 less than the 3184, he said, because it did not need the Model 3184's ability to upgrade to other things, such as color printing.

REVIEWS

from page 74

Elsevier Science Publishing Co., 52 Vanderbilt Ave., New York, N.Y. 10017.

MICROCOMPUTER SOFTWARE BUYER'S GUIDE reviews the top-selling word processing, spreadsheet, data base management and integrated software packages. The guide also includes benchmark comparisons of these packages; by Tony Webster and Richard Champion (with the cooperation of Datapro Research Corp.). Paperback, 422 pages, $19.95, ISBN 0-07-068967-9. McGraw-Hill Book Co., Professional and General Books, 1221 Avenue of the Americas, New York, N.Y. 10020.

UNIX FOR PEOPLE provides practical guidance as well as theory for the experiential learning of the operating system; by Peter Birns, Patrick Brown and John Muster. Hardcover, 528 pages, $29.95, ISBN 0-13-937459-0. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Until now, when you operated the PC in the terminal emulation mode, keys had to be redefined. For inexperienced users, that could be both awkward and time-consuming.

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CALENDAR

WEEK OF NOVEMBER 18

NOVEMBER 19, NEW YORK — **Sysed Training Forum.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 19, NEW YORK — **Introduction to the IBM Personal Computer.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123. Also being held Nov. 26 in New York.

NOVEMBER 19, NEW YORK — **Spreadsheets Using Lotus 1-2-3.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 19-20, MINNEAPOLIS — **Operating Systems for Personal Computers.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

NOVEMBER 19-20, BOSTON — **Discovering Lotus 1-2-3.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

NOVEMBER 19-21, PALO ALTO, CALIF. — **Structured Techniques Using Fourth-Generation Languages.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held Dec. 18-20 in Dallas.

NOVEMBER 19-21, BOSTON — **Project Management & Control.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 19-21, NEW DELHI — **International Conference on Computers and Technology.** Contact: J.K. Hassan, IBM, Corporate Headquarters, Armonk, N.Y. 10504.

NOVEMBER 19-22, TORONTO — **The 15th Annual Canadian Computer Show and Conference.** Contact: Canadian Information Processing Society, Fifth Floor, 243 College St., Toronto, Canada M5T 2Y1.

NOVEMBER 20, NEW YORK — **Symphony for 1-2-3 Users.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 20, NEW YORK — **Word Processing with Multimate.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123. Also being held Nov. 26 in New York.

NOVEMBER 20-22, AMSTERDAM — **Videotex International Conference and Exhibition.** Contact: On-line Conference Ltd., Pinner Green House, Ash Hill Drive, Pinner HA5 2AE, Middlesex, UK.

NOVEMBER 21-26, SHANGHAI — **China International Microelectronics/Computer Exhibition and Conference.** Contact: Harry C. Lepinske, American Exhibition Services International, Inc., P.O. Box 66373, O'Hare International Airport, Chicago, Ill. 60666.

NOVEMBER 21, NEW YORK — **Advanced Multimate.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 21, NEW YORK — **Advanced Displaywrite 2.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 22-30, MOSCOW — **Systemotronics '84.** Contact: Harry C. Lepinske, American Exhibition Services International, Inc., P.O. Box 66373, O'Hare International Airport, Chicago, Ill. 60666.

NOVEMBER 23-25, PACIFIC GROVE, CALIF. — **Forth Modification Laboratory.** Contact: Forth Interest Group, P.O. Box 1105, San Carlos, Calif. 94070.

WEEK OF NOVEMBER 25

NOVEMBER 26-27, INDIANAPOLIS — **Expanding Lotus 1-2-3 Applications.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

NOVEMBER 26-28, WASHINGTON, D.C — **X.25 and Other Protocols.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 26-28, CHICAGO — **Cellular Communications '84: The Industry Conference.** Contact: Online Conferences, Inc., Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

NOVEMBER 26-28, SAN FRANCISCO — **Computer Graphics for Business.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 26-28, PINE MOUNTAIN, GA. — **Data Communications: Bringing You Up-To-Date.** Contact: Institute for Communications and Information Management, P.O. Box 8, Pine Mountain, Ga. 31822.

NOVEMBER 26-28, WASHINGTON, D.C — **Integrating Microcomputers into Corporate Environments.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

NOVEMBER 26-28, TEANECK, N.J. — **Project Management Control.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 26-29, COLUMBIA, MD. — **Data Base Machines: In-Depth.** Contact: Continuing Education Institute, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

NOVEMBER 26-29, LOS ANGELES — **Data Communications: Components, Systems and Networks.** Contact: Institute for Advanced Technology, 65 W. 55th St., New York, N.Y. 10019.

NOVEMBER 26-29, COLUMBUS, OHIO — **DOS/VSE with Explore/XP.** Contact: Betty Bruce, Education

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NOVEMBER 26-30, BOSTON — **Systems Analysis.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 26-30, DALLAS — **The James Martin Seminar.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 26-30, NEW YORK — **IMS Data Base Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 27, NEW YORK — **Introduction to Framework.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 27, NEW YORK — **Displaywrite 2.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 27-28, TAMPA, FLA. — **Realistic Applications of Personal Computers in Business: An Executive Hands-On Experience.** Contact: Lucy Bell Burton, Peat, Marwick, Mitchell & Co., 810 Seventh Ave., New York, N.Y. 10019.

NOVEMBER 27-28, CHICAGO — **IBM vs. AT&T: Round One.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

NOVEMBER 27-29, FORT LAUDERDALE, FLA. — **Telephone Systems: Their Selection, Operation and Management.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

NOVEMBER 27-29, CAMBRIDGE, MASS. — **The 1984 Hammer Information Systems Conference.** Contact: Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.

NOVEMBER 27-29, SAN DIEGO — **Personal Computing at the Crossroads.** Contact: Lynn Bentley, Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

NOVEMBER 27-30, BOSTON — **National Data Base and Fourth-Generation Language Symposium.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

NOVEMBER 27-30, DALLAS — **Leadership: Managing & Influencing People.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 27-30, PHILADELPHIA — **Modern Pattern Recognition Systems.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

NOVEMBER 27-30, BOSTON — **Designing Effective Man/Machine Interfaces.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

NOVEMBER 27-30, LOS ANGELES — **Data Communications.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

NOVEMBER 28, NEW YORK — **Introduction to Dbase.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

NOVEMBER 28-29, BALTIMORE — **The World of Electronic Data Interchange.** Contact: Transportation Data Coordination Committee, 1101 Seventh St. N.W., Washington, D.C. 20036.

NOVEMBER 28-29, SAN DIEGO — **Computer Vertical Markets.** Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

NOVEMBER 28-30, MACAO — **The First Asian Digital Equipment Corp.-Compatible Exposition and Conference (Dexpo Asia '84).** Contact: Dexpo Asia '84, Expoconsul International, 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

NOVEMBER 28-30, DALLAS — **1984 Winter Simulation Conference.** Contact: Udo Pooch, Department of Computer Science, College of Engineering, Texas A&M University, College Station, Texas 77843.

NOVEMBER 28-30, PARSIPPANY, N.J. — **Job Control Language.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

NOVEMBER 28-30, DENVER — **Relational Data Bases.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

NOVEMBER 28-30, SAN FRANCISCO — **Computers in Manufacturing.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

NOVEMBER 28-30, BELTSVILLE, MD. — **Structured Testing.** Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

NOVEMBER 28-30, BOSTON — **Information Center Software Selection.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 28-30, LOS ANGELES — **Unix Application Forum.** Contact: Meg Rustad, Yates Ventures, Suite 111, 4962 El Camino Real, Los Altos, Calif. 94022.

NOVEMBER 28-30, LOS ANGELES — **Data Modeling and Conceptual Data Base Design.** Contact: Jack Hokikian, Skyline Information Systems, Suite 900, 3250 Wilshire Blvd., Los Angeles, Calif. 90010.

NOVEMBER 28-30, TUSCON, ARIZ. — **Fifth International Conference on Information Systems.** Contact: James Nunamaker, College of Business, University of Arizona, Tuscon, Ariz. 85721.

NOVEMBER 28-30, NEW YORK — **An In-Depth Study of IBM's Architecture for Data Communications.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

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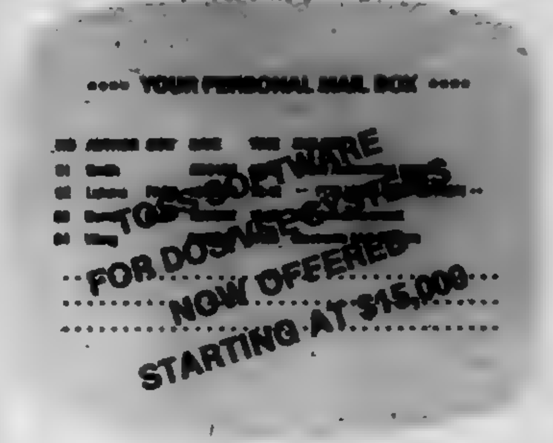

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EDITORIAL

STC: Beyond the smoke

As the smoke from Storage Technology Corp.'s crash into bankruptcy court begins to clear, more about the state of the company, and more important, about the state of the large-scale mass storage business, comes into sharper focus. At the same time, much broader issues involving the state of the entire computer industry rise inexorably as key market segments fade into oligopoly.

First of all, it is likely that STC will emerge from Chapter 11 in some scaled-down form — if it isn't totally absorbed in a takeover. The company still maintains a viable, IBM-compatible tape drive business and, in fact, can be criticized for not more aggressively pursuing the tape market in the past several years. IBM's dominance here is much less complete as it is (and has been) in the disk market, and while it is not a major market for IBM, the tape arena could provide a leg up for limited STC operations.

But any other operations, including Chairman Jesse I. Aweida's vision of producing complete, large-scale, IBM-compatible computer systems, must await massive infusions of capital that will be tough — if not impossible — to find.

For present users of STC equipment, this could mean looking elsewhere for both add-on machines and maintenance. According to some users contacted by *Computerworld*, STC's service component has traveled the same downward path as have the company's fortunes in the past two years.

Lurking beneath the immediate question of the fate of STC is the larger issue of IBM's dominance of the industry. Consider the disk drive business. In the last two years, IBM has shipped an estimated 90,000 3380-class disk drives at about $90,000 per unit and has, from all indications, reaped very healthy profits from these sales.

What is it about the market that forces the likes of STC into bankruptcy court while other competitors like Control Data Corp. drop out altogether, leaving Memorex Corp. as the only other U.S. manufacturer of big disk drives?

It is IBM's ultramodern disk drive plant in San Jose, Calif., built to churn out 3380s in volume at low per-unit costs, costs that can be matched perhaps only by the Japanese (like Hitachi Ltd., which supplies drives to National Advanced Systems, Inc., and Fujitsu Ltd., which supplies Amdahl Corp.). It is IBM's ability to gain a 12- to 18-month lead time on any compatible competitor, then slash its price when a competing machine goes on the market, ultimately delivering a knockout punch of an entirely new product just when the competition gets ramped up to compete against the old line. It is IBM's R&D effort, which annually pours more money into new technology than its nearest mainframe competitor realizes in total sales.

It is sheer size and brute market force.

No, there's nothing clearly underhanded or illegal about what the company does or the attendant result. But imagine a time when one company dominates every aspect of the business, for all the reasons listed above, to the point where its competitors just can't compete. Sound farfetched? Of course it is. Isn't it?

Not dead yet

LETTER

DBMS: Continuing the debate

I am professionally compelled to take issue with some of the expressions by other contributors to the Special Report, "DBMS — Not whether, but which" [CW, Sept. 24].

- Traditional application transactions and data structures frequently change — due to changes in the law and the corner offices. If they don't, where are our huge maintenance backlogs coming from?
- Suggesting that a data modeling exercise will make the appropriate general type of DBMS obvious is ill-founded. Many application data models can be equally well represented in several, if not all, of the four standard DBMS architectures (network, hierarchical, inverted-index, relational).
- You can't buy, install and use DBMS theory. Therefore, any strength/weakness contrasts must be on a product vs. product basis. Vendors have overcome the inherent theoretical weaknesses of their products with significantly varying degrees of success.
- There is nothing inherently high performance about network or hierarchical DBMS. Indeed, each has specific — and often severe — performance drawbacks.
- There are at least three IBM mainframe implemented commercial DBMS that are fundamentally hierarchical. The inherent, fundamental logical architecture of a DBMS is not determined by what a sales representative says, but by how data structures are initially defined to the DBMS.
- Programming productivity improvement with a full-feature, modern DBMS can be as high as 50:1 (for example, one hour vs. one week, with

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VIEWPOINT

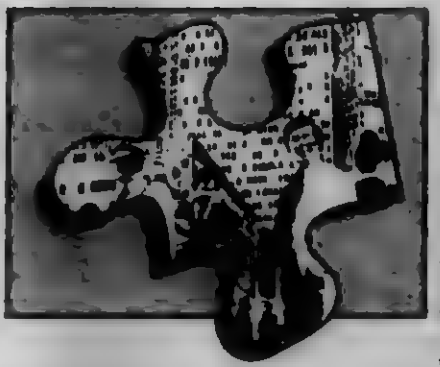
Fit to be tried

THE DATA CENTER
John P. Murray

Many of us are familiar with the phenomenon of the employee who fails in one information processing installation and who moves on to some other installation and does well, sometimes very well, in that new position. In some instances the change can be dramatic.

While every case is to some degree unique, there do appear to be two salient factors that have a strong effect on how a particular employee performs in a particular installation. These factors have to do with the environment that exists in the installation and with the chemistry between the employee, those he works with and the management of the installation. It follows then, if more time and attention are applied to consideration of these factors by both potential employers and prospective employees, some of the problems that occur relative to dissatisfaction (on both sides) and with excessive turnover, could be mitigated.

Is there a right or a wrong environment? Who can say? It depends, at least to some degree, upon the interest and the personality of the individual. It seems, however, that certain environments are more conducive to eventual success for a given individual than are others.



It could be argued, in fact it has been argued, that the use of leading-edge information processing tools and techniques, a fast pace, a rapid rate of growth and change are viewed as positive factors, and that they make a job highly desirable. As a general rule, that is a reasonable enough statement, but it cannot be universally applied.

Some people, some very skilled and competent people, are going to feel threatened by a fast-paced, leading-edge environment. The fact that these people will find themselves uncomfortable in such an environment clearly has a deleterious effect on their work and on their contribution. In such a situation, changing to a more static, less dynamic environment can often prove to be the tonic needed to bring out the employee's best effort.

Conversely, the person who sees himself as a changer, a doer, will not be comfortable, nor will he likely remain long in an installation where there is little real challenge or opportunity. So, the match between the technical environment and the individual can, and does, influence the performance of the employee.

When considering the issue of an installation's environment, the technical factor is not the only component to consider. Consideration should also be given to the pace of the installation. This has less to do with the particular technical state of the installation and more with the "feel" of the installation. Is there a sense of urgency, a pressure to get things done in a controlled manner? Does the function operate in a crisis mode, where panic appears to be the salient feature? Is there a decidedly laid-back aura to the environment? The applicant should attempt to determine the pace of the installation, and consider the appropriateness of that environment with regard to his particular temperment.

Ideally, as a part of the process to make a good match between prospective employee and employer, these environmental issues need to be presented fairly by the employer. Too often the employer tends to "sell" the job. Too often the prospective employee ignores those little warnings the mind sends out about a bad match. The eventual outcome is often disappointing for all concerned.

The chemistry between the employee and the boss, and between him and his peers, is another area that should not be ignored. Organizations develop cultures, some good, some bad, some simply bland. Over time, many of the long-term employees within the organization tend to take on various traits of that culture. One facet of the hiring process should be to describe, as fully and as candidly as possible to the employee, the cultural aspects of the organization.

The person who views himself as a creative type, a free spirit, who does best unfettered by rules and conventions, will probably not be satisfied or remain long in an organization governed by formula rules that places a great deal of restraint on the individual actions of the employees. Given such a circumstance, a very talented person may not live up to his potential. One reason for failure will have to do with expending too much time and energy chafing under the rules.

Someone else, however, just as talented, will feel very comfortable, probably even secure in such an environment. They no doubt will do very well.

Part of the interview process, for both the employer and the employee, should focus on the determination of the chemistry between the two. This cannot always be accomplished and

See PERFORM page 84

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Microcomputer training for the administrative staff

HUMAN CONNECTION
Jack Stone

It was only a modest news squib in *The New York Times* that I read, but the announcement of a personal computer "especially designed for secretaries" clearly opens up possibilities for both a new universe of personal computer users and a major contribution to advancing the art of office automation.

The idea of supplying machines particularly oriented to secretaries — and enabling secretaries to work with spreadsheets, develop graphics displays and process data files in addition to their conventional word processing responsibilities — is a natural. Clerks, secretaries and other administrative personnel have a terrific background of information processing on which to build more advanced skills. What a wonderful way to broaden their jobs: Give them electronic tools so that they can take on more challenging and interesting work and handle it in an effective, productive manner.

In this column, I want to share some thoughts on training administrative personnel that I have gathered over the years; but first, some initial comments.

Surely, there are an awful lot of administrative personnel who have been saddled with manual processing chores that can be handled by the personal computer. Certainly word processing systems have proved their worth in the productivity arena when compared with the capabilities of electric typewriters. And we can extrapolate from there: How many millions of hours have been frittered away by administrative people in the generation of hand-drawn bar graphs and pie charts that often wind up being unsatisfactory? How much time has been wasted on the maintenance and processing of 3- by 5-in. card files or on generating budget spreads with paper and pencil — only to have to redo them time and again?

> *I was forced to address this frontline issue: how to ease the [administrative] staff into new, more complex applications — in contrast with word processing — without burdening them with technical detail and turning them off.*

On numerous occasions in recent times, I have trained administrative staffs, then employing small minicomputers for word processing, to raise their sights into higher echelons of performance, most notably, data processing. They had little difficulty with DP operator keyboarding, but became glassy-eyed when I attempted to explain the systems aspects of what they were doing. I was forced to address this frontline issue: how to ease the staff into new, more complex applications — in contrast with word processing — without burdening them with technical detail and turning them off before they returned to their jobs.

Now the academicians may take a dim view of my strategy, but what I find works is the design of the training as a series of problem-solving experiences, also known as "cookbook" training. To be sure, this is an idea anathema on the college campus, but it does the job in the industrial setting. The reason for this approach stems from the basic goal of administrative students: the understanding of how to solve those particular information handling problems they face on a daily basis. Cookbook training, in my experience, is applicable to the administrative staff because they tend to operate in accordance with standard operating procedures.

The trainer should select an example from one application area in the business office — an easy one — and drill the students on the computerized solution to it until they get it down pat. Naturally, this takes place in the hands-on environment, using the exact hardware/software configuration being employed in the offices. The instructor should bring the students along step-by-step, covering the procedures for setting up the problem in the computer, entering data, processing the data and obtaining output. When and if the students get this all straight, the trainer continues on to another, more difficult example in the same application area. Finally, the students are given a workshop in which they attempt to solve additional problems on their own, with the instructor present to offer aid and guidance as necessary. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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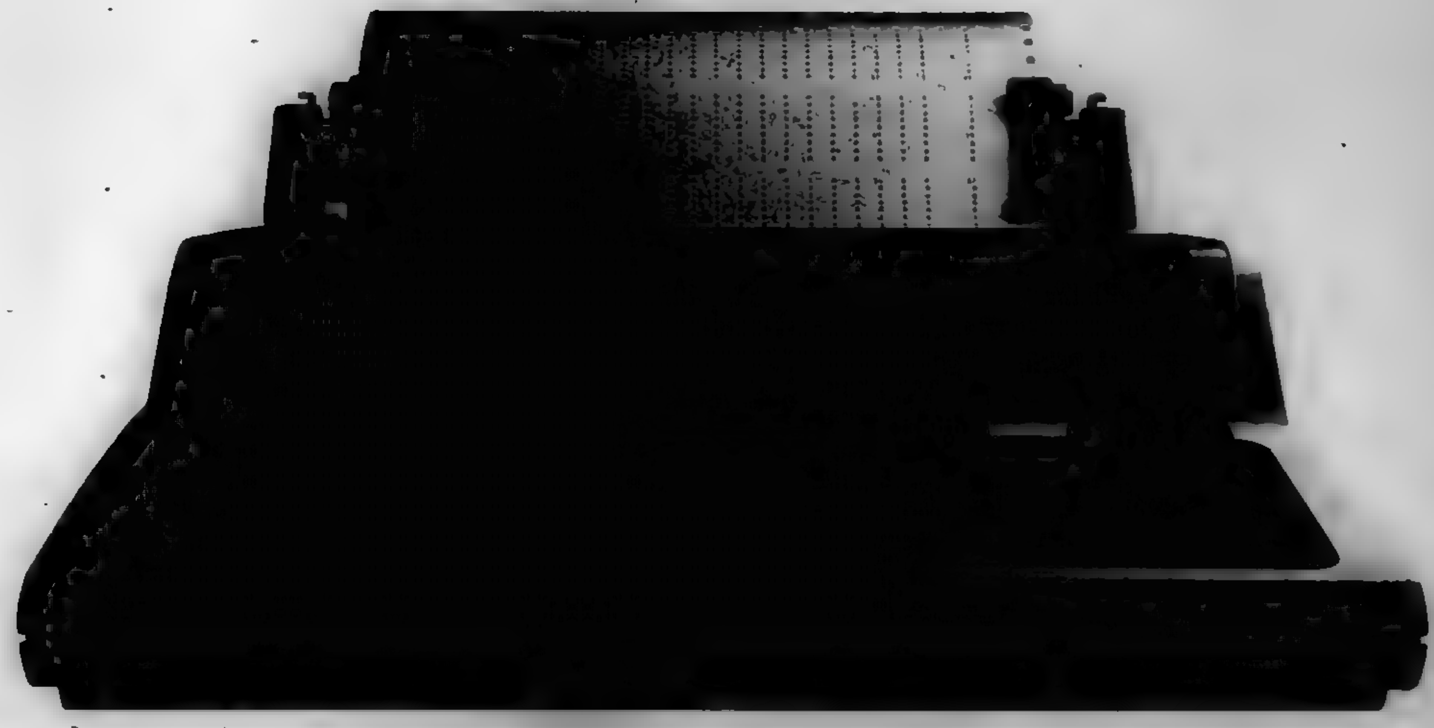

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'Techno-Bandits' fails to close book on Software AG affair

READER'S PLATFORM
Howard Karten

The excerpt from the forthcoming book *Techno-Bandits* [CW, Sept. 24] covered the affair of Software AG of North America in considerable detail. Yet the excerpt, like the reporting at the time, failed to explore certain questions that have remained unanswered up to today.

I find it curious that none of these questions have been raised; they make me wonder if the whole story has been adequately explored, how well trained Federal Bureau of Investigation personnel are when it comes to computers and how adept they are at combating computer-related crimes.

I am not suggesting anything sinister or conspiratorial — simply that these issues deserve to be answered.

Consider these questions and scenarios.

Insistence on obtaining source code

Why were the Russians so insistent on having the source code in the first place?

They must have been able to deduce that the product operated correctly by and large — after all, it had withstood the roughest test of all, that of the marketplace — and most U.S. users seemed able to get along without source code.

Because they were having so much difficulty obtaining the source code, why risk the success of the whole operation by trying to get the one part that was not, strictly speaking, necessary to have?

Disassemble object code

The Russians have in common with other human beings the ability to be counterproductively single-minded, bull-headed and plain foolish, so let's assume that for their own arcane reasons, they insisted on having source code.

Early on, it would have been clear that getting their hands on the source code would not be an easy job.

In that case, why did they not simply buy a disassembler (or write their own) and disassemble the object code? Surely the Russians have had experience with reverse engineering.

Form dummy company

Continuing this line of thought, how about forming a dummy company as a front, and then hiring a consulting company to disassemble the object code? That might not yield perfect results, but would surely go a long way toward giving the Russians the source code they wanted.

Marc De Geyter's clients must have sensed the difficulty of using at least semilegitimate methods to obtain the source code.

> ***These questions make me wonder if the whole story has been adequately explored, how well trained FBI personnel are when it comes to computers and how adept they are at combating computer-related crimes.***

Given the unending series of obstacles to this course of action, why not simply try to get the information in — as John Houseman might say — the old-fashioned way, by bribery, blackmail or otherwise getting a hold on a company executive who could then make a copy without anyone being the wiser?

Golden opportunity for FBI

Software AG's John Maguire goes to the FBI with the information that the Russians want the source code to his product. It seems to me that this presents the FBI with a golden opportunity : Give them the source code — but first, hire a patriotic, crack programmer to make a few subtle, well-hidden changes that will cause the program to give incorrect results, or to fail at some critical time. At the minimum, this might cause some heads to roll at KGB headquarters.

If I were the FBI, I would certainly want to explore this opportunity to commit some sabotage and be able to deny it at the same time.

And years afterward, in a neat, high-tech, now-it-can-be-told-type piece — the kind at which the bureau is so excellent — the FBI could do a little boasting and restore its faded image.

These questions are fairly obvious ones that should occur to anyone conversant with even elementary aspects of software. Perhaps someone will explore them in the future. Until that time, I suspect the story will be incomplete.

Karten is a Boston-based free-lance writer specializing in data processing and behavioral issues.

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VIEWPOINT

LETTERS

User finds Big Blue bug

On Sept. 10, IBM Entry Systems Division was notified through formal channels that a significant error existed in the IBM Personal Computer Peachtree General Ledger 1.1 software package. This software package is marketed directly, and supposedly supported, by IBM.

IBM Customer Service Support in Boca Raton, Fla., investigated the error that we had reported and found conclusively that the error did exist and caused the erroneous results as reported. On Sept. 25th, IBM Customer Service rendered the decision "that even though the error exists, and has no doubt existed over the three-year period that this product has been on the market, we do not intend to correct or do anything about it at this time. You are the first to report this problem, so it must not be causing much of a problem."

The problem is the date parameter within the system, and it is in two forms.

■ If you are using the IBM Peachtree General Ledger 1.1 software on an evening-shift basis, and it is 11:00 p.m. and you continue to use the system beyond midnight, the date reflected by the system and encoded on all reports and directories will still be the prior day. The date does not change, even when the internal interval timing has passed 24 hours.

■ The more critical problem is that when you exit the IBM Peachtree General Ledger 1.1 software via normal operating procedures, the date that was loaded into the computer's operating system is obliterated, and the date reflected at the operating system prompt is the base date of the operating system. For example, under DOS 2.10, the date in the system when you exit general ledger to DOS will be 1-01-1980, not the current date that you loaded into the Personal Computer at start-up or boot time or while using the general ledger system.

Unless the user remembers that the date is flushed and reloads it, or unless the user creates a special batch stream to prompt the reloading of the date, any and all file activity from this point forward will contain the incorrect date of 1-01-1980. The user's disk directories will be in error for all files from that point forward. This problem will occur on the Personal Computer, Personal Computer XT and the Personal Computer AT.

Raymond C. Florence Jr.
York, Pa.

LETTER from page 78

overtime) — particularly in maintaining unfamiliar applications. New application development productivity should improve by at least 10:1.

■ Full-feature mainframe DBMS are as complex and sophisticated as equivalent operating systems. "Gut feeling" has no more place in DBMS selection decisions than it has in navigating a ship. Its use will likely put you in the wrong port — if you're lucky.

■ The more multirecord-type selection criteria a retrieval involves, the more efficient a fully inverted-index DBMS becomes, as all selection is done via compact indexes and not by lengthy data searching.

■ There exist today a few DBMS products that serve high-volume traditional applications, yet have superb ad hoc query/report/update/analysis capabilities. Installing multiple DBMS is no more desirable than putting a roller skate on one foot and a ski on the other.

DBMS selection is one of the most important decisions a modern organization will make. It can be fairly equated in impact to the selection of computer hardware itself. No organization can afford to "repent at leisure."

Henry J. Meyer
Norwalk, Conn.

PERFORM from page 79

sometimes incorrect assessments are made, but if an environment of openness and candor can be developed, a reasonable assessment of how these two will work together in the future can be made.

The same thing should apply to the prospective employee and those with whom he will work. The prospective employee should be given some time to meet with several of these people to determine the potential working relationship. If, in talking with these people, the candidate senses a strong interest in maintaining the status quo, while he wants to deal in leading-edge issues, incompatibility is likely. Some contention is desirable within an information processing installation; however, bringing in someone who has views and a philosophy radically different from the rest of the group may lead to difficulty, unless the idea is to attempt to create change.

Using increased care in selecting either a new position or a new employee is by no means a panacea. However, more care on the part of both parties can be beneficial. All concerned benefit from the ability to select employees or jobs where satisfaction, growth and a feeling of belonging are likely to occur.

Candor and openness on the part of all participants can help reduce turnover and increase job satisfaction.

When an employee with the skills, interest and ability does not do well, both the employee and the organization lose. More care in the hiring process can help avoid much mutual loss.

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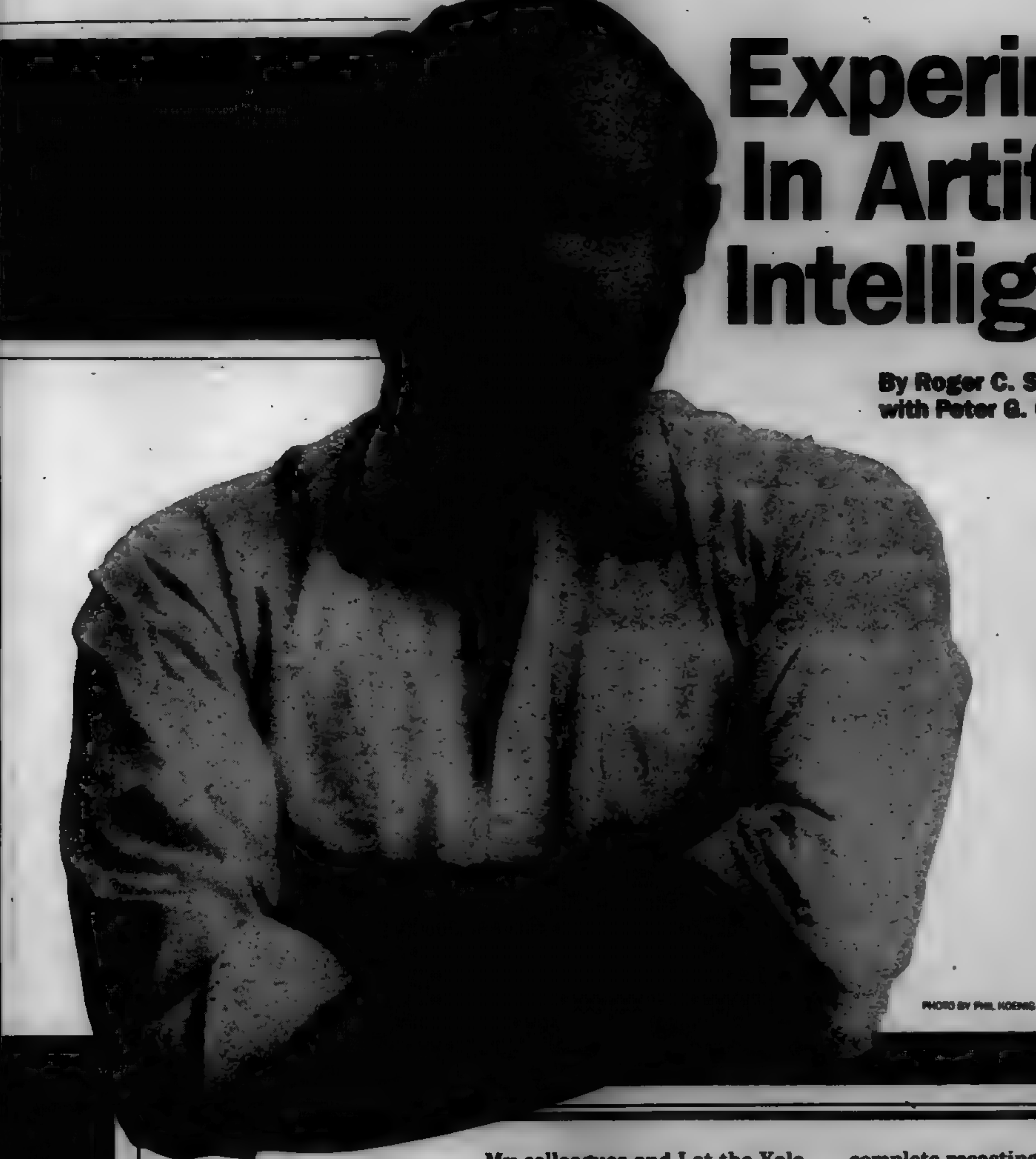

PHOTO BY PHIL KOENIG

Experiments In Artificial Intelligence

By Roger C. Schank
with Peter G. Childers

It is clear what we must do next. We must develop systems with flexible, changeable knowledge structures that can learn while doing.

My colleagues and I at the Yale Artificial Intelligence Laboratory write programs in order to crystallize our theories. Ordinarily, our theories encompass such a complex range of processes that we cannot tell if they will do what we thought they would without actually writing the program and finding out. The early versions of programs rarely do fulfill our expectations completely, not unlike a first set of plans by an architect. The finished product, after having undergone numerous revisions, including perhaps a complete recasting of the problem, may bear little relation to the original idea.

Every program we have written at the Yale laboratory has been an attempt to get a handle on a particular problem during our progress in solving some other problem. We may stop briefly and jump for joy at what a completed program does, but soon enough we are

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thinking about fixing its problems and moving along to the next program.

The real excitement in AI comes when we realize what we have left out of our previous attempt, which then tells us what to try next. Why we wrote these programs is more important than any of the programs themselves. With this in mind, let me offer a look at some of the programs we have produced over the last decade.

Work on natural language processing began in the 1960s, but those initial attempts bear almost no resemblance to our approach today. These researchers, whether they happened to be in computer science or linguistics, started out by attempting to find the formal rules that might underlie language itself. This approach may not seem wrong in principle, but the question, *What is language?* is not quite the same as the question, *How do humans understand one another?*

Early research concentrated on the outer form of language rather than on the content of communication and focused on getting a computer to break down a sentence into its parts of speech rather than into its elements of meaning.

These early researchers first attempted to build a parser. They wanted the computer to parse or convert sentences into grammatical structures according to standard grade-school rules. These programs told the computer how to find the noun phrases, verb phrases, prepositional phrases and so on in a sentence by using the rules of how sentences are constructed. These investigators hadn't really given any thought to what would come after that. They never succeeded in writing down all the grammar rules and found themselves with a lot of unanswered questions about how to get the computer to use language effectively.

On the surface, at least, language is composed of vocabulary, grammar, syntax and semantics (whatever that is). But this kind of definition doesn't tell us much about what language has to do with understanding. Language is, above all, a medium for communication between people. It cannot be correctly analyzed without considering what kinds of ideas people want to express. Language must be treated as a vehicle rather than an entity in and of itself.

The statement *I want ice cream* isn't effectively analyzed if all we do is break it up into its subject and predicate. If a child came out with this sentence, we wouldn't reply to him, *All right, subject, I'll bring you some direct object.* But this is what programs that rely primarily upon syntactic rules, as well as some of the commercial systems now available, actually do. They match words in certain syntactic slots (the head noun, for instance) to field names in data bases. This allows them to find the information about "employees" under "employees" in the data base. But since these programs have no idea what "employee" means, heaven help them if the user of the system should mistakenly refer to them as "wage earners" or, worse yet, ask about the "money people make" instead of using the correct field name, "salary."

Playing doctor

Other early programs searched for key words or phrases in sentences without regard for the role of those words in the sentence or their meaning. This yielded programs that at most demonstrated people's gullibility. The most frequently cited examples of this approach are programs that simulated some of the questions and answers that a Rogerian psychiatrist might offer.

It isn't difficult to see how one could create a very simple program that appears to mimic a psychiatrist. In keyword systems, the computer can print messages that previously were composed by people when the program tells it to do so. A machine that prints "HELLO" when you type "Hello" might seem to be communicating, even though such behavior proves nothing about understanding.

This method of printing certain messages in response to certain inputs works well enough if your goal is to achieve not understanding but simply the appearance of understanding. One rule you might give such a program would be that whenever the program sees the words *mother, father* or *parents* in the user's input, the program should print, *Tell me about*

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your relationship with your ______, tacking on whichever word had appeared in the user's input. This will work well enough when the input is, *My mother made me come here*. But the user might type in, *My ring is made of mother of pearl*, or *Do you read* Mother Jones *magazine?* The computer would use the same rule in each case and reply, *Tell me about your relationship with your mother.*

This ridiculously simple rule may indeed convince the user that he is talking to a psychiatrist who wants to bring the discussion around to the user's parental relationship. It also may convince the user that he is talking to an idiot. (When I showed one of the more sophisticated of these programs to a psychiatrist, he concluded that a computer program that was supposed to model paranoia instead had brain damage, a diagnosis that may have been more accurate than he realized.)

When this program failed to see any of the "parents" words in the user's first few statements, it would print, *You haven't talked about your family very much.* This gives the user the impression that the computer thinks he is avoiding the subject; however, the computer isn't thinking anything. Instead, it has been programmed to count the number of statements until it has to print that message. Another very simple, yet highly deceptive, print rule would be to tell the computer to print what the patient has said, changing only the personal pronouns and perhaps a few other words. This can have the effect of encouraging the user to think about what he has said and to elaborate on it. A conversation like the following might take place:

COMPUTER: You haven't talked about your family very much.

USER: Yes, well, I didn't get along with my family very well.

COMPUTER: You didn't get along with your family.

USER: Well no, not for most of my childhood.

COMPUTER: Not for most of your childhood.

USER: That's right. My parents were always critizing me.

COMPUTER: Your parents were always criticizing you.

USER: Yes. They never thought I was a good person.

COMPUTER: What does your father do?

USER: He's a professor.

COMPUTER: How do you feel about professors?

The computer can't miss with the last question. The computer has been given a simple rule telling it to let the user make two or three statements after the family question, replying to them only by repeating them, and then ask, *What does your father do?* Of course, as happened in one instance when these types of programs were being taken rather seriously, if a user responds, *He's dead*, the computer's response, *How do you feel about deads?* can be fairly irritating. Such a program obviously doesn't exhibit much true understanding.

The point here is that the program anticipates certain key words and responds to them with certain canned responses. A computer programmed to convert the statement *I hate you* to *Why do you hate me?* doesn't understand anything, doesn't have any expectations or knowledge structures for what it says and, most important, doesn't tell us anything about the nature of human understanding. (It does serve to test a hypothesis that I assume no one ever had, namely, that people respond to sentences by parroting back what they heard. Some people may well do this — they may even get paid to

> *In the late '60s, researchers began to look at the underlying problems of language — the nature and representation of meaning — in the hope of developing a completely new approach to natural language processing.*

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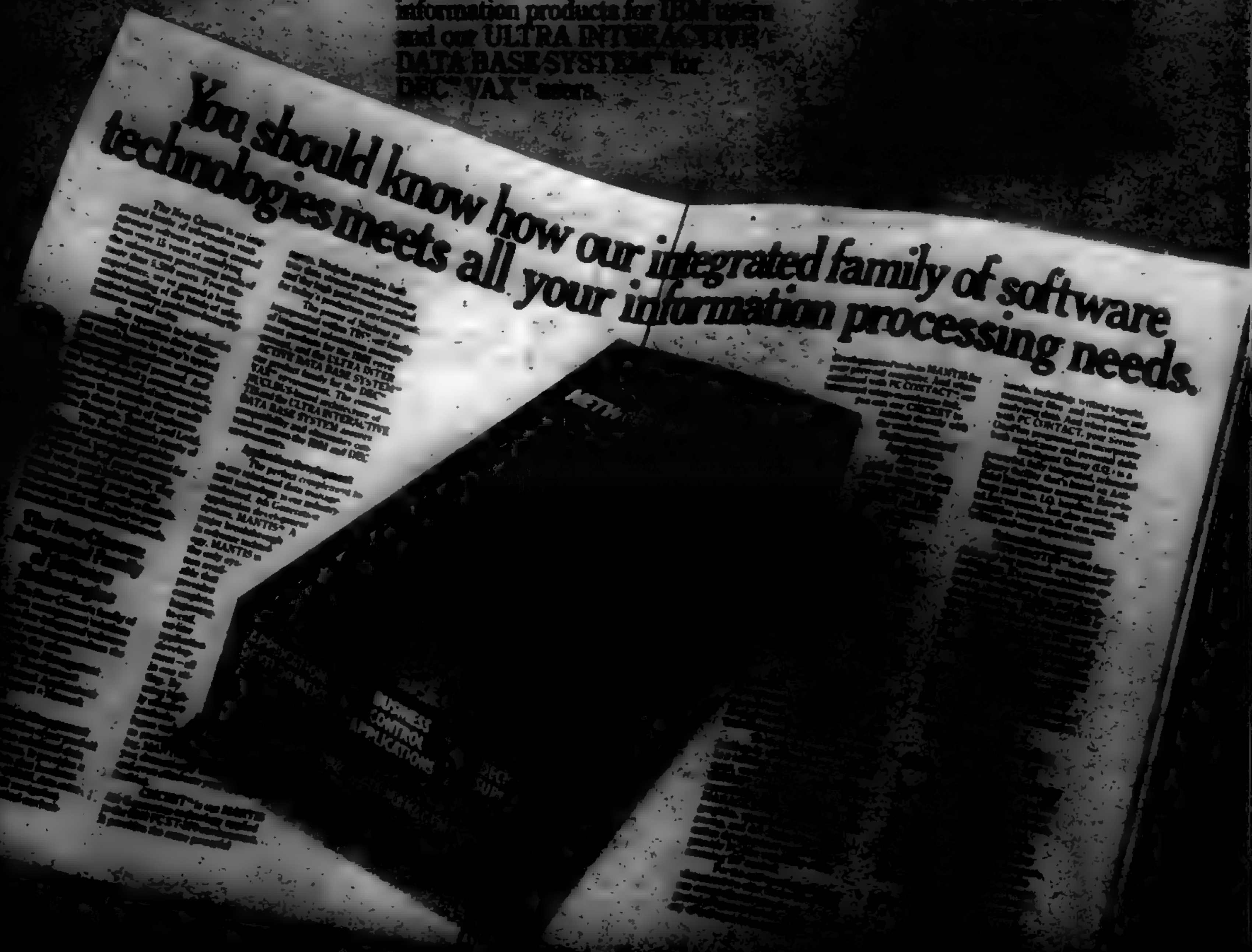
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do it — but as a theory of understanding it falls apart rather quickly).

If the user said, instead, *The very sight of you makes me want to throw up*, the computer wouldn't understand. A tricky programmer might have told it to print, *Are you feeling ill?* whenever it saw the words *throw up*. This program would be no more than a set of tricks. It might initially look convincing, but it wouldn't take long to get exasperated with it.

In the late '60s, researchers — myself included — began to consider problems of meaning as central to the development of natural language processing by humans or computers. We began to look at the underlying problems of language — the nature and representation of meaning — in the hope of developing a completely new approach to natural language processing. The best way to appreciate how far we have come is to look at various programs and see how we progressed from one to the other.

The programs I have chosen to discuss were all done under my direction, since it seems most sensible to discuss the work I know best.

The programs

My students and I decided that it would be better to try to extract meanings from sentences than to extract grammatical units from sentences. Where the old objective of a parser was to make a grammatical analysis of a sentence, we decided that the new objective should be a meaning analysis of the sentence. In other words, rather than concentrate on how a sentence was constructed, we worried about how to represent what was happening in the event that the sentence describes. Our aim was to write programs that would concentrate on crucial differences in meaning, not on issues of grammatical structure.

This view redefined the parsing problem. We used whatever grammatical rules were necessary in our quest to extract meanings from sentences but, to our surprise, little grammar proved to be relevant for translating sentences into a system of conceptual representations. While I was at Stanford in the late '60s and early '70s, we began work on a program that could parse English sentences into conceptual representations. At the same time, we began to build a generator, that is, a program that could take conceptual representations and make English out of them. We realized that if you could extract the meaning from a sentence by representing it conceptually, you had better be able to retrieve the English or you would have lost information in the process.

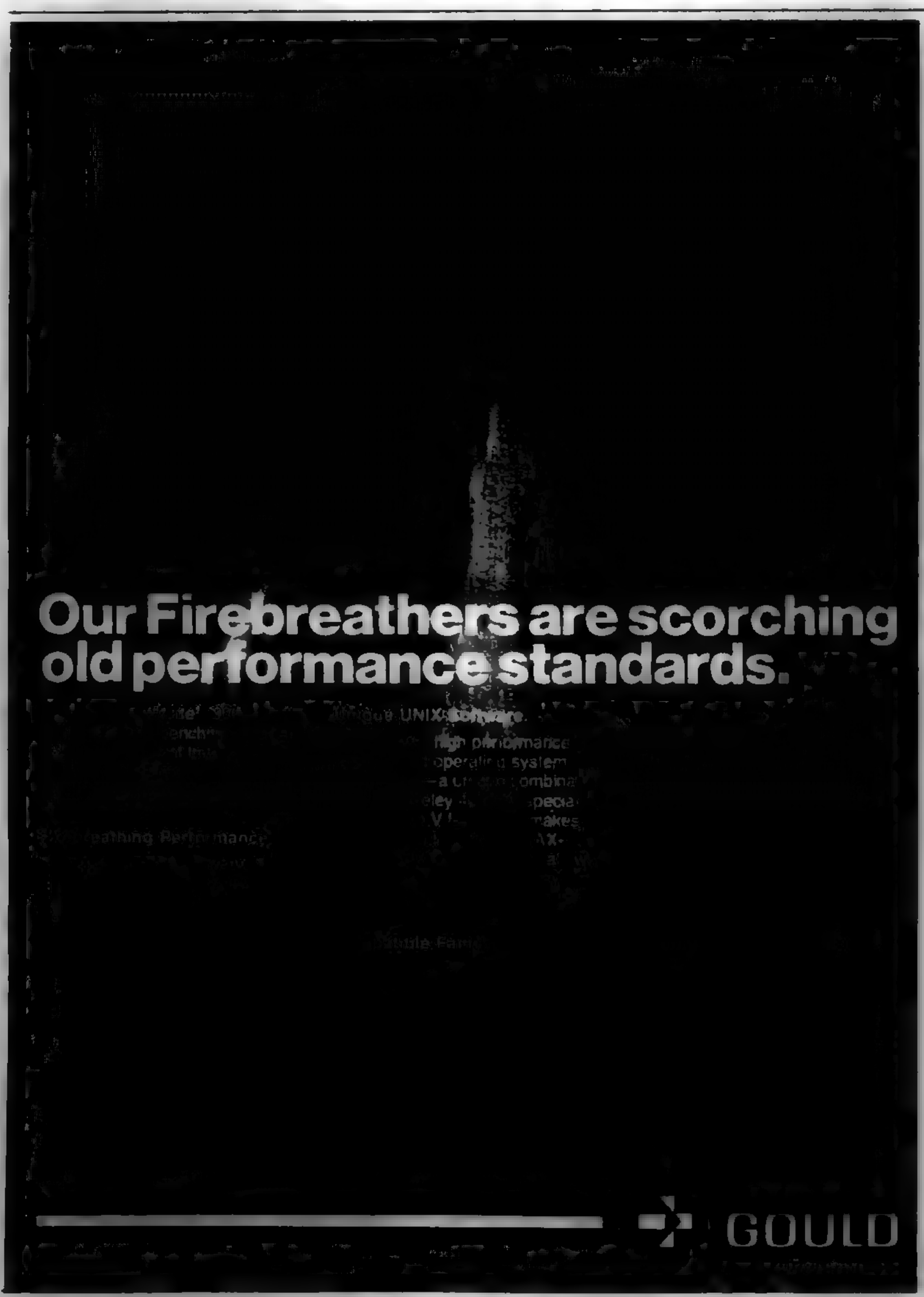
If early work on parsing was overly concerned with syntax, the work on generation of sentences by computer was even worse. Early efforts on the generation of English sentences had concentrated on the problem of generating random sentences. Because the computer had nothing to say, generating sentences only could serve as an exercise in the grammatical construction of a sentence. But the moment we had achieved even the crudest levels of language understanding — the most primitive form of meaning representation — we realized that we needed a generator right away. Like the parser, the generator had to be constructed from new principles.

> ***Our aim was to write programs that would concentrate on crucial differences in meaning, not on issues of grammatical structure.***

From the very beginning, the theories of language generation that evolved in AI looked considerably different from those developed in fields that were concerned with language per se rather than with understanding. An AI generator has to express what the computer wants to say. However, getting a computer to have something to say poses a problem. In this first stage, the computer just "wanted" to express what it had just parsed, so we could start with a meaning and then find a form to express it, rather than the other way around.

In linguistics, for example, rules for the generation of sentences started with the idea that because a sentence consisted of a noun phrase and a verb phrase, the generation of a sentence required the selection of a noun phrase and, hence, a noun. Thus, generating a sentence meant just finding its form and then finding a meaning to fit that form. Clearly, this method would not work for either computers or people.

The basic intent of our work was to provide unique representations for ideas that could be expressed in many ways. Because of this, our programs could understand an event to be the same one as one seen previously, even if the previous expression of that event had been quite



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different. The conceptual representations that we devised were intended to facilitate the automatic paraphrasing of a sentence that the program read — and even the translation of that sentence into other languages.

We connected the generator to the parser to get a paraphrasing program. We found some graduate students who knew German and Chinese, so they went to work on building generators for those languages, which gave us the ability to develop translations of a sentence. Translation followed rather naturally from what we were doing. Once the parser represented the meaning, encoding that meaning into a language again was just as complex a task whether the language was English or Chinese. As long as the representation had no language-specific parts, that is, if it were truly conceptual, translation and paraphrase were essentially the same task.

By 1973 we could parse, generate, paraphrase and even translate sentences. We did not yet have an understanding system, but we had a new view on the problem and a cascade of solutions and new ideas.

```
INFERENCE MODE
INPUT:       John told Mary that Bill wants a
             book.
OUTPUT1:     A book about what?
OUTPUT2:     Mary knows that Bill wants a
             book.
OUTPUT3:     Bill wants to come to have a
             book.
OUTPUT4:     Bill wants someone to cease to
             have a book.
OUTPUT5:     Bill wants to read a book.

INPUT:       John gave Mary a beating with
             a stick.
OUTPUT1:     A stick touched Mary.
OUTPUT2:     Mary became hurt.
OUTPUT3:     John wanted Mary to become
             hurt.
OUTPUT4:     Why was John angry?

INPUT:       John gave Mary an aspirin.
OUTPUT1:     John believes that Mary wants
             an aspirin.
OUTPUT2:     Mary is sick.
OUTPUT3:     Mary wants to feel better.
OUTPUT4:     Mary will ingest the aspirin.

INPUT:       John is going to go to the
             store.
OUTPUT1:     John wants to be at the store.
OUTPUT2:     What does John want to buy?
OUTPUT3:     John will trade money to the
             store for something.

PARAPHRASE MODE

INPUT:       John advised Mary to drink the
             wine.
OUTPUT:      John told Mary that drinking
             the wine would benefit her.

INPUT:       John killed Mary by choking
             Mary.
OUTPUT1:     John strangled Mary.
OUTPUT2:     John choked Mary and she
             died because she could not
             breathe.
OUTPUT3:     Mary died because she was
             unable to inhale some air and
             she was unable to inhale some
             air because John grabbed her
             neck.

INPUT:       Reading the book reminded
             Rita to loan the book to Bill.
OUTPUT:      Rita remembered to give the
             book to Bill and she expects
             him to return it to her because
             someone read the book.

INPUT:       John prevented Bill from giving
             a banana to Mary by selling a
             banana to Rita.
OUTPUT1:     Bill was unable to give a ba-
             nana to Mary because Rita
             traded John some money for a
             banana.
OUTPUT2:     Mary could not get a banana
             from Bill because Rita bought a
             banana from John.
```

Figure 1. The Margie program, 1973

Margie. Where did we go from there? Clearly, paraphrasing is not all we can do when we read a sentence. We can extrapolate from the smallest amount of information. The full meaning of a sentence is more than the sum of its parts. People speak in a kind of shorthand, expecting that their listeners will fill in assumptions as needed. We needed to program the computer to understand not only by extracting meanings from sentences, but also by making inferences. We began to develop a theory of inference and built an inferencer.

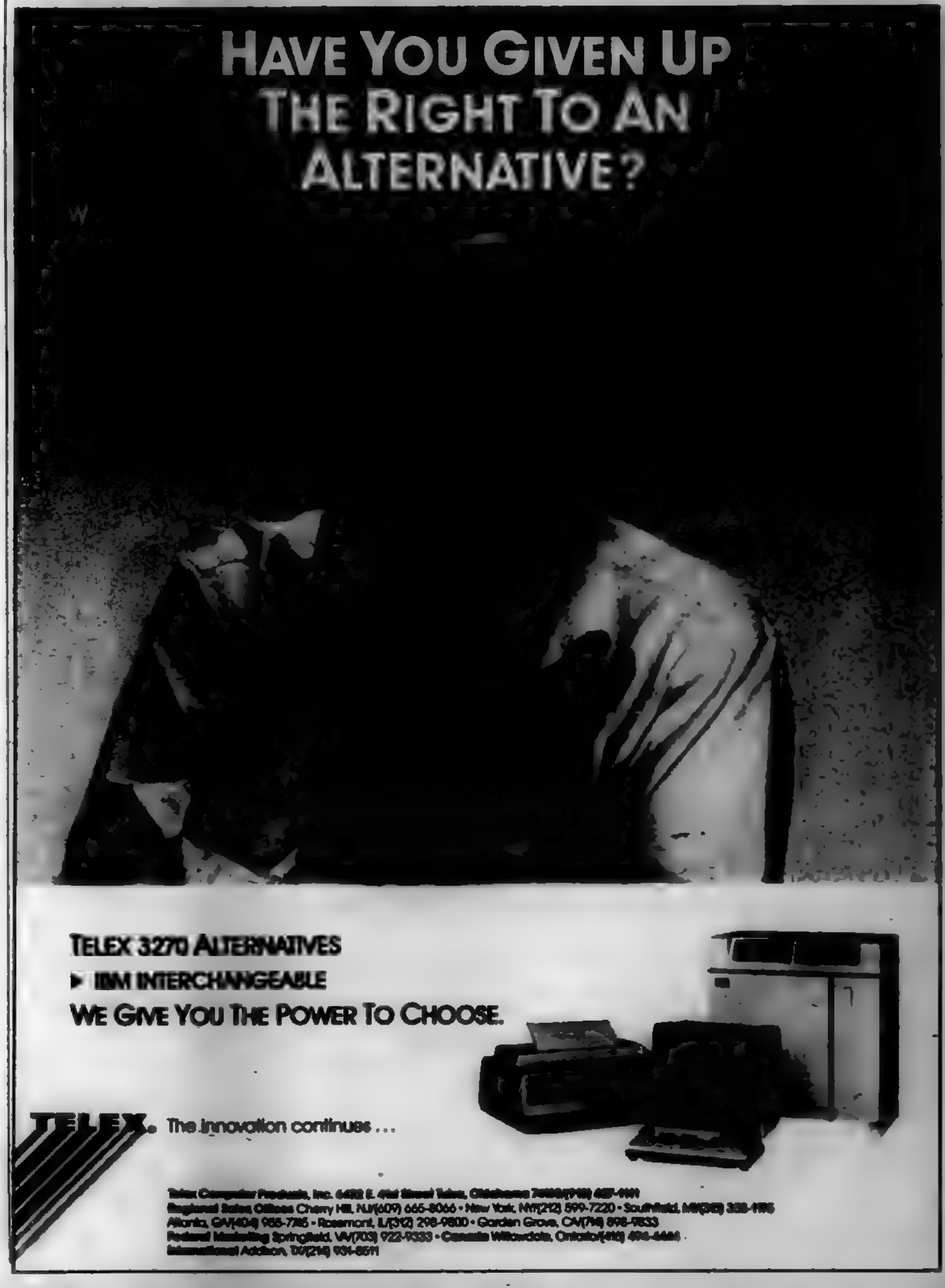
Then someone suggested that we should put the parser, inferencer and generator together in one big program, so we did and called it Margie.

Margie stood for Memory, Analysis, Response Generation in English. (Margie also is the name of my mother.) This was the first time anyone had created a system that could paraphrase meanings, translate and draw inferences from sentences.

Margie was our first attempt to parse English into conceptual representations. It consisted of three separate programs: a parser, which we called a conceptual analyzer to distinguish it from other syntactic parsers (the parser was written by Christopher Riesbeck as part of his Ph.D. work at Stanford); an inferencer (written by Chuck Rieger as part of his Ph.D. work at Stanford); and a generator (written by Neil Goldman as part of his Ph.D. work at Stanford).

The output in Figure 1 shows Margie in two different modes of operation. In the Inference mode, all three programs were linked together. The parser sent its output to the inferencer, which then made inferences and sent them to the generator to be expressed in English. In the Paraphrase mode, the parser decomposed the sentences into conceptual representations, and then the generator expressed those representations in a number of different ways that showed the power of the representations.

No sooner did we gain some success than we began to see trouble ahead or new problems to work on. Margie showed us that inferencing required careful control. We had 16 basic rules of inference, each of which was used every time the computer read a sentence. These rules were fairly simple, but the goal was merely to test some ideas about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inferencing. Since people also make inferences from inferences, the program subjected the new conceptual representations that it had derived from the inference process to the 16 rules of inference and generated inferences from each of them.

A combinatorial explosion of inferences quickly resulted. Some of the new inferences were valid and sensible, but many were ridiculous and irrelevant. Our new problem involved getting the computer to know the difference.

Two important theoretical issues emerged from the work on Margie. First, we had to find a way to focus the inferencing process in such a way as to pursue only reasonable paths at reasonable levels of detail. The second problem, related to the inference explosion problem, had to do with the initial restrictions placed on Margie. Margie handled individual sentences that were unrelated to one another.

We developed a system of causal chaining, principles that allowed the computer to tie the meaning of one sentence to that of the next sentence by attempting to infer the connections between them.

We began to concern ourselves with the differences between understanding sentences by themselves, out of context, and understanding cohesive paragraphs which themselves were part of a larger context. We could parse sentences individually, but we had no idea what it would mean to relate them to one another. If we wanted a computer to process and understand text, then a program would have to be able to connect one sentence to the next.

Fortunately, these two problems were related. Inference explosions aren't as likely to occur in context, since we have a sense of what a paragraph is really about. Understanding in context, therefore, poses a fundamentally different program from the one presented to Margie. Serendipitously, the same basic parsing and generation techniques did apply.

Sam. I sat in a villa by a lake for a year working on these two problems. (An AI researcher doesn't need a computer most of the time. All he needs to begin with are a pencil and paper.) Both problems, inference explosion and connected text, were intimately related and could be solved with similar mechanisms. We developed a system of causal chaining, principles that allowed the computer to tie the meaning of one sentence to that of the next sentence by attempting to infer the connections between them. For example, one of the results of the first sentence might have to do with enabling an action in other sentences in the paragraph.

At Yale in 1974, we began to try to program rules for causal chaining to limit inferences during the reading of stories. But some connections between sentences couldn't be figured out as if they were "logical." It isn't "logical" to think that looking at a menu naturally precedes eating in the context of a restaurant. People don't attempt to figure out the connection between these two events each time as if it were the first time they had encountered such a situation.

Scripts were invented by Robert Abelson (a psychology professor at Yale) and me to solve this problem. They enabled the computer to process stories by providing rules for

Input:

Friday evening a car swerved off Route 69. The vehicle struck a tree. The passenger, a New Jersey man, was killed. David Hall, 27, was pronounced dead at the scene by Dr. Dane Blanchard, medical examiner. Frank Miller, 32, of 593 Foxon Rd., the driver, was taken to Milford Hospital by Flanagan Ambulance. He was treated and released. No charges were made. Patrolman Robert Onofrio investigated the accident.

English summary:

```
AN AUTOMOBILE HIT A TREE NEAR HIGH-
WAY 69 FOUR DAYS AGO. DAVID HALL, AGE
27, RESIDENCE IN NEW JERSEY, THE PAS-
SENGER, DIED. FRANK MILLER, AGE 32,
RESIDENCE AT 593 FOXON ROAD IN NEW
HAVEN, CONNECTICUT, THE DRIVER, WAS
SLIGHTLY INJURED. THE POLICE DEPART-
MENT DID NOT FILE CHARGES.
```

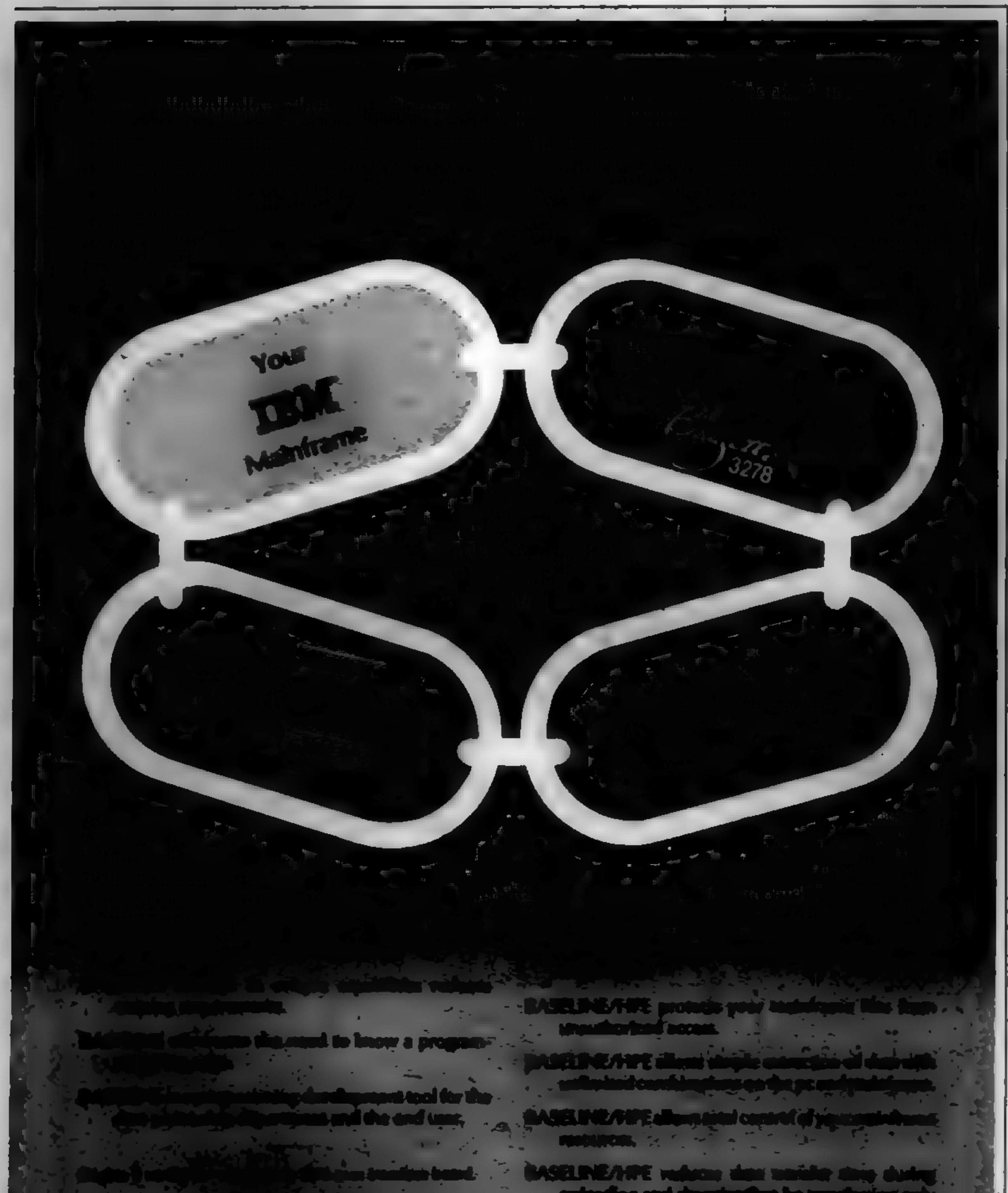
Spanish summary:

```
UN AUTO CHOCO CONTRA UN ARBOL CERCA
DE LA CARRETERA 69 EL VIERNES AL ANO-
CHECER. DAVID HALL, DE 27 ANOS, QUE VI-
VIA EN NEW JERSEY, EL PASAGERO, SE
MURIO. FRANK MILLER, DE 32 ANOS, QUE
VIVIA EN 593 CALLE FOXON EN NEW HA-
VEN, CONNECTICUT, EL CHOFER, QUEDO
UN POCO HERIDO. EL DEPARTAMENTO DE
POLICIA NO ACUSO A NADIE.
```

Question-answering output:

```
Q1: Was anyone killed?
A1: YES, DAVID HALL DIED.

Q2: Was anyone hurt?
A2: YES, FRANK MILLER WAS SLIGHTLY
    INJURED.

Q3: Why was Miller hurt?
A3: BECAUSE THE AUTOMOBILE HIT THE
    TREE.

Q4: Did Miller go to the hospital?
A4: YES, HE WAS IN THE MILFORD HOSPI-
    TAL.

Q5: How did Miller get to the hospital?
A5: THE FLANAGAN AMBULANCE COMPA-
    NY TOOK HIM TO THE MILFORD HOSPI-
    TAL.
```

Figure 2. The Sam program, 1975



understanding the connectivity in a stereotypical situation. We wrote Sam (Script Applier Mechanism), a program that could read stories that were scriptlike or script based (see Figure 2).

Sam could read a variety of stories, including actual newspaper stories on specific subjects. Since we already had the translation ability that the conceptual parsers and generators from Margie provided, we could translate the stories that we read into other languages. We concentrated on car accident stories because they were both scriptlike and plentiful.

We built programs to translate car accident stories from the *New Haven Register* into Russian and Spanish. A few people who knew both languages would look at the Russian and Spanish versions of a story and say, *Hey, these aren't exact translations of each other.* We told them no, they weren't exact translations of each other. The student who had written the Russian generator wrote it differently from the one that the Spanish-speaking student had written. Each system was independent, and the meaning representations used reflected not only linguistic but also cultural differences. (The Russian-speaking student reported, for example, that Russian newspapers never report car accidents, so he had a fair amount of difficulty just deciding what vocabulary to use.)

The translation modules converted the conceptual representations that Sam produced into an appropriate expression in the target language.

Sam had four basic modules. It used the parser and generators from Margie, although they were in a somewhat modified form. The center of the program was the Script Applier, which also contained a memory and inference part. The Script Applier was written by Richard Cullingford as part of his Ph.D. thesis at Yale. He also put all the other pieces together to make it all work.

A question-answering module attempted to figure out the intention of a question and give the memory a clue as to where the answer might be found in the conceptual representation of the story that had been produced by the Script Applier. The question-answerer was written by Wendy Lehnert as part of her Ph.D. thesis at Yale. The Russian generator was written by Anatole Gershman and the Spanish one by Jaime Carbonell.

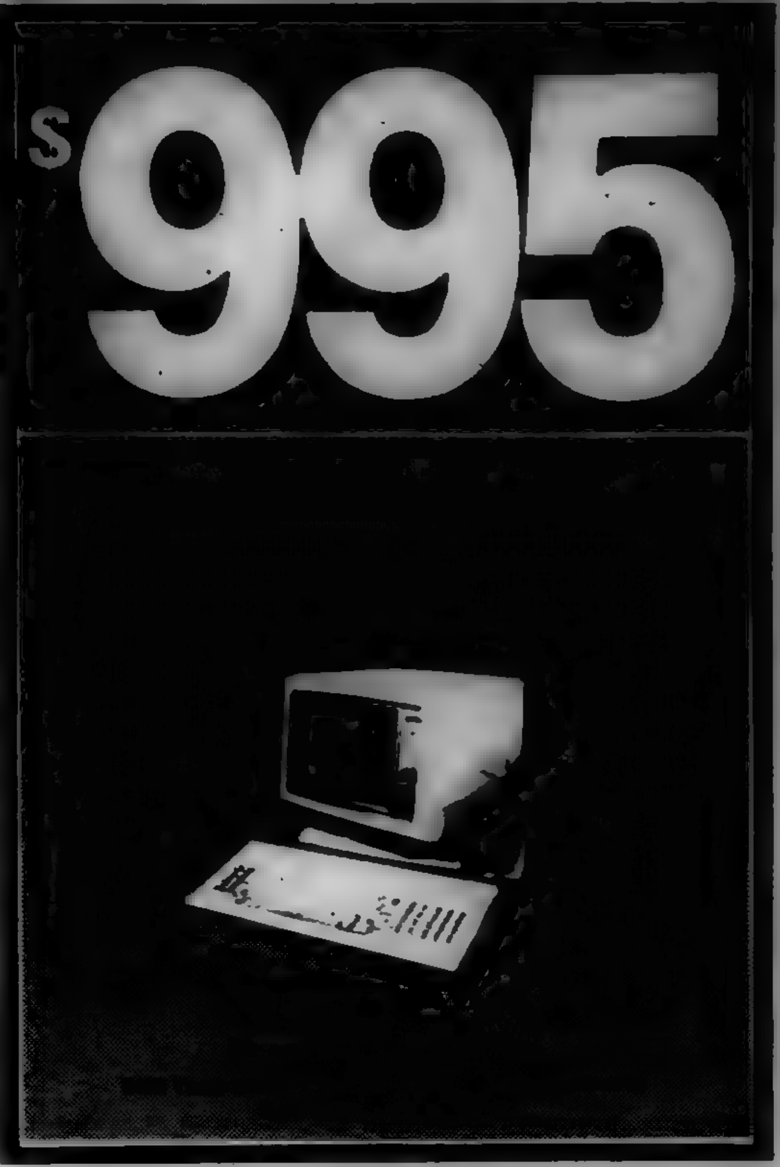
Once again, what Sam could not do made it obvious what to do next. We had been dealing with highly restricted scripts, but real stories contain interesting complications and unusual consequences. Stories have characters who find novel ways to get what they want, characters who act without resorting to a script. We had to start developing structures that allowed the computer to understand a character's plans and goals.

In order to understand a story about a liquor store robbery, we could have created a liquor store robbery script. But most people don't have such a script, having neither observed nor participated in a liquor store robbery. We could have given the computer a large range of understanding by giving it an endless number of scripts, but when it found itself without a script, it would have

```
INPUT TEXT:

        John wanted money.
        He got a gun and walked into a liquor
        store.
        He told the owner he wanted some
        money.
        The owner gave John the money and
        John left.

INPUT:      Why did John get a gun?
OUTPUT:     Because John wanted to rob
            the liquor store.

INPUT:      Why did John threaten the
            shopkeeper?
OUTPUT:     Because John needed to get
            some money.

INPUT:      Why did the shopkeeper give
            John the money?
OUTPUT:     Because the shopkeeper
            didn't want to get hurt.

INPUT:      Why did John leave?
OUTPUT:     Because John didn't want to
            get caught.

OUTPUT:

STORY FROM JOHN'S POINT OF VIEW:
        I needed to get some dough. So I got
        myself this gun, and I walked down to
        the liquor store. I told the shopkeeper
        that if he didn't let me have the mon-
        ey then I would shoot him. So he
        handed it over. Then I left.

OUTPUT

STORY FROM THE OWNER'S POINT OF
VIEW:
        I was minding the store when a man
        entered. He threatened me with a gun
        and demanded all the cash receipts.
        Well, I didn't want to get hurt, so I
        gave him the money. Then he es-
        caped.
```

```
INPUT TEXT:

        John wanted to win the stockcar race.
        Bill also wanted to win the stockcar
        race.
        Before the race John cut Bill's ignition
        wire.

INPUT:      Why did John break an ignition
            wire?
OUTPUT:     Because he was trying to pre-
            vent Bill from racing.

INPUT:

        JOHN WANTED BILL'S BICYCLE.
        HE WENT OVER TO BILL AND ASKED
        HIM IF HE WOULD GIVE IT TO HIM.
        BILL REFUSED.
        JOHN TOLD BILL HE WOULD GIVE HIM
        FIVE DOLLARS FOR IT.
        BUT BILL WOULD NOT AGREE.
        THEN JOHN TOLD BILL HE WOULD
        BREAK HIS ARM IF HE DIDN'T LET
        HIM HAVE IT.
        BILL GAVE HIM THE BICYCLE.

        QUESTION: Q1
                Why did John walk over to Bill?
                Because he wanted to get his
                bicycle.

        QUESTION: Q2
                Why did Bill give his bicycle to
                John?
                Because he didn't want to get
                hurt.

        QUESTION: Q3
                What were the consequences
                of John's walking over to Bill?
                This enabled him to ask him to
                give him Bill's bicycle.

        QUESTION: Q4
                What were the consequences
                of John's asking Bill to give him
                Bill's bicycle?
                Bill told him that Bill wouldn't
                give him Bill's bicycle.
```

Figure 3. The Pam program, 1977



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```
The US Congress is expected to approve the
Panama Canal Treaty.

CONSERVATIVE MODE:

INTERPRETATION COMPLETED, READY TO
ACCEPT QUESTIONS.

Q1: Should the US approve the treaty?
A1: NO, THE TREATY IS BAD FOR THE UNIT-
    ED STATES.

Q2: Why is the treaty bad for the US?
A2: THE UNITED STATES WOULD LOSE THE
    CANAL TO PANAMA AND THE UNITED
    STATES WILL BE WEAKER.

Q3: What might happen if the United States
    loses the Canal?
A3: RUSSIA WILL TRY TO CONTROL THE
    CANAL.

Q4: Why would Russia try to take over the
    Canal?
A4: RUSSIA WANTS TO EXPAND ITS MILI-
    TARY CONTROL. THE PANAMA CANAL
    HAS HIGH MILITARY VALUE.

Q5: How might this happen?
A5: THE UNITED STATES MAY NOT BE
    ABLE TO STOP ANYONE TAKING OVER
    THE PANAMA CANAL. TORRIJOS IS A
    COMMUNIST. TORRIJOS WILL LET RUS-
    SIA CONTROL PANAMA.

Q6: Why should the US worry about Russia
    taking over the Canal?
A6: BECAUSE RUSSIA WANTS TO CONTROL
    THE WORLD.

Q7: What should the US do to stop Russia
    from taking over the Canal?
A7: CONGRESS SHOULD VOTE AGAINST
    THE PANAMA CANAL TREATY.

LIBERAL MODE:

INTERPRETATION COMPLETED, READY TO
ACCEPT QUESTIONS.

Q1: Should the US approve the treaty?
A1: YES, THE PANAMA CANAL TREATY IS
    GOOD FOR THE UNITED STATES.

Q2: Why is the treaty good?
A2: THE PANAMA CANAL TREATY IM-
    PROVES RELATIONS WITH LATIN
    AMERICAN COUNTRIES.

Q3: What happens if the US keeps the Ca-
    nal?
A3: THIS WILL CAUSE DISCONTENT AND
    CONFLICT IN PANAMA AND LATIN
    AMERICA.

Q4: Why would this lead to conflict?
A4: THE CANAL ZONE IS A UNITED STATES
    COLONY. LATIN AMERICA DOES NOT
    LIKE COLONIALISM. THE UNITED
    STATES WOULD MAINTAIN COLONIAL-
    ISM.

Q5: What if Russia tries to take over the ca-
    nal?
A5: RUSSIA DOES NOT WANT CONFLICT
    WITH THE US. RUSSIA WILL STAY OUT
    OF THE CANAL IF THE UNITED STATES
    DEFENDS IT. THE UNITED STATES DE-
    FENDING THE CANAL IS PART OF THE
    TREATY.


Russia is massing troops on the Czech bor-
der.

CONSERVATIVE MODE:

INTERPRETATION COMPLETED, READY TO
ACCEPT QUESTIONS.

Q1: Why did Russia do this?
A1: BECAUSE RUSSIA THOUGHT THAT IT
    COULD TAKE POLITICAL CONTROL OF
    CZECHOSLOVAKIA BY SENDING
    TROOPS.

Q2: What will Russia do next?
A2: RUSSIA MAY TELL ITS TROOPS TO
    START THE INVASION.

Q3: What else can Russia do?
A3: RUSSIA MAY WAIT FOR CZECHOSLO-
    VAKIA TO GIVE IN TO RUSSIAN DE-
    MANDS.

Q4: What happens if Czechoslovakia does
    not give in?
A4: RUSSIA MAY DECIDE TO START THE IN-
    VASION.

Q5: What should the United States do?
A5: THE UNITED STATES SHOULD INTER-
    VENE MILITARILY.

Q6: What else can the United States do?
A6: THE UNITED STATES CAN DO NOTH-
    ING, OR IT CAN INTERVENE DIPLOMAT-
    ICALLY BY CONFERRING WITH RUSSIA
    ABOUT CZECHOSLOVAKIA. THESE AL-
    TERNATIVES ARE BAD FOR THE UNIT-
    ED STATES.
```

Figure 4. The Politics program, 1978

```
INPUT:

   WASHINGTON, MARCH 15 — THE STATE
DEPARTMENT ANNOUNCED TODAY THE
SUSPENSION OF DIPLOMATIC RELATIONS
WITH EQUATORIAL GUINEA. THE AN-
NOUNCEMENT CAME FIVE DAYS AFTER THE
DEPARTMENT RECEIVED A MESSAGE FROM
THE FOREIGN MINISTER OF THE WEST AFRI-
CAN COUNTRY SAYING THAT HIS GOVERN-
MENT HAD DECLARED TWO UNITED STATES
DIPLOMATS PERSONA NON GRATA.

   THE TWO ARE AMBASSADOR HERBERT
J. SPIRO AND CONSUL WILLIAM C. MITH-
OEFER JR., BOTH STATIONED IN NEIGHBOR-
ING CAMEROON BUT ALSO ACCREDITED TO
EQUATORIAL GUINEA.

   ROBERT L. FUNSETH, STATE DEPART-
MENT SPOKESMAN, SAID MR. SPIRO AND
MR. MITHOEFER SPENT FIVE DAYS IN
EQUATORIAL GUINEA EARLIER THIS MONTH
AND WERE GIVEN "A WARM RECEPTION."

   BUT AT THE CONCLUSION OF THEIR VIS-
IT, MR. FUNSETH SAID, EQUATORIAL GUIN-
EA'S ACTING CHIEF OF PROTOCOL HANDED
THEM A FIVE-PAGE LETTER THAT CAST "UN-
WARRANTED AND INSULTING SLURS" ON
BOTH DIPLOMATS.

SELECTED SKETCHY SCRIPT $BREAK-RELA-
TIONS

CPU TIME FOR UNDERSTANDING = 2515
MILLISECONDS

ENGLISH SUMMARY:
      THE US STATE DEPARTMENT AND
      GUINEA HAVE BROKEN DIPLOMATIC
      RELATIONS.

FRENCH SUMMARY:
      LE DEPARTMENT D'ETAT DES ETATS-
      UNIS ET LA GUINEE ONT COUPE
      LEURS RELATIONS DIPLOMATIQUES.

CHINESE SUMMARY:
      MEEIGWO GWOWUHYUANN GEN
      JIINAHYAH DUANNJYUELE WAYJIAU
      GUANSHIH.

SPANISH SUMMARY:
      EL DEPARTAMENTO DE RELACIONES
      EXTERIORES DE LOS EE UU Y GUINEA
      CORTATION SUS RELACIONES DIPLO-
      MATICAS.

INPUT:

   MOUNT VERNON, ILL. (UPI) — A SMALL
EARTHQUAKE SHOOK SEVERAL SOUTHERN
ILLINOIS COUNTIES MONDAY NIGHT, THE
NATIONAL EARTHQUAKE INFORMATION
SERVICE IN GOLDEN, COLO., REPORTED.

   SPOKESMAN DON FINLEY SAID THE
QUAKE MEASURED 3.2 ON THE RICHTER
SCALE, "PROBABLY NOT ENOUGH TO DO
ANY DAMAGE OR CAUSE ANY INJURIES."
THE QUAKE OCCURRED ABOUT 7:48 P.M.
CST AND WAS CENTERED ABOUT 30 MILES
EAST OF MOUNT VERNON, FINLEY SAID. IT
WAS FELT IN RICHLAND, CLAY, JASPER,
EFFINGTON AND MARION COUNTIES.

   SMALL EARTHQUAKES ARE COMMON IN
THE AREA, FINLEY SAID.

SELECTED SKETCHY SCRIPT $EARTH-
QUAKE

CPU TIME FOR UNDERSTANDING = 3040
MILLISECONDS

ENGLISH SUMMARY:

      THERE WAS AN EARTHQUAKE IN ILLI-
      NOIS WITH A 3.1999 RICHTER SCALE
      READING.

INPUT:

   THE CHILEAN GOVERNMENT HAS
SEIZED OPERATIONAL AND FINANCIAL CON-
TROL OF THE U.S. INTEREST IN THE EL TEN-
IENTE MINING COMPANY, ONE OF THE
THREE BIG COPPER ENTERPRISES HERE.
WHEN THE KENNECOTT COPPER COMPANY,
THE OWNERS, SOLD A 51 PERCENT INTER-
EST IN THE COMPANY TO THE CHILEAN
STATE COPPER CORPORATION IN 1967 IT
RETAINED A CONTRACT TO MANAGE THE
MINE. ROBERT HALDEMAN, EXECUTIVE
VICE PRESIDENT OF EL TENIENTE, SAID THE
CONTRACT HAD BEEN "IMPAIRED" BY THE
LATEST GOVERNMENT ACTION. AFTER A
MEETING WITH COMPANY OFFICIALS AT
THE MINE SITE NEAR HERE, HOWEVER, HE
SAID THAT HE HAD INSTRUCTED THEM TO
COOPERATE WITH EIGHT ADMINISTRATORS
THAT THE CHILEAN GOVERNMENT HAD AP-
POINTED TO CONTROL ALL ASPECTS OF THE
COMPANY'S OPERATIONS.

SELECTED SKETCHY SCRIPT $NATIONALIZE

CPU TIME FOR UNDERSTANDING = 3457
MILLISECONDS

ENGLISH SUMMARY:
      CHILE HAS NATIONALIZED AN AMERI-
      CAN MINE.
```

Figure 5. The Frump program, 1979

been stymied. We had to give the computer methods for dealing with the world when it did not have an applicable script.

Pam. As a way of exercising our ability to program plan and goal structures, we were building Tale-Spin at the same time we were building Sam. This was the first program to make up its own stories using just some principles of storytelling and rules for planning in an imaginary world.

We then used these ideas of how people plan to achieve goals to help in getting computers to understand stories by building Pam (Plan Applier Mechanism), a program that attempted to understand the world in terms of the rules we have for resolving goal conflicts, achieving temporarily blocked goals and so on.

Pam was written by Robert Wilensky as part of his Ph.D. thesis at Yale. The generator used by Pam was different from our Margie generator. The generator for Pam was written by Richard Granger. Because Pam used goals to track its characters, it was possible to tell stories from the viewpoint of those characters. We also added some vocabulary typical of different types of people to make the output seem realistic.

The vocabulary trick was showy

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PRICE PERFORMANCE	$ 3,571	$ 7,079	$ 6,840	$ 5,999

Relative Price Performance Index

*Computerworld, August 20, 1984

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```
*(PARSE S1-7)

              (10 9 79) SPAIN

(STEPPING UP EFFORTS TO DERAIL A BASQUE HOME RULE STATUTE THAT WILL BE PUT TO
A REFERENDUM THIS MONTH BASQUE GUNMEN IN SAN SEBASTIAN SPRAYED A BAR
FREQUENTED BY POLICEMEN WITH GUNFIRE WOUNDING 11 PERSONS)

(IN PAMPLONA ANOTHER BASQUE CITY TERRORISTS MURDERED A POLICE INSPECTOR
*COMMA* KILLING HIM AS HE DREW HIS OWN WEAPON IN SELF-DEFENSE)

>>> Beginning final memory incorporation . . .

Feature analysis:   EV1 (S-DESTRUCTIVE-ATTACK)
      RESULTS       HEALTH               -10
                    AU                   HURT-PERSON
                    HEALTH               -5
      VICTIM        NUMBER               MANY
                    ROLE                 AUTHORITY
    · TARGET        PLACE                BAR
      ACTOR         NATIONALITY          BASQUE
      METHODS       AU                   $SHOOT-ATTACK
      LOCATION      AREA                 WESTERN-EUROPE
                    NATION               SPAIN

Indexing EV1 (S1-7) as variant of S-DESTRUCTIVE-ATTACK

>>> Memory incorporation complete

          (5 15 80) SPAIN

(A BASQUE SEPARATIST GUERRILLA SHOT TO DEATH THREE YOUNG NATIONAL POLICEMEN
AT POINT BLANK RANGE THURSDAY AS THEY DRANK THEIR MORNING COFFEE IN A BAR)

>>> Beginning final memory incorporation . . .

Feature analysis:   EV5 (S-DESTRUCTIVE-ATTACK)
      TARGET        PLACE                BAR
      VICTIM        GENDER               MALE
                    ROLE                 AUTHORITY
      ACTOR         NATIONALITY          BASQUE
                    DEMAND-TYPE          SEPARATISM
      METHODS       AU                   $SHOOT-ATTACK
      LOCATION      AREA                 WESTERN-EUROPE
                    NATION               SPAIN

Creating more specific S-DESTRUCTIVE-ATTACK
     (G1-1 : BASQUE-GEN) from events EV1 (S1-7)
     EV5 (S1-6) with features:

VICTIM           (1)   GENDER                MALE
                       ROLE                  AUTHORITY
ACTOR            (1)   NATIONALITY           BASQUE
METHODS          (1)   AU                    $SHOOT-ATTACK
LOCATION         (1)   AREA                  WESTERN-EUROPE
                       NATION                SPAIN
TARGET           (1)   PLACE                 BAR

>>> Memory incorporation complete

"Terrorist attacks in Spain are often shootings of policemen in bars by Basques"
```

Figure 6. The IPP program, 1980

but involved little theory.

Politics. Once we built a program that used plans to understand stories, we opened up a set of new problems. For example, once we create a plan, someone else can come up with a counterplan. When we read stories, we aren't just aware of plans; we can recognize counterplans and counter-counterplans. With this in mind, we wrote Politics (we never did think up an acronym for this one), a model of a U.S. senator's position on foreign policy questions, complete with separate belief systems that held the beliefs of a conservative and those of a liberal. Politics was intended to sound like a U.S. senator by reflecting some of the reasoning processes that a senator might use in answering questions that were asked of him (see Figure 4 on ID/10).

Politics was written by Jaime Carbonell as part of his Ph.D. thesis at Yale. It differed from our other programs in that it was an integrated system. Rather than have a separate parser as we had done before, Politics used its knowledge of the situation to help it understand sentences.

Politics demonstrated that one must interpret any new item of information using all the mental processes available. Beliefs, inferences, plans, goals, scripts, prior memories — all were relevant to the understanding of international events. In Politics, they all were there in one place.

Frump. Success in these programs led us to begin to attack our old problems in different ways. First, we tried to speed up what we had done already. Next, we tried to integrate fully all the processes we knew about into one grand story understanding system. Sam had been slow; it made inferences for every single aspect of a script-based story as it read through, and it took the computer a very long time to process each story. Although we believed that the processes Sam went through were part of language understanding, not all those processes were used all the time.

We decided to work on turning off some of Sam's processes at appropriate times. Another problem with Sam was that it was modular. It first put a sentence through a parser, then through the inferencer, script applier and generator. But real human understanding is more likely to be integrated. We start parsing, making inferences and generally interpreting a sentence even before we have heard the end of it. We do not wait to see how a sentence will turn out before we begin to understand it.

We decided to integrate everything and speed everything up by not wasting time on spurious inferencing. We wrote Frump (Fast Reading, Understanding and Memory Program). We hooked this program up to the United Press International news wire, and the program zipped through it, summarizing the stories that it understood in several languages (see Figure 5 on ID/10).

Frump was written by Jerry De Jong as part of his Ph.D. thesis at Yale. Frump was a complex program, and Jerry had many assistants to help build various parts of the program. These included Kris Hammond, Jim Hendler and Bill Ferguson. Frump was our first attempt to build a product-directed program. We wanted to see how hard it would be to make the story-understanding process fast. As a result, we sacrificed careful understanding for speed. Nevertheless, theoretical advances did come from Frump, the most notable being the fusing of the parsing and inference processes into one basic process.

Frump worked so well that people were calling up to ask us to create a program that could read and keep track of massive texts such as the Congressional Record and to build systems that could analyze foreign publications. We had to point out that Frump only contained a few scripts to read restricted kinds of new stories and that any kind of general understanding system would require thousands of scripts.

IPP. We next wrote a program called IPP (Integrated Partial Parser). IPP was essentially like Frump except that it had detailed

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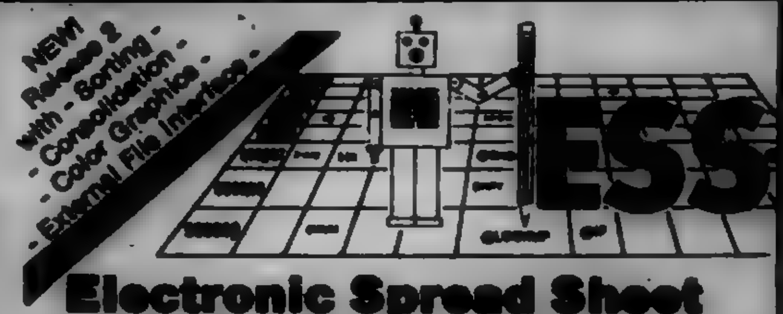
```
PROCESSING PARAGRAPH 1:

        Richard hadn't heard from his college
        roommate Paul for years.
        Richard had borrowed money from
        Paul which was never paid back.
        But now he had no idea where to find
        his old friend.
        When a letter finally arrived from San
        Francisco, Richard was anxious to find
        out how Paul was.

READY TO ACCEPT Q/A:

        >What happened to Richard at
        home?<
        RICHARD GOT A LETTER FROM PAUL.

        >Who is Paul?<
        RICHARD'S FRIEND.

        >Did Richard want to see Paul?<
        YES, RICHARD WANTED TO KNOW
        HOW PAUL WAS.

        >Had Paul helped Richard?<
        YES, PAUL LENT MONEY TO RICH-
        ARD.

        >Why didn't Richard pay Paul
        back?<
        RICHARD DID NOT KNOW WHERE
        PAUL WAS.

        >How did Richard feel when the let-
        ter appeared?<
        RICHARD FELT GLAD BECAUSE PAUL
        AND HE WERE FRIENDS.

PROCESSING PARAGRAPH 2:

        Unfortunately, the news was not
        good.
        Paul's wife Sarah wanted a divorce.
        She also wanted the car, the house,
        the children, and alimony.
        Paul wanted a divorce, but he didn't
        want to see Sarah walk off with every-
        thing he had.
        His salary from the state school sys-
        tem was very small.
        Not knowing who to turn to, he was
        hoping for a favor from the only lawyer
        he knew.
        Paul gave his home phone number in
        case Richard felt he could help.

READY TO ACCEPT Q/A:

        >What was the letter about?<
        PAUL AND SARAH WERE GETTING A
        DIVORCE.

        >Did Paul write Sarah?<
        NO, IT WASN'T SARAH, IT WAS RICH-
        ARD WHO GOT THE LETTER.

        >Why was Paul upset about the di-
        vorce?<
        PAUL AND SARAH WERE FIGHTING
        OVER THE FAMILY POSSESSIONS.

        >What did Paul do for a living?<
        PAUL WAS A TEACHER.

        >What did Sarah want?<
        SARAH WANTED TO HAVE THE CAR
        AND THE HOUSE AND THE KIDS AND
        THE ALIMONY.

        >Why did Paul write,to Richard?<
        PAUL WANTED RICHARD TO BE HIS
        LAWYER.

        >go<

PROCESSING PARAGRAPH 3:

        Richard eagerly picked up the phone
        and dialed.
        After a brief conversation, Paul agreed
        to have lunch with him the next day.
        He sounded extremely relieved and
        grateful.

READY TO ACCEPT Q/A:

        >Why did Richard call Paul?<
        RICHARD WANTED TO ARRANGE A
        MEETING WITH PAUL.

        >Did Richard contact Paul?<
        >How did Richard contact Paul?<
        BY PHONE.

        >How did Paul feel when Richard
        called?<
        PAUL WAS HAPPY BECAUSE RICH-
        ARD AGREED TO BE PAUL'S LAWYER.

        >go<

PROCESSING PARAGRAPH 4:

        The next day, as Richard was driving
        into the restaurant, he barely avoided
        hitting an old man on the street.
        He felt extremely upset by the inci-
        dent, and had three drinks at the res-
        taurant.
        When Paul arrived Richard was fairly
        drunk.
        After the food came, Richard spilled a
        cup of coffee on Paul.
        Paul seemed very annoyed by this so
        Richard offered to drive him home for
        a change of clothes.

READY TO ACCEPT Q/A:

        >Why did Richard eat out with
        Paul?<
        RICHARD WANTED TO DISCUSS THE
        DIVORCE CASE WITH PAUL.

        >What happened to Richard on the
        way to the restaurant?<
        RICHARD ALMOST RAN OVER AN OLD
        MAN.

        >Why did Richard get drunk?<
        RICHARD WAS UPSET ABOUT AL-
        MOST RUNNING OVER THE OLD MAN.

        >What happened at the restau-
        rant?<
        RICHARD SPILLED COFFEE ON PAUL.

        >How did Richard feel when the cof-
        fee spilled?<
        RICHARD WAS UNHAPPY.

        >Why did Richard spill the coffee?<
        RICHARD WAS DRUNK.

        >When did Richard almost hit the old
        man?<
        WHILE RICHARD WAS DRIVING TO
        THE RESTAURANT.

        >Where did Richard have lunch with
        Paul?<
        AT A RESTAURANT.

PROCESSING PARAGRAPH 5:

        When Paul walked into the bedroom
        and found Sarah with another man he
        nearly had a heart attack.
        Then he realized what a blessing it
        was.
        With Richard there as a witness, Sa-
        rah's divorce case was shot.
        Richard congratulated Paul and sug-
        gested that they celebrate at dinner.
        Paul was eager to comply.

READY TO ACCEPT Q/A:

        >Why did Richard drive Paul
        home?<
        SO PAUL COULD CHANGE HIS
        CLOTHES.

        >What happened to Paul at home?<
        PAUL CAUGHT SARAH COMMITTING
        ADULTERY,

        >How did Paul feel?<
        PAUL WAS SURPRISED.

        >Why did Sarah lose her divorce
        case?<
        SARAH COMMITTED ADULTERY.

        >Why did Richard congratulate
        Paul?<
        PAUL WON HIS DIVORCE CASE.

        >go<

TEXT PROCESSING COMPLETE ON: DI-
VORCE-STORY
```

Figure 7. The Boris program, 1981



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```
@CYRUS

ARE YOU INTERESTED IN MUSKIE, OR
VANCE? (M OR V): *VANCE

*(DIALOG2)

>When was the last time you were in Egypt?

        inferring a diplomatic trip
        answering question using time con-
        text

ON DEC 10 1978.

>Why did you go there?

        answering question using previous
        context

TO NEGOTIATE THE CAMP DAVID ACCORDS.

>Who did you talk to there?

        inferring undifferentiated political
        meeting
        answering question using previous
        context

WITH ANWAR SADAT.

>Has your wife ever met Mrs. Begin?

        inferring a social political occasion

YES, MOST RECENTLY AT A STATE DINNER
IN ISRAEL IN JAN 1980.

>What heads of state have you met?

        inferring a diplomatic meeting
        searching directly for $MEET

        .  .  .

        applying strategies to search memory

        .  .  .

        searching for sM-CONFERENCE

        .  .  .

        searching for sM-VIPVISIT
        searching sM-VIPVISIT instance for
        $MEET

        .  .  .

        searching for I-NEGOTIATE

        .  .  .
KING HASSAN, MENACHEM BEGIN, MUS-
TAFA KHALIL, IAN SMITH, PRESIDENT AS-
SAD, KING HUSSEIN, AND ANWAR SADAT.

>Last time you went to Saudi Arabia, where
did you stay?

        inferring a diplomatic trip
        answering question using time con-
        text

IN A PALACE IN SAUDI ARABIA ON SEP 23
1978.

>Did you go sightseeing there?

        answering question using previous
        context

YES, AT AN OILFIELD IN DHARAN ON SEP 23
1978.

....

@CYRUS

ARE YOU INTERESTED IN MUSKIE OR
VANCE? (M OR V): *MUSKIE

*(DIALOG2)

>Where are you today?

        inferring a diplomatic trip

        PROBABLY IN THE UNITED STATES
        ON JUN 14 1980.

>Where were you three weeks ago?

        inferring a diplomatic trip

        IN EUROPE.

>Why did you go?

        answering question using previous
        context:

        TO TALK TO ANDREI GROMYKO.

>Who did you talk to?

        inferring undifferentiated political
        meeting
        answering question using previous
        context

        TO NATO IN BRUSSELS ON MAY 14
        AND TO ANDREI GROMYKO IN VIEN-
        NA.

>Did you give a speech?

        answering question using previous
        context

        YES, ONE TO A GROUP OF REPORT-
        ERS AND ONE TO NATO.

>Are you going to Asia?

        inferring a diplomatic trip

        YES, THIS MONTH.

>Who will you talk to?

        inferring undifferentiated political
        meeting
        answering question using previous
        context

        TO NATO IN ANKARA, TURKEY.

....
```

Figure 8. The Cyrus program

knowledge of one domain — terrorism — and it could add to that knowledge by absorbing information from what it read into its memory.

We were attempting to address two different problems in IPP. First, if we ever are to automate the reading of news wires, we will have to build in detailed knowledge of the subject matter to be read. IPP concentrated on only one domain of knowledge so that it could attempt to build-up its knowledge in that domain. Our goal was to get IPP to build up that knowledge automatically, by learning from what it read. The second goal in IPP was to put all the knowledge structures we had devised into the same program. Frump used only scripts. IPP used plans, goals and scripts and also had a memory.

IPP was written by Michael Lebowitz as part of his Ph.D. thesis at Yale. The major intention of IPP was to add to its knowledge structures by forming new structures as a result of what it read. The program made a new generalization about Basque terrorist attacks, which it constructed for itself after reading the following three stories. Often the generalizations IPP made were a bit spurious. Nevertheless, it was beginning to update and expand its own memory structures, and that was of critical importance.

Boris. After spending a fair amount of effort on news stories, we began to be concerned that there was a range of phenomena in understanding that did not come across on the news wire but nevertheless posed significant problems. We wanted also to see how we could improve our general story understanding capabilities by using a new set of memory structures we were devising, ones more suited to facilitate learning by cross-contextual understanding.

We created a more fully integrated program that relied on a model of human beliefs and interactions that we could use in understanding little melodramas. This program was called Boris. (We were feeling a bit whimsical in naming this one. In fact, we named it long before we wrote it. The name expresses our frustration with some of our previous programs: Better Organized Reasoning and Inference System.)

As our lab grew, we started to add new faculty and projects, which often were not run directly by me. The Boris project was supervised by Wendy Lehnert, who by this time was a professor at Yale. Boris was written by Michael Dyer as part of his Ph.D. thesis. Tom Wolf and Pete Johnson also worked on the project. Boris was a rather complicated program that employed new parsing techniques, new inference techniques and used different memory structures from those we had been using (see Figure 7 on ID/15).

The language understanding programs we had built so far were satisfying in that they showed us we

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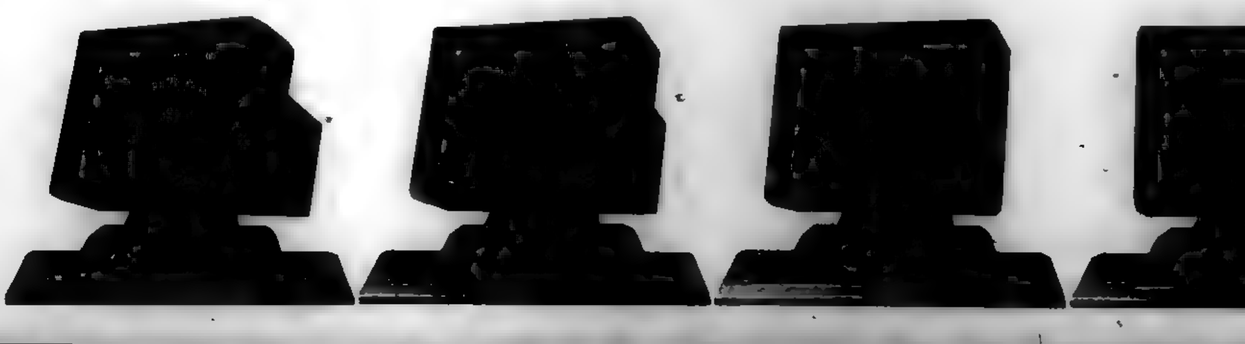

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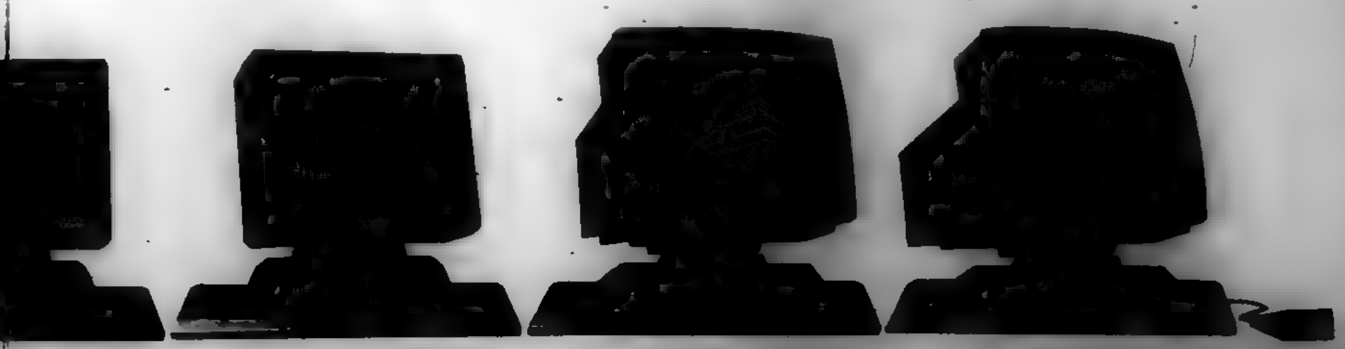

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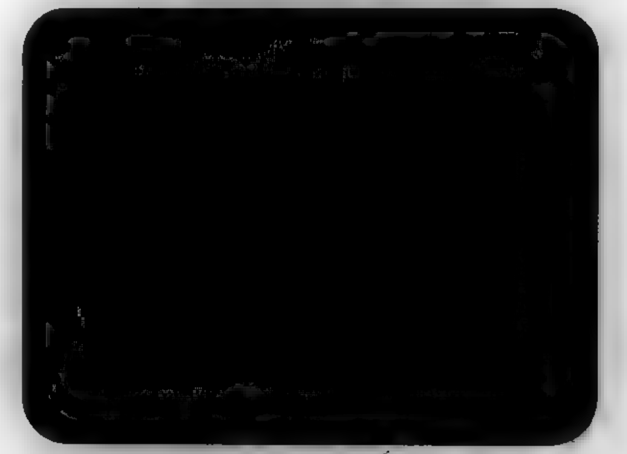

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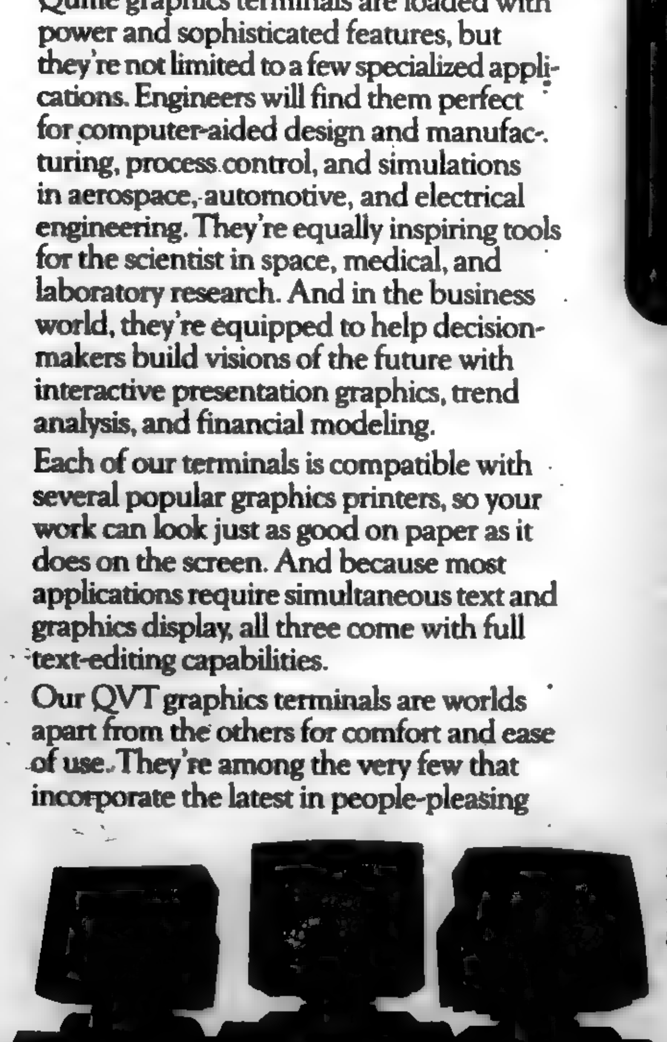

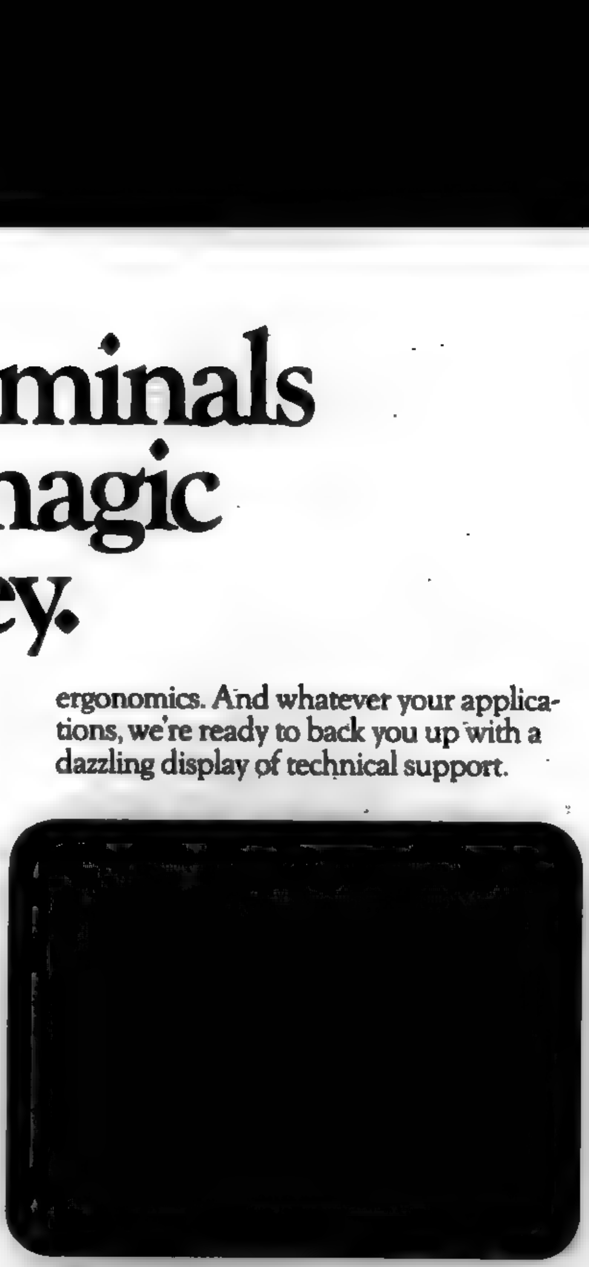

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Display Resolution:	640 x 480 pixels 4 shades of gray
Graphics Printer Compatibility:	Digital LA 30, Epson FX 80 and MX 80
QVT 511GX	
Max. Addressable Memory:	4096 x 4096 points
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could do what we set out to do. But they also were frustrating because each showed us a new set of problems that were unsolved and lay as obstacles on the road to automating the understanding process. These programs became more and more complicated to write as they encompassed ever more processes and greater and greater knowledge.

Cyrus. Perhaps the program we have written that best illustrates just where we are going is Cyrus. Cyrus stands for Computerized Yale Reasoning and Understanding System. (In this case, we knew the name had to be Cyrus; it was just a question of figuring out what Cyrus could be an acronym for.) Cyrus was a memory program that received from Frump all the stories it could find about Cyrus Vance, who was Secretary of State at the time. (The program later switched to Muskie.)

Cyrus compiled a professional and personal history of Cyrus Vance. This was an attempt to begin to model the memory of a particular individual. In some sense, the program thought of itself as Cyrus Vance.

Cyrus compiled a professional and personal history of Cyrus Vance. This was an attempt to begin to model the memory of a particular individual. In some sense, the program thought of itself as Cyrus Vance. (Well, we wrote it that way. It is hard to say that this program thought anything about itself.) We wanted the program to change constantly on the basis of its new experiences. It succeeded to some degree, but its success is not quite the point.

In a sense, Cyrus — or programs that will succeed Cyrus — will replace the large data base programs we have today. The problem with today's data bases is that they don't know what they know. Cyrus reorganized itself continually to reflect best what it knew.

And, although it was only an experiment, it taught us a great deal about what it means to remember.

Cyrus was written by Jane Kolodner as part of her Ph.D. thesis at Yale. Perhaps Cyrus' most interesting highlight was its ability to answer questions about which it had no direct information. When Cyrus responded that Mrs. Begin had met Mrs. Vance (see Figure 8 on ID/16), the program actually was just guessing. It figured that if it could find a situation when both women were likely to be present, then it could assume that they had met. The program thus searched for social situations (to which wives might have been invited) that occurred on trips that either one of the men might have made with his wife to the home of the other.

Finding a state dinner in Israel that occurred during a trip on which Mrs. Vance did accompany her husband, it assumed the rest.

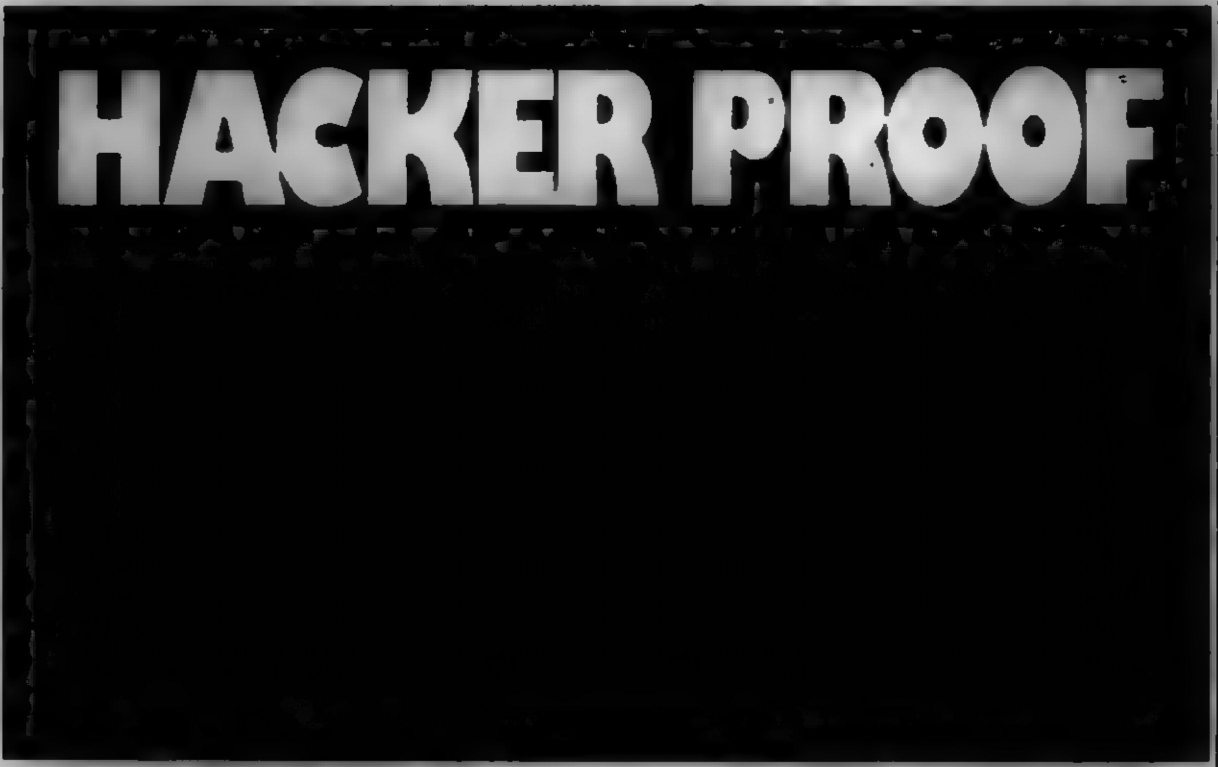
The problem with today's data bases is that they don't know what they know.

The road ahead

On a crude level, both Cyrus and IPP could be reminded of a previous story and compare the two in search of some general characteristics. For example, IPP researched some generalizations on its own derived from what it read. The program decided that every terrorist attack in Ireland was by the IRA; in every terrorist attack in New Zealand, the weapon was a boomerang; and that every time there was a hijacking in Lebanon, it was in protest of the disappearance of a Shiite Moslem leader.

But more and more, we came to realize that scripts, plans, goals and cross-textual referencing weren't the only crucial elements of an understanding system. Understanding a story can involve everything a person has ever known. We began to realize the importance of a dynamic memory, one that changes every time it understands a story.

A dynamic memory program would be able to find experiences



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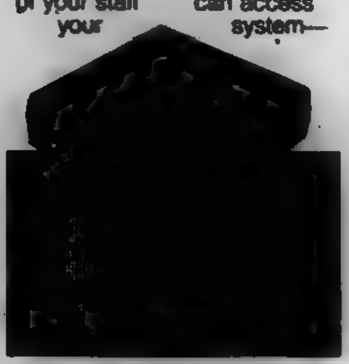

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Finance and Administration
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Capitol Station - Room E119
Post Office Box [illegible]
Charleston, West Virginia 25311

Attention: Kathy Kline, Senior Buyer

NOTE: With a copy of the letter to:

Mr. Edward L. Henderson
Administrative Assistant
Division of Medical Care
West Virginia Department
of Human Services
1900 Washington Street East
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> *We are trying to develop a system that is capable of building up an increasing number of memories about different situations it has experienced, which it then can use in understanding even more stories and experiences.*

from its past to help it understand a new event. A program equipped with such a memory would read a story differently each time it saw it, since it would be updating memory the first time, but be bored the second time. Or, it might learn more from it the second time, if it had gathered many new experiences that related to the subject of that story in the interim.

Our early programs never changed their processing structures as a result of reading a new story. They served to lead us into what may be the most complicated elements of any understanding system — the memory problem and the learning problem. Cyrus and IPP were our first attempts at getting programs to learn.

We are now trying to develop a system that is capable of building up an increasing number of memories about different situations it has experienced, which it then can use in understanding even more stories and experiences. We don't all have the same knowledge of earthquakes or even of driving a car, because we don't all have the same experiences with earthquakes and cars. We don't just want to have to put in everything we have ever known about earthquakes; we want to enable the machine to generate its own knowledge of them derived from its experiences.

Reading a story should change the way we read a later story on the same subject. Creating a belief system with some knowledge structures about what humans might do in certain situations depends upon the development of good representational methods. Getting a system that can use all its beliefs at any given time and modify them on the basis of what it reads, one that can learn from its experiences, requires an even more flexible representation than the kind we had been using.

How do people expand their knowledge so that it helps them with everything, so that it changes the way they parse sentences? Children constantly dream up generalizations, see when they fail and modify them on the basis of their experiences. Intelligent readers learn from what they read — that is why they read.

It is clear, then, what we must do next. We must develop systems with flexible, changeable structures that can learn while doing.‡

About the author

Roger Schank is professor of computer science and psychology at Yale University, chairman of the computer science department and director of the Yale Artificial Intelligence Project. He is also chairman of the board of Cognitive Systems, Inc., in New Haven, Conn.

Peter Childers is a recent graduate of Yale University.

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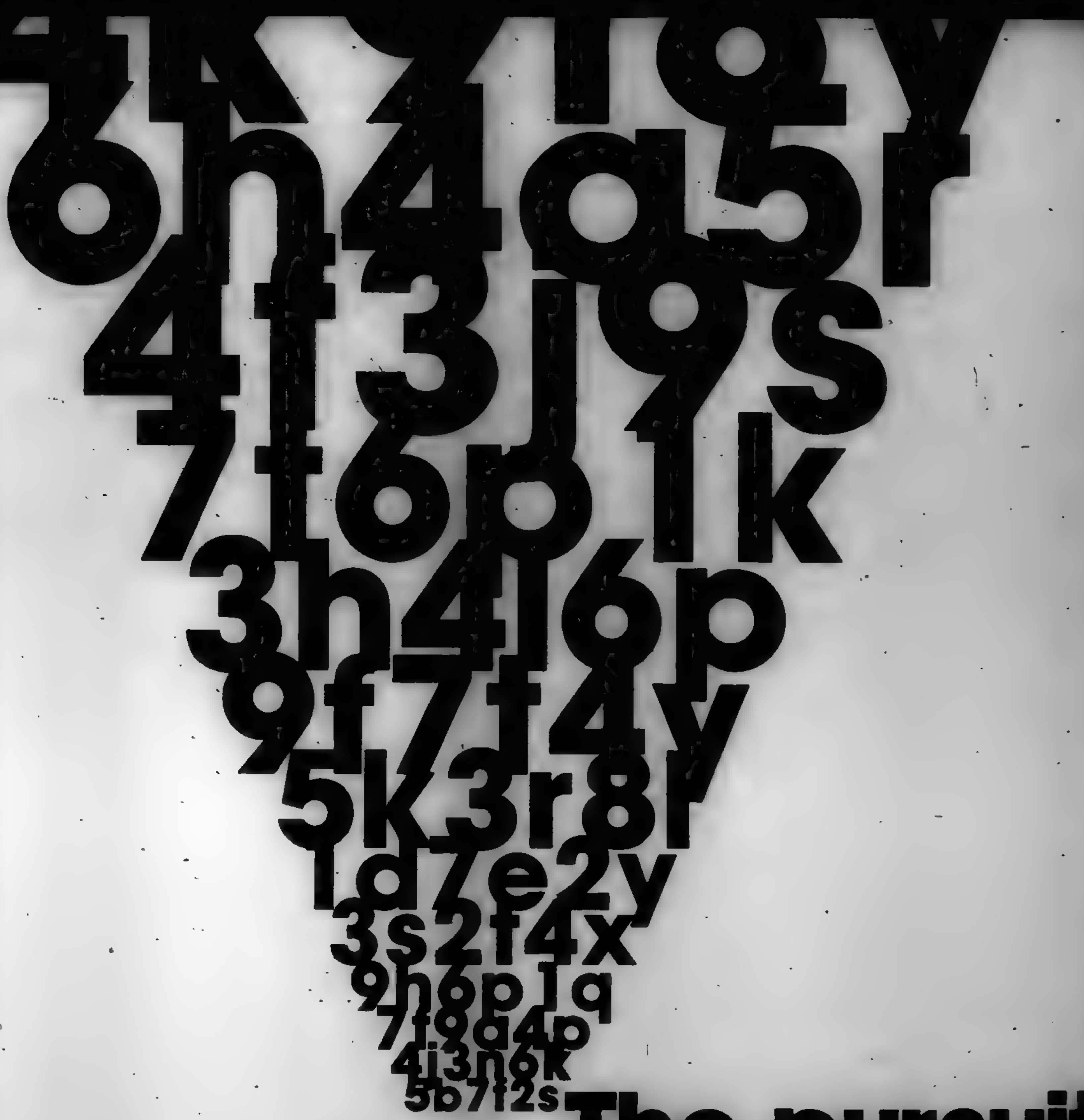

The pursuit of data integration

Marketing sells one product, manufacturing makes another, engineering adds changes, and accounting tries futilely to balance it all on the books. Therein lies the need for data integration.

By Thomas Womeldorff

Integration takes on almost as many definitions as there are vendors claiming to provide it. True integration between all operating systems is, in fact, one of the primary ways in which organizations are beginning to move forward in pursuit of a competitive edge.

So what constitutes true integration among application systems? At the highest level, integration is simple. It means that a software mechanism ties together all of an organization's support systems in a way that mirrors the way the organization actually does business. Furthermore, that mechanism is capable of evolving with the organization as its business requirements change.

From a functional level, integration must be understood as multidimensional. Truly integrated systems provide data integration, transactional integration and operational integration.

Data integration provides a company with a common set of facts. All information about related business activities is stored in a common repository and updated as events affecting that data occur. Marketing, manufacturing, engineering and accounting all use the

Events occurring in one system must update the data base and communicate those changes to other systems or users who, in turn, will use the data to plan or replan their business activities.

same data to make decisions about their particular role in selling, manufacturing, designing or costing any given product.

Traditionally, each operating group had its own system, which used its own data to make decisions about its activities in the delivery of products or services. The problem with this approach is that very seldom, if ever, does all of this information agree. Marketing sells one thing, manufacturing makes something else, engineering makes changes and accounting tries futilely to make it all balance on the books.

In this scenario, no one really knows what the "facts" are. The only way to develop any reliable information that portrays uniformly the facts of the business is to integrate fully all the data about the business.

Full data integration requires the use of normalized data, data reduced to its lowest common denominator. This normalized data is then stored in subject data bases that contain all the information about a given subject. Vendors, for example, could be a subject.

This data, stored once for everyone, is made available to any system or user requiring it. Vendor data would then be accessed by purchasing, accounts payable, engineering and manufacturing. Everyone in the organization would have access to the same vendor information, and each department would be in constant communication, via the data base, to make effective business decisions.

Data integration is really nothing new. The concept was introduced by data base management systems more than 15 years ago. But because the architecture of data bases varied with the requirements of the applications they served, we find ourselves today with almost as many data bases as applications. As a result, instead of having redundant data, which the data base was designed to eliminate, we now have redundant data bases and still no real integration.

The next dimension of integration is transactional integration. Just as data integration ties all systems and users to a single set of data, transactional integration ties together all the events or transactions that occur in these systems.

Events occurring in one system must update the data base and communicate those changes to other systems or users who, in turn, will use the data to plan or replan their business activities. This coordination and communication of activities ensures that events in one area of business appropriately affect related events in another without the need for manual intervention.

To accomplish this, the programs in these diverse applications must be triggered by changes in the data base. These changes, in turn, produce replanning logic or exception reporting to ensure that operating objectives are effectively met. In addition, the system must produce appropriate operational and financial audit trails, as well as historical records, to reflect the source and sequence of these business events.

Transactional integration, like data integration, is not a new concept. But its application has been broadened and extended as the notion of integration has matured.

Operational integration

Operational integration involves the sharing of information in one system by programs or screens in another. Without such sharing, significant benefits will be lost. Software investments intended to reap these benefits

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will be largely wasted.

Consider this example, using the entry of a customer order, to illustrate the point. A customer calls in an order for a standard item to be delivered within normal lead time. The order entry clerk accepts the order, without *confirming* availability through the production schedule, because such a confirmation would require signing off the order entry system and signing onto the production scheduling system.

Because this is a time-consuming and awkward procedure, it is rarely, if ever, executed. Customer and production problems result from these borders or barriers between systems because valuable information, although available, goes unused.

A solution to this common problem involves the integration of systems so that screens from one system (production scheduling) can be accessed without sign on/off procedures from the operator in the order entry system.

This facility allows an order entry clerk to easily check production schedules, inventory records, shipping schedules and even customer credit information to make sure that the order can, and should, be filled under terms confirmed at order entry time.

Ideally, all screens and reports across all applications should be presented in a common format, using common terminology and sharing a common security mechanism. As a result, once someone learns a single application system, that person should be able to learn additional systems quickly and easily. This can dramatically reduce an organization's training, documentation and support requirements.

Some software people have used the term "borderless" to describe this aspect of integration. To someone who does not routinely use a CRT terminal, this may not seem important, but the fact is, if it is not convenient to access a particular inquiry function, that information will go unused, no matter how valuable it may be.

Software solution

The only practical way to achieve these dimensions of integration is through the use of a complete set of complementary software designed to support the needs of every level of the organization and the various aspects of data processing.

Support for predictable business events (recording shipments, maintaining customer master files, tracking on-hand inventory and so on) should all be largely available from the standard application packages. These functions build and maintain a single corporate data base organized under a common set of data management tools.

Unpredictable information needs or queries (for instance, "How many orders for Part No. 2341-A came from the western region in the last 90 days?") should be supported by the data retrieval and decision support systems (report writer, word processing, electronic spreadsheets, graphics and so on) that are general-purpose in nature and that are, in turn, integrated with the data management software and therefore common to all the primary application systems.

A fourth-generation application development language should also be used to bridge the gaps between the application packages and the unique business needs of a particular company. With such a system, it is possible to extend and enhance the prepackaged systems for maximum functionality and performance while maintaining the software in a manner that accounts for incorporation of future enhancements from the vendor.

Communications link

In order to utilize fully the power of microcomputers, an integrated mainframe-micro communications link should allow personal computers to download, manipulate and upload information from or to the central data base. Again, the important point is that this function can be performed against any portion of the data base, without regard to the system that maintains the information that is needed.

For organizations with multiple CPUs, integrated network management software should provide efficient communications with far-flung divisions or departments on an organizationwide basis.

In the larger sense, integration provides a company with the ability to organize and manipulate information with maximum ease and efficiency. Organizations that are able to achieve fully dimensional integration of their computing resources are the ones that will be the most competitive in the future.

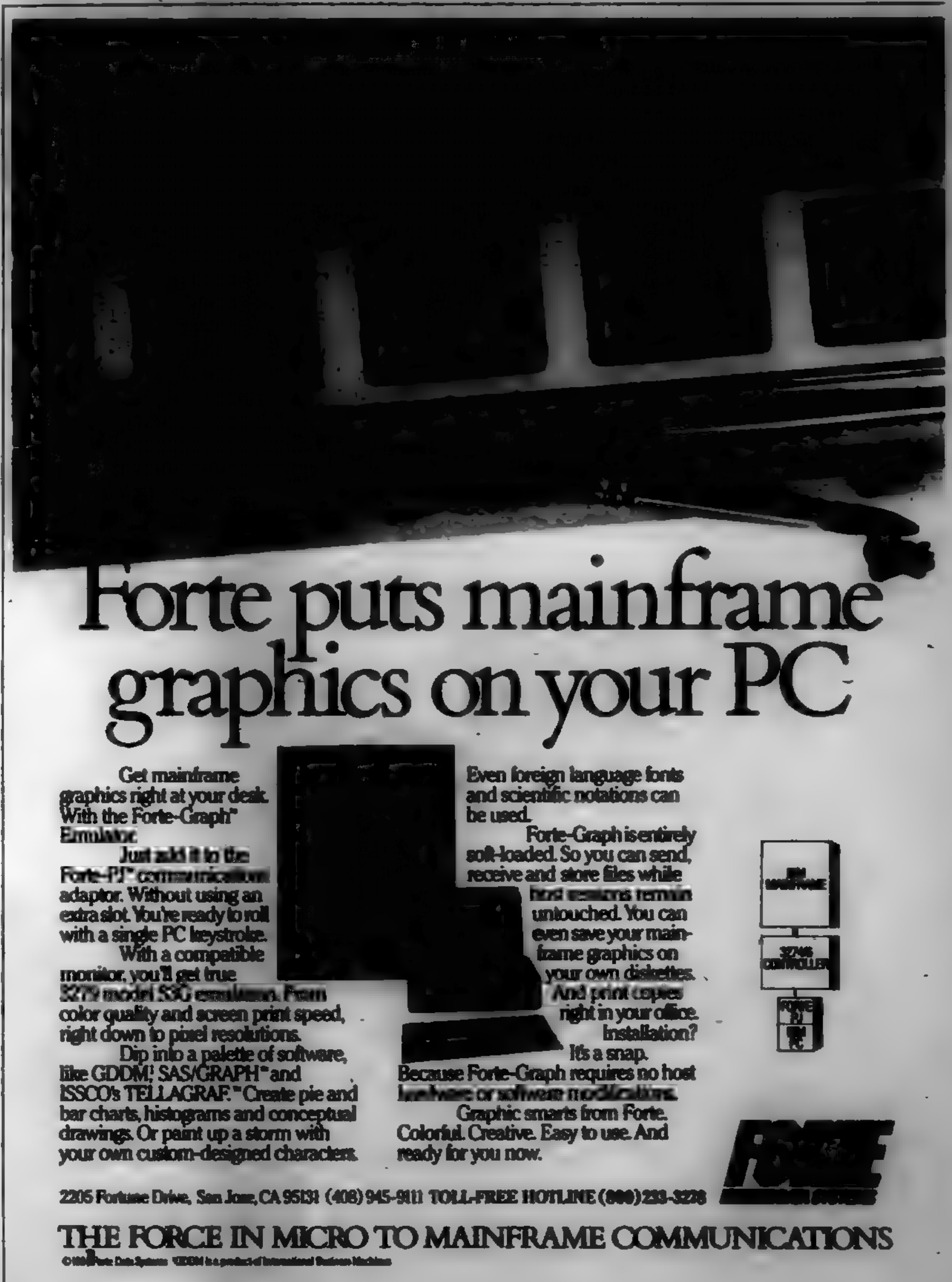
Benefits of integration

Clearly, well-coordinated organizational activity supported by integrated information systems will have a major impact on success in the marketplace, profitability and, ultimately, the relative success of the organization as a whole.

An organization with an integrated software system can expect such tangible benefits as:

- Improved manufacturing performance.
- Shorter lead times for planning.
- Improved inventory control.
- Accurate vendor performance analysis (delivery, quality, price).
- Improved vendor negotiations (reduced costs).
- Accurate payments.
- Reduced clerical effort.
- Improved cash flow visibility.
- Improved management communications.

These benefits illustrate the positive impact integration can have on an organization. A common by-product of the implementation of a closed-loop manufacturing resource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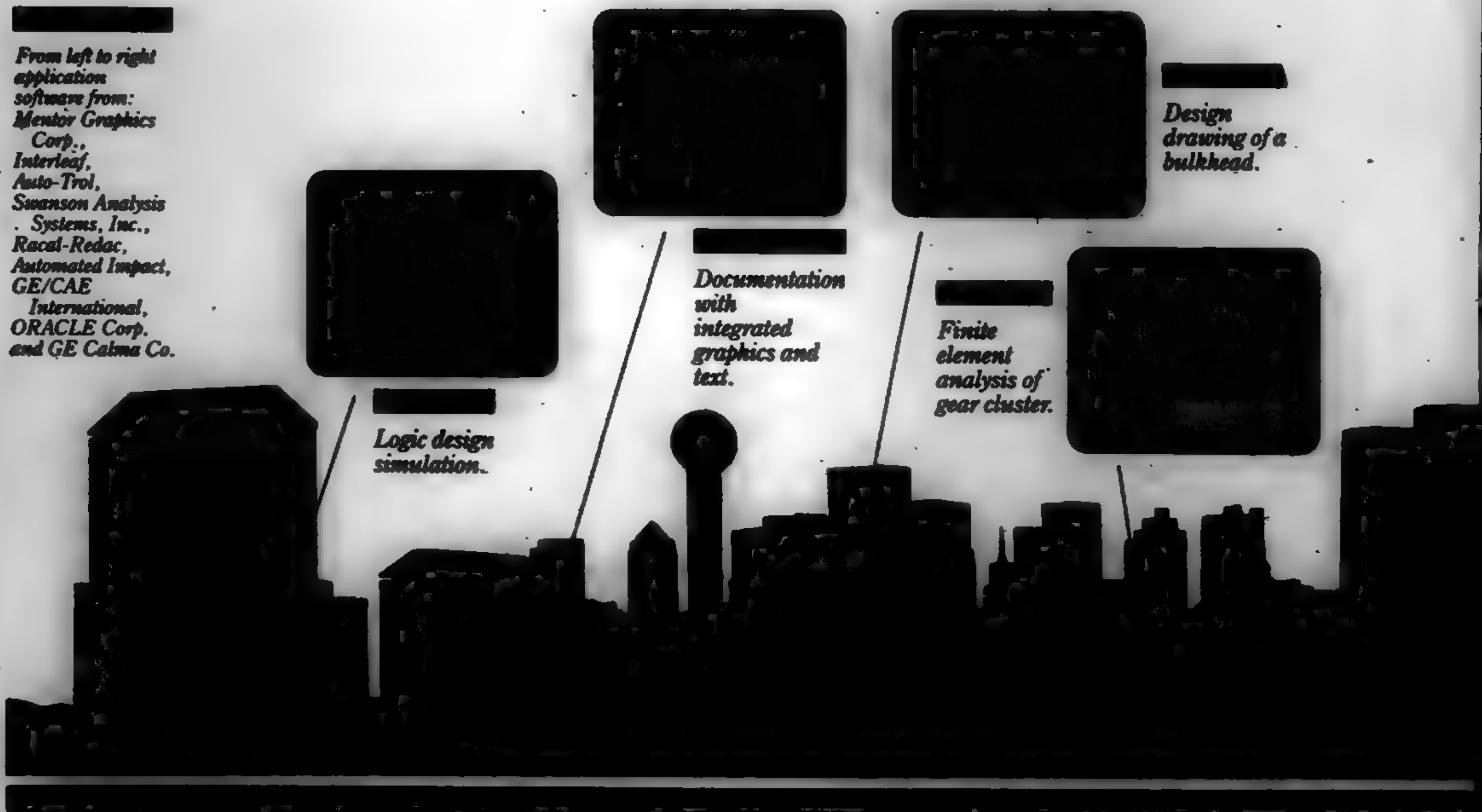

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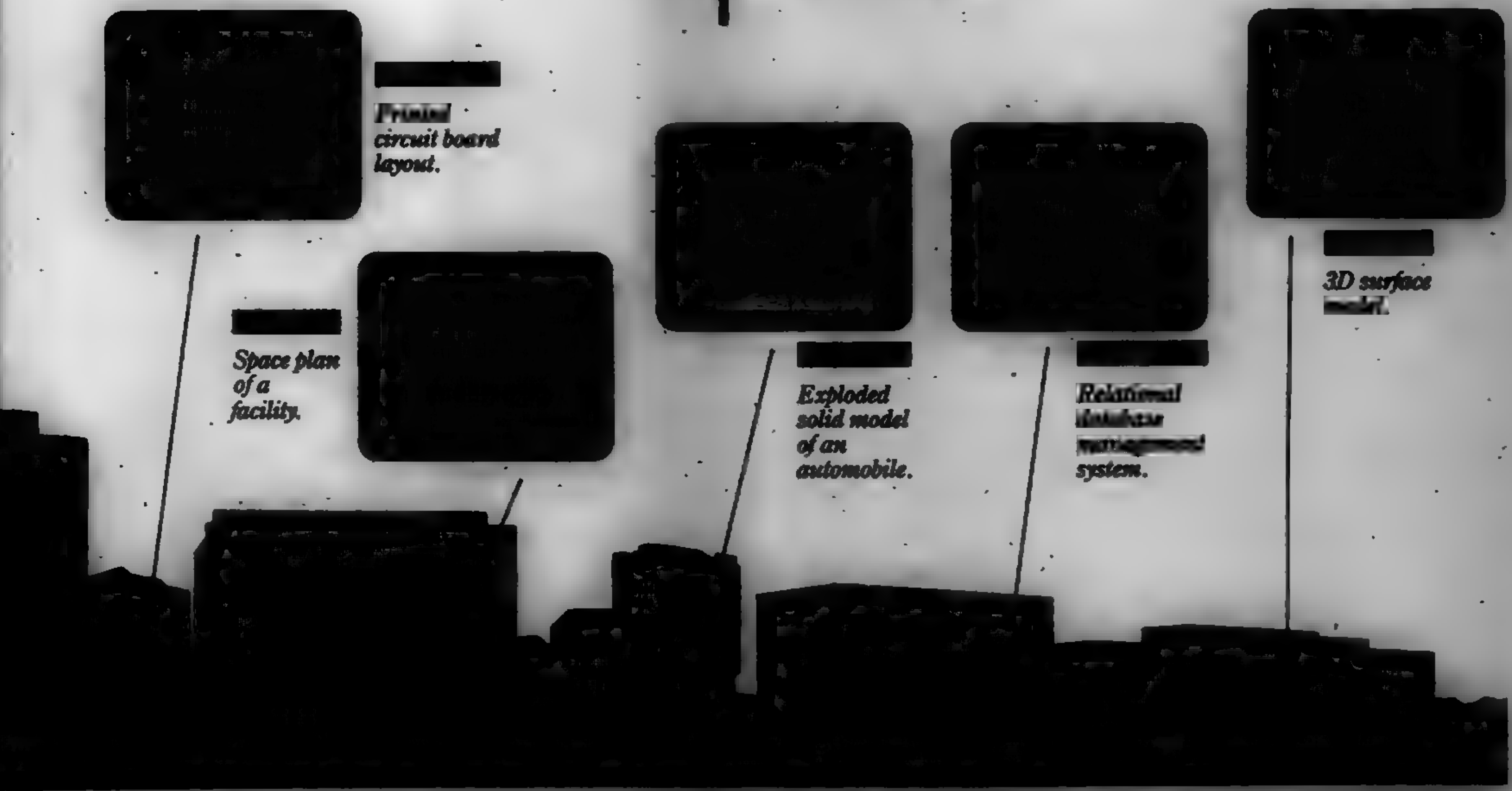

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IN DEPTH/DATA INTEGRATION

planning II system is that for the first time the purchasing manager, the production manager and the shop foreman actually begin to communicate with each other on a regular basis. Computer systems with arbitrary borders actually inhibit rather than enhance this process.

In many organizations these people often have little or no idea of how much they have in common or how much impact their actions have on the company as a whole. With more integrated systems, they begin to see how their particular arm of the organization is critical to the effective operations of other areas.

The availability of consistent, reliable, easily accessed information from an integrated set of systems can provide benefits beyond those that are obvious. When the artificial boundaries between organizational functions like manufacturing and accounting are removed, people naturally begin to apply their own native ingenuity to day-to-day activities. (Of course, system security is necessary to avoid too much ingenuity).

Easy access to common, reliable and timely information can create a climate for creativity throughout the organization. People can begin to find new ways to use information to solve problems, improve efficiency and generally raise the overall performance of the organization as a whole.

Why not everyone?

Probably no one would argue against the benefits of integration..If so, then why hasn't every organization implemented an integrated information systems environment? Some organizations are actually doing it, especially smaller, younger companies. Many of the largest companies, however, are not yet ready, for a variety of reasons.

Manufacturing systems have only recently matured to the point where financial systems have been for a number of years — to the point where there is a high degree of agreement as to what the basic required functions are in a system. Usable, integrated manufacturing software was not available a few years back.

Software vendors tended to focus on specialized application areas in the past. Few even considered the concept of integration beyond that scope, much less committed themselves to developing it.

Even when the potential has been recognized, the cost and difficulty of developing what amounts to a single (though modular) system that encompasses application support for all aspects of a business, as well as general-purpose data management and retrieval tools, has been too great for all but the largest software vendors.

The world of application software is, however, changing dramatically. A whole new generation of application software is emerging, along with a new generation of software companies. The companies that built the leading data base management systems (the foundation for all applications) are now building major packaged application systems designed to take advantage of this emerging software technology. These new-generation system builders are uniquely positioned to build these systems because they alone have laid the required foundation for such systems.

This new generation represents great strides toward truly integrated systems. They represent the foundation upon which companies are beginning to build their information systems for the 1990s.

With this new generation of software now becoming available, the key to integration for any large company is long-term planning. While you may be wrestling with a veritable fruit salad of application systems right now, it doesn't have to remain that way. By stepping back and taking a global approach, a long-term systems investment and implementation strategy can be devised.

About the author

Thomas Womeldorff is senior product manager for application software at Cincom Systems, Inc. in Cincinnati.

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IN DEPTH

MOVING MIS AND THE COMPANY INTO THE FUTURE

By Robert Peterson

Through all the technological advances of the past, the MIS charter remained the same — we provided systems and computer power to the company. Now that charter will change. The specific industry and organization we serve will determine precisely how we change. MIS will truly become a services group. We can either plan for that transition and guide its outcome, or we can ignore it and conduct business as we always have.

If MIS is to remain a viable, dynamic part of the corporate community, we must move quickly to effect that transition. Otherwise, we will become merely a utility function, driven from the outside and responding solely to specific directives. The organization will most certainly suffer, even while never realizing it.

Being an executive in MIS is not for the weak of heart or those who require a highly stable environment. We have seen the discipline change so dramatically, in a relatively short time, that experience more than 10 years removed is nearly extraneous. MIS now rates as one of the 10 most stressful occupations, according to recent studies. The future doesn't promise any respite.

Over the years, the bulk of the changes have been technology-driven. The raw power of hardware and software has yielded opportunities for information facilities. These opportunities presented themselves in such a way that the MIS professional was in a position to market them to the customer community. What MIS didn't want to address, it didn't market — a very nice situation indeed.

We now find ourselves in a different situation. The advent of personal computers, end-user development systems and a general rise in computer literacy has put an extraordinarily high level of pressure on the MIS professional. We are now being driven into a new age by our customers who are no longer content to wait for us to understand the issues facing the organization. The implications of this transition drive into the very framework of how we operate and how we support the corporate community.

Anticipating the impacts

With the wide range of new opportunities, technological variations and choices facing us today, how can we predict the future with any degree of success? The answer is that we cannot. There are simply too many issues on the horizon; any number of them could present themselves as prime issues. What we can do is make ourselves aware of the major issues facing us in our specific environment and begin to prepare as best we can for the future of highest probability.

This isn't something done over coffee one morning. It is a down to earth, well-communicated planning effort that takes place constantly among the senior staff of the MIS group. The planning effort includes assigning staff members to study options and alternatives, produce study members to explore options and alternatives, produce study reports on those efforts and present them to the senior staff.

It means a concrete strategic plan that concentrates not only on the business environment but on what MIS will do to assure its viability. More than anything else, the planning effort means promoting that idea to upper and middle management and gaining their cooperation and commitment.

The key impact areas will vary from organization to organization. But even if they didn't, the priorities and marketing method would vary to such an extent that the issues would not even look the same. There are, however, some obvious issues facing all of us today.

End-user computing

Probably the greatest impact for the future that exists today takes the form of end-user computing through the use of decision support systems, statistical analysis and presentation capabilities, data base managers and application generators. We have actually entered an age where the user may not need us — or at least the wherewithal exists by which he can make a case for it. It is a difficult argument to fight, especially in the abstract.

If we honestly evaluate the probabilities for the future, end users will be generating the vast majority of their own systems. MIS will concentrate on the very complex portions, building architectural frameworks around the users' efforts and protecting the corporate information base. With all this, it is safe to assume that systems development as we know it today — with its feasibility studies, analysis, programming and testing phases — will go the way of the dinosaur.

Futurists have tried to predict time frames for this progression for years with little or no success. But the changes will take place — and in the not-too-distant future. The inevitability of this progression is stamped in the power of the software on the market today. That power is nowhere near what it must be to totally support end-user development, but the progress toward that power level is now taking place. The realization of the capability is just around the corner.

The opportunities for disaster in this type of environment are staggering. With all the emphasis placed on computer literacy in recent years, we must never forget that literacy does not mean proficiency or professionalism. Uncontrolled information manipulation provides incredible opportunities to misrepresent key corporate decision issues.

When this happens today, the hope is that the bureaucracy of the development cycle itself will preclude strategic decisions being made on faulty information. That certification of systems is a by-product of an independent development organization. With end users making the effort themselves, certification will not necessarily take place — unless MIS plans and implements mechanisms to ensure its existence.

It is unwise to confuse computer literacy with computer expertise. Literacy will allow the general user environment to develop solutions to its own problems — given the framework to make sure those solutions conform to good practices and corporate goals. It is the computer professional who will provide that framework and monitor compliance with those practices.

Realistically, there is little hope that MIS can keep pace with the accelerating demand for computer solutions to business problems. In a competitive marketplace, an emphasis exists on the ready availability of usable information. Providing that information base requires systems for capture of the daily activities, entry of demand, maintenance of product or service flow and delivering that product to the end customer.

Even with the influx of fourth-generation languages, increasingly sophisticated data base management systems and scientific methodologies, MIS continues to fall behind in the demand for new systems. Backlogs increase to the point where they are no longer really backlogs but daydreams. It is a significant and severe problem.

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Since most organizations are not likely to create an MIS group of infinite size, the solutions must come from quarters other than improvement of the conventional mechanisms of developing and delivering systems.

The typical contract/consulting groups will have to change and improve as well. These groups can no longer afford to be body shops that ship out programming talent.

We will see an increased sophistication in the level of shelf-package software to the point where we will purchase core units that can be modified and maintained by the end user with MIS guidance.

In order for this to be feasible, the software producers will have to change their approach from a single approach solution to the creation of tool kits tailored to generic applications — accounts payable, manufacturing resource planning, check processing and so on. With the central core and adaptable peripheral modules, organizations will still have the ability to create an endemic hybrid that will make their approach different from their competitors.

We should see a higher use of contract and consulting services at the expense of internal development staff. This change means a lowered investment for permanent staff as well as the ability to apply more specific skills to specific problems. MIS will remain the coordinating force and communication vehicle between the company and the vendors.

The typical contract/consulting groups will have to change and improve as well. These groups can no longer afford to be body shops that ship out programming talent. They must evolve into stable, professional organizations that can provide specialized talent at all levels, from project management to coding.

A substantial portion of the development effort will be accomplished directly by the user community. Their effectiveness will be largely dependent upon a number of factors, including evolution of software products, continued improvement of the price/performance ratio of hardware, availability of a reasonable data base approach and the evolution of the MIS professional's consulting capability. The last factor may be the most important relative to the health of the organization.

MIS, if nothing more, is quite competent in the role of project management. We take it for granted, but the typical cycle of project to project is something that everyone is not inherently good at. With end-user development we will see the project mode of doing things moving into the areas where steady-state maintenance is the prime orientation. Project roles are somewhat foreign. One of the major contributions the MIS professional can make is to bring project management and control expertise to the typical user development efforts.

Dispersing of MIS

In many organizations today, we see a subtle dispersing of many traditional MIS functions outward into the user community. A substantial portion of the cost/benefit efforts are there. The development methodologies shift a large part of the responsibility for analysis and design, and in many organizations the testing efforts are the user's responsibility. In a truly pragmatic sense, it represents a logical and healthy transition of responsibility.

However, like a train gaining momentum, it can be very difficult to stop. Often, functions are transferred with only a vague understanding of what ancillary activities are implicitly transferred. These ancillary activities can very quickly come back to haunt us in very subtle ways.

MIS is independent of the political motivations of other departments. Therefore, it takes (or should take) a less parochial view than any single area. MIS tends to seek solutions without bias that serve and protect the entire organization. When any single user area takes responsibility for the design and justification of a system, there is less protection for the balance of the company.

The only way to deal with this situation is for MIS to take an active role in review and recommendation for all development efforts. That role is substantially different than total control of a project and requires a different view and talent. Understanding these differences and establishing the procedural mechanisms to ensure success is important for the future.

Data base environment

The promise of the integrated corporate data base with its ability to secure and protect the corporate data resource has had, at best, a spotty realization. Few organizations today can honestly say that they have successfully implemented a data base facility that meets the goals they started out trying to achieve. It appears unlikely that we will ever see such a realization.

The limitation occurs for two reasons. First, we have never been able to truly communicate the abstract need for an integrated data base to the management of our user community.

With some notable exceptions, management has never seen the need to get overly excited about the opportunity, at least to the point of

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Secondly, it is a substantial expense to create subject data bases with the inversion capabilities that allow the gains to be realized.

The more systems we install — or the users install — the further away we find ourselves from the integrated solution. There can be no argument as to the advantages of an integrated, integral data base management system. However, we must be pragmatic enough to realize that the concept may never be realized and take steps that alleviate some of the problems of not having [illegible]

This is far from an exhaustive list of major issues facing MIS today. The emergence of the information center, the personal computer revolution, enhanced communications capabilities and a host of other issues face the MIS executive today. Whereas it is difficult to perceive where these issues will take us, it is essential that we take steps to ensure that they are not the cause of our demise in the corporate structure. That demise is a very real possibility if we do not adequately determine where we go from here.

Planning for transition

The planning function within MIS typically concentrated on presentation of business issues and how we will react to those issues. While that is certainly essential, it is only two-thirds of the need at best. What we cannot ignore are the internal aspects of the department and how we will react to our own future.

The issues facing MIS as a discipline should be defined and discussed relative to their importance to the specific environment. For instance, the issue of hierarchical data bases with decision support facilities for all knowledge workers is certainly less critical in a mill environment than at a statistical research firm. It is imperative to concentrate on the issues that are most likely to impact you specifically. Those are the ones that are most urgent, and they are probably the only ones to which your management will react.

The implications, cost factors and competitive impacts should be highlighted as well as the steps to protect the organization from mistakes in each area. We should project a comprehensive picture of where MIS is going for the next five years and how that transition will affect the company.

Typically, management prefers to relate to action-plan type scenarios. However, in an evolutionary environment we are not always dealing with subjects that translate readily into actions. While management may not like to deal in that framework, it is simply going to have to if its information resources are to remain valid and useful. The generic, abstract issues must be stated and the department's plans to facilitate the transition described.

These abstract issues can be a far more traumatic set of problems than the well-directed specifics. They tend to be molded into the framework of how the department does business and how it interacts with the other groups within the corporate body. The following issues deserve a high level of consideration.

Place for your people?

In the MIS organization of tomorrow (not 10 years from today, but tomorrow), the prime emphasis for development personnel will be on the attributes of consulting, communicating and coordinating. These attributes will be the interface point to the user/developer with a prime responsibility for protecting the overall organization from information abuse and misuse. The cloistered programmer/analyst will be a creature of the past, except in highly specialized cases.

If the conventional development approach has characterized your organization for the past several years, you are likely to find yourself with a rather striking mismatch of needed skills to possessed skills. If that is the case, ask yourself what steps you can take to rectify the situation in the long run and how you can migrate your personnel skills over time.

The comprehensiveness of that plan is key as is its visibility. The plan should be communicated effectively to the staff so it does not feel its future is in doubt. Being reasonably intelligent individuals, the staff will quickly perceive the changes taking place and be quite sensitive to the implications. It is imperative that they do not feel threatened.

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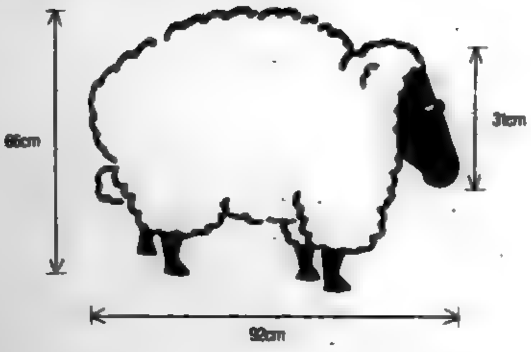

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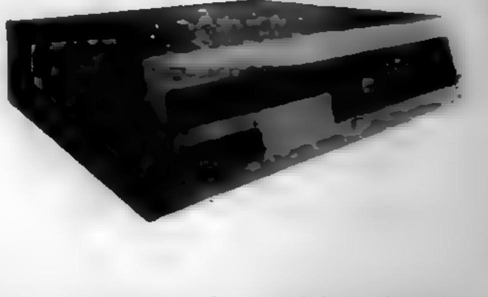

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There seems to be an almost pathological desire by upper management to stay as far as possible from decisions that involve MIS.

One of the chronic cries from MIS has always been that management chooses not to get involved in issues related to information services. In general, the complaint is valid — there seems to be an almost pathological desire by upper management to stay as far as possible from decisions involving MIS.

Volumes have been written on the reasons why and recommendations as to how the situation can be changed. The bottom line is that without management's understanding and backing, any hope of moving to an effective new era of MIS is moot.

After nearly 25 years of MIS influence on the future growth capabilities of most organizations, it is unreasonable for any senior executive to ignore the importance of comprehensive information planning.

The successful integration of that resource into the general plans of the organization is essentially a matter of corporate life and death in an increasingly competitive marketplace. The senior executive should and must stay actively involved in MIS planning.

Look elsewhere

If the senior-level management of the company you serve chooses to avoid the issues, refuses to hear the logic behind the need for effective planning and/or considers MIS to be a necessary evil — find another organization.

If you consider yourself a forward-looking MIS professional then you are wasting your time with that organization. Find one where they recognize the changing world; there are plenty of forward-looking managements that will appreciate and reward your efforts.

For those of you with reasonably mature upper management, the concentration point in your marketing effort must be on the future that you are planning. Don't be overly definitive. The future is hazy at best. Presenting it in a strategic plan doesn't make it any less hazy. Concentrating on where you intend to go based upon probable variables will make your interim steps (which are really what you want to sell) substantially easier.

Much of what can be done with the new development tools depends upon the sophistication level of the user community. That is a factor that must bear heavily on the plans for MIS. Sophisticated, intelligent users allow for a substantially lowered commitment to education and training as well as a considerably lowered requirement for constant assistance.

Faced with a level that is incompatible with the need, one has two choices: attempt to create foolproof system interfaces or raise the sophistication level selectively.

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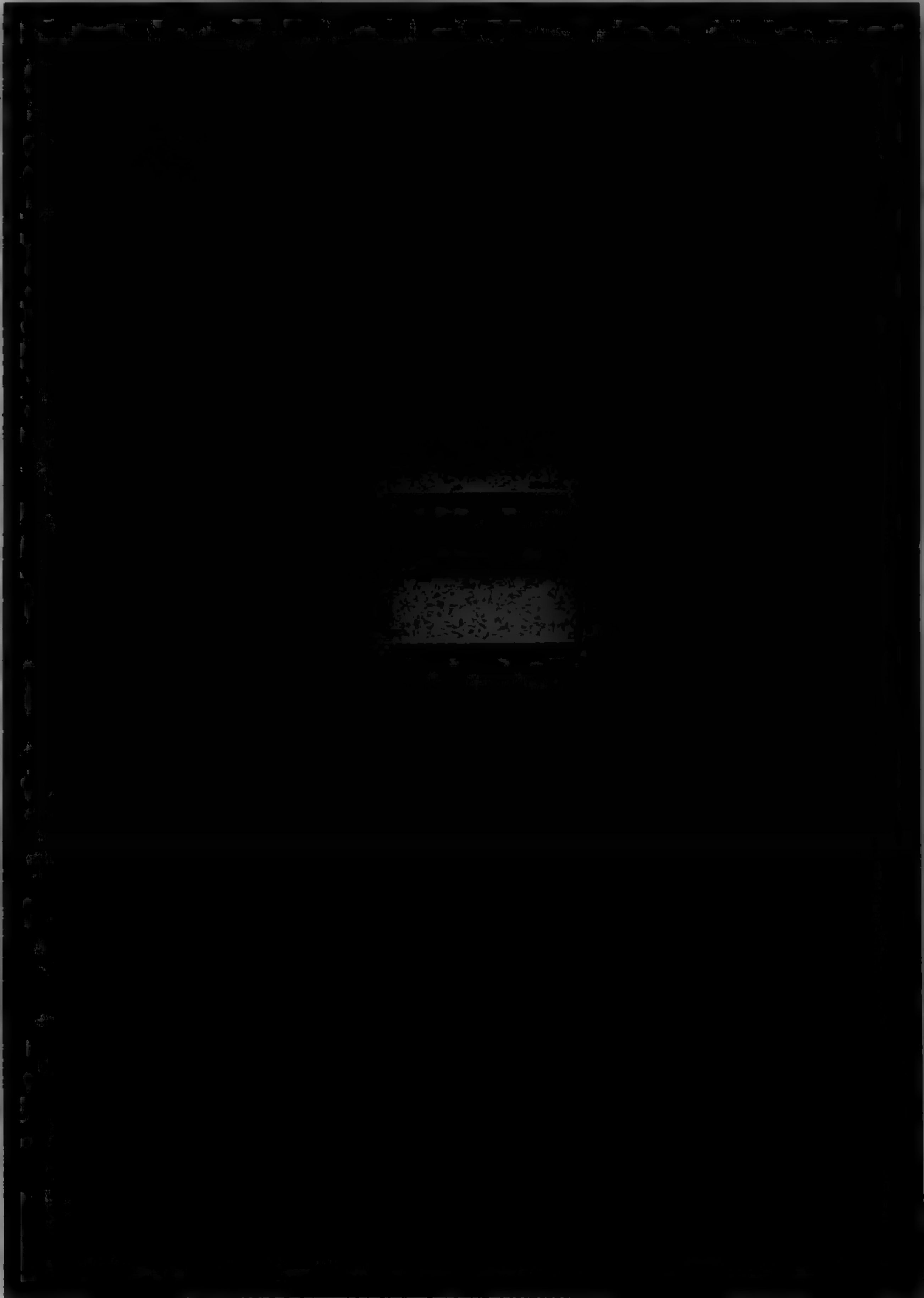


If the senior-level management of the company you serve chooses to avoid the issues, refuses to hear the logic behind the need for effective planning and/or considers MIS to be a necessary evil — find yourself another organization.

The first choice is the one typically taken and the least likely to succeed. It is expensive, penalizes aggressive, dedicated individuals and stifles innovation.

The second option is the only rational approach and will require the commitment of management for reallocation of some existing personnel, raising the selective hiring standards and some costly training. However, in the long run, the cost is substantially lower and the results more lasting than trying to create systems for gorillas.

Turnover rates

It is nearly impossible to build any type of future organization without a stable core of senior people to build around. People are always the key ingredient in any attempt to change the general direction of an organization. Often, the change itself will produce or aggravate a problem turnover rate; equally as often it will correct one.

MIS has historically been satisfied that turnover in excess of 25% was inevitable. In some major cities where competition is abnormally high this may be the case. However, accepting those rates is the prime guarantee that they will continue. Only by determining the bottom-line reasons can we ever hope to overcome them.

This has been a sample of the types of generic issues facing the typical MIS organization. They should not be surprising nor enlightening. They have appeared in the press for years with long, expert treatments of each subject.

But reading about the issues facing us is not enough. Until they are addressed and analyzed and approaches are devised for your organization, by you and your people, they will not be solved.

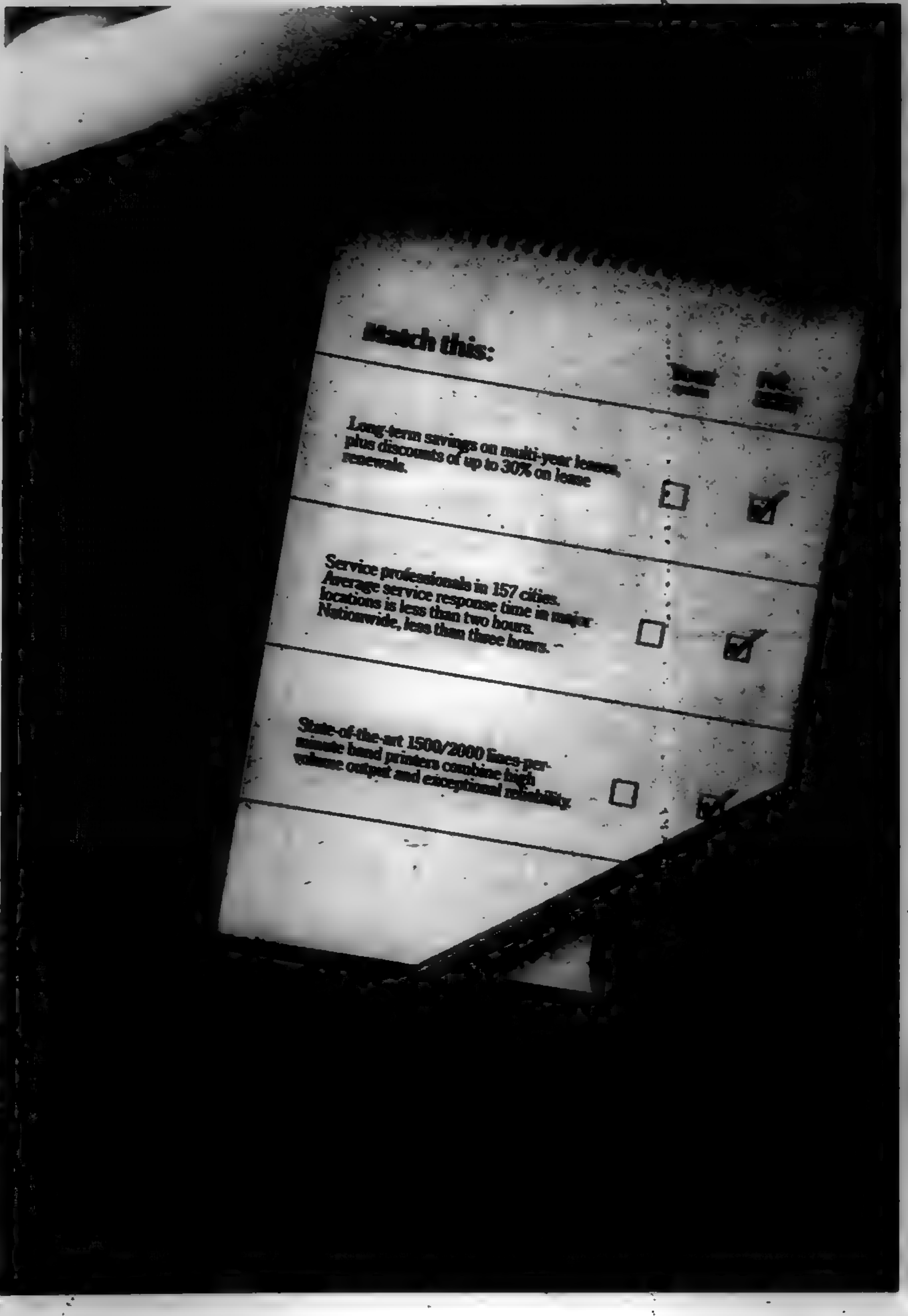
It is not enough to say that the MIS we know today will not exist tomorrow. It is not enough to convince management of that fact. You must understand what the transition means to your organization and take steps to make that transition take place in as orderly a fashion as possible.

Establish strategy sessions among the senior members of the MIS staff, and detail the prime issues. Boil those down into very pragmatic statements on impact, probable time frame and solutions. Establish study teams to determine how other organizations have addressed the issues or plan for them yourself. Create formal plans, procedures, policies and practices to ensure that the organization is properly serviced.

In any case, plan for the transition and communicate those plans to management. Spend the time now to make your staff part of that planning effort, not casual observers. The opportunities of the future will be realized by the aggressive, conceptual thinkers who define the leading edge, not those who follow. It is not a simple matter of being sophisticated but rather of ensuring the survival of MIS in your organization.

About the author

Robert Peterson is an independent consultant specializing in MIS. He lives in Cary, N.C.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IN DEPTH

WOMEN IN COMPUTER SERVICES

By Judith Larkin

Recent data from personality tests, questionnaires and a job satisfaction survey sheds light on three areas: the psychological characteristics of women in DP, the sources of satisfaction and dissatisfaction in their jobs and concerns that might be addressed through workshops and training.

Over the past three years, I have conducted workshops on leadership skills for systems engineers at the Computer Task Group Education Center in Buffalo, N.Y. The systems engineering group is composed of the technical people who work as applications programmers, systems programmers and systems analysts.

During the three-day management training course, I administer the 16 Personality Factor Questionnaire (16PF), an adult personality test whose reliability and validity have been well established. A multipage, computer-generated description of the individual's personality, which is later sent to participants, was designed to help them gain insight into themselves and plan their careers.

A STUDY

The women subjects of this study are technicians with the title of systems engineer. They function as programmers, programmer/analysts and systems engineers, providing professional services in the design, analysis, implementation, maintenance and management of software systems. The majority of the women who provided data for this study are employed by Computer Task Group, Inc. and are spread thoughout the country, doing contract computer work at different client sites in a variety of industries.

This discussion also reflects the input of a number of women at Computer Task Group and several other software companies who have advanced from the technical ranks to become managers of data processing personnel.

> *From these studies, the DP woman emerges as a committed professional: intelligent, independent, persistent in striving to accomplish difficult tasks and maintain high standards, assertive in attempting to control and impose order on the environment.*

In the management education program, I have tested 58 women systems engineers, 11 of whom became managers, and 179 men, including 39 who were or have become managers. The results discussed here are based on the scores of 47 women, all nonmanagerial systems engineers. Data on the men was discussed in a previous *Computerworld* article [CW, Feb. 21, 1983.]

A group profile on the 47 women was developed by pooling individual data from the 16PF tests. The results of statistical tests showed that compared with the population average for women, DP women are significantly different on the following dimensions:

1. More intelligent, capable of abstract thinking, bright. They tend to be insightful, fast-learning and intellectually adaptable.

2. More assertive, aggressive, competitive. This trait is also expressed in independent-minded behavior, sometimes unconventional and headstrong, that is not easily upset by authority.

3. More conscientious, persistent, persevering and determined. This personality factor characteristically expresses itself in a drive to do one's best and a high level of achievement motivation.

4. More venturesome, socially bold. The combination of toughness and sociability is important in occupations that require dealing with people and emotional situations — but especially so if one is to feel comfortable venturing into such diverse work environments as banking or manufacturing to tackle work assignments.

5. More tough-minded and realistic. Not prone to dwell in fantasy or sentimentality, DP women take a tough, practical, realistic (no-nonsense) approach to situations. They tend to keep to the point and act on practical, logical evidence.

6. More experimenting, liberal, questioning. This trait is expressed in a tendency to experiment with solutions to problems, an analytical and questioning approach to problems, a desire to be well-informed and a tendency to like innovation and to be willing to break with customary and traditional ways of thinking. (Executives, university professors and scientific researchers also tend to show high scores on this characteristic.)

These results are consistent with the findings of Charles Woodruff, who used a different instrument to identify the strength of various needs in a group of 50 women in DP. Compared with the population of women in general, the women in Woodruff's sample showed a higher need for achievement and need for understanding — a desire to understand many areas of knowledge, to satisfy their intellectual curiosity. Similar to the high score on persistence in the present sample, Woodruff's subjects showed a high score on "endurance" — a willingness to work long hours and not give up in the face of difficulty.

Other needs strongly in evidence included a high need for dominance — the desire to have control over the environment and to influence or direct others; a need for order — the desire to be organized and to avoid confusion or clutter; and a high need for cognitive structure — which results in a dislike of ambiguity and a desire to find answers based on definite knowledge rather than guesswork.

Personality profile

From these studies, the DP woman emerges as a committed professional: intelligent, independent, persistent in striving to accomplish difficult tasks and maintain high standards, assertive in attempting to control and impose order on the environment. J. Daniel Couger and Robert A. Zawacki found in their 1980 study of computer personnel that data processing professionals have higher growth needs than people in any of 500 other job categories they surveyed for their study. They found a strong need for personal growth and accomplishment — the need to be stimulated and challenged and to develop their abilities.

The women in the present study

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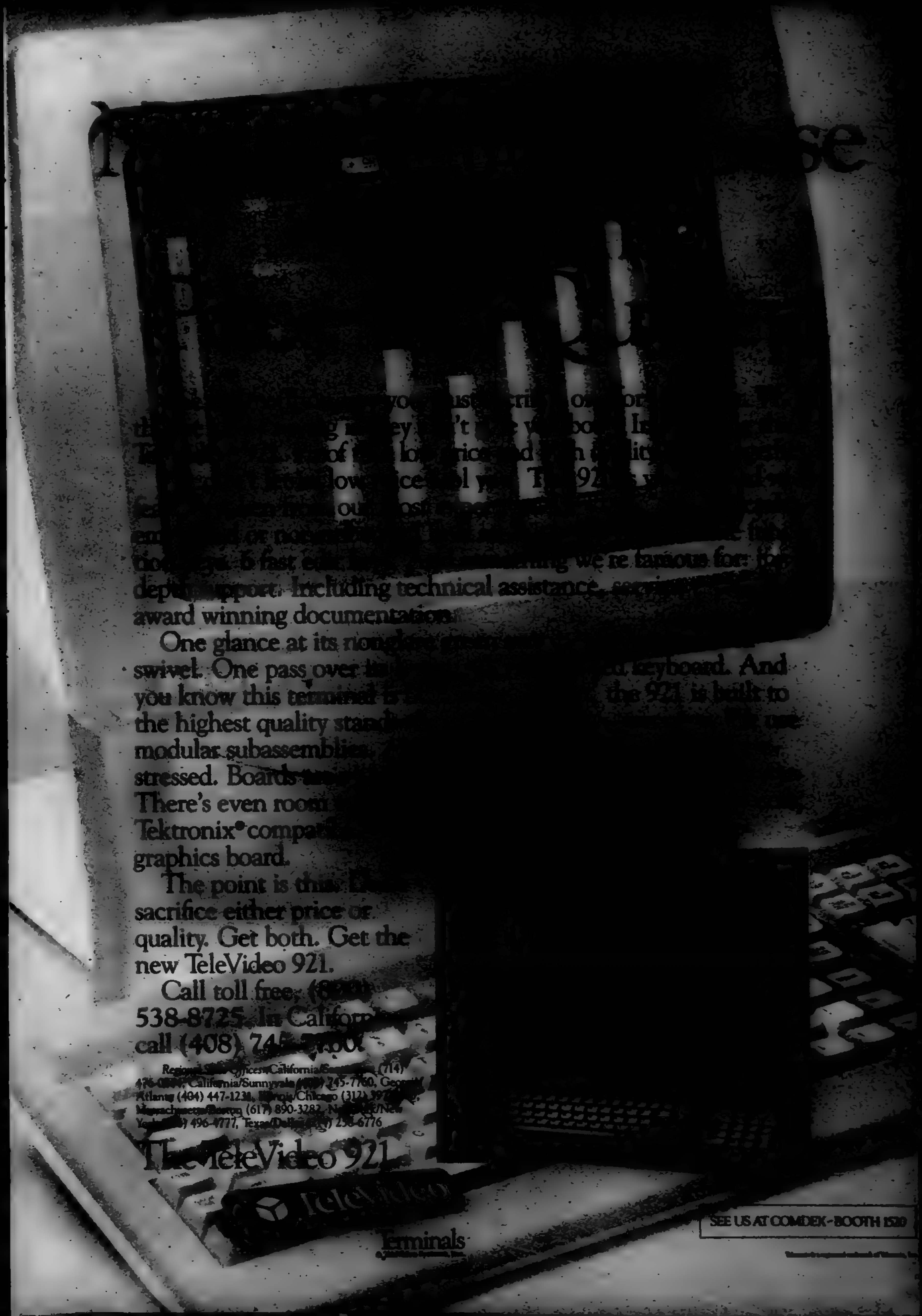

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fit that description very closely. Moreover, as indicated by their responses to open-ended survey questions, they are very much aware that their success in fact depends upon continually updating their technical skills, adapting to a rapidly changing environment and developing techniques for continued learning in order to stay current with technological advances.

Only in one area does the present sample differ from the findings of previous studies. With respect to "social-need strength," Couger and Zawacki found that DP professionals have a decidedly low need for interaction with others. Woodruff found that, going along with the relatively high need for autonomy, there was a low need for affiliation or to make efforts to win friendships or maintain associations with people.

The picture that emerges from the 16PF, however, suggests that DP women in the present sample may not be so extreme. They do not differ at all from other women in the degree to which they are warm, personable and caring or cool, aloof and distant. Moreover, they do not differ significantly from women in general in the degree to which they are group-oriented as opposed to having a preference for being alone.

While they also do not differ from average in emotional stability, they are significantly more candid and open (as opposed to sophisticated or shrewd) than women in general and tend to be more impulsive and enthusiastic and enjoy excitement more.

The reasons for the higher scores on the social dimensions of personality undoubtedly reflect the particular characteristics of the sample. While these women are skilled technicians, they have chosen to work in computer services, that sector of the computer industry in which programmers and analysts move in a variety of business environments and meet and interact with different clients as part of their work.

Contract programming entails working side by side with the employees of client companies on a temporary basis until a project is completed or they are assigned to another account. Women who have chosen an area of computer work involving considerable social interaction are likely to be at least average in their own social needs.

Perhaps even more important, the women were all participants in a management education program, an indication that they might already have exhibited the social and interpersonal skills expected of potential managers.

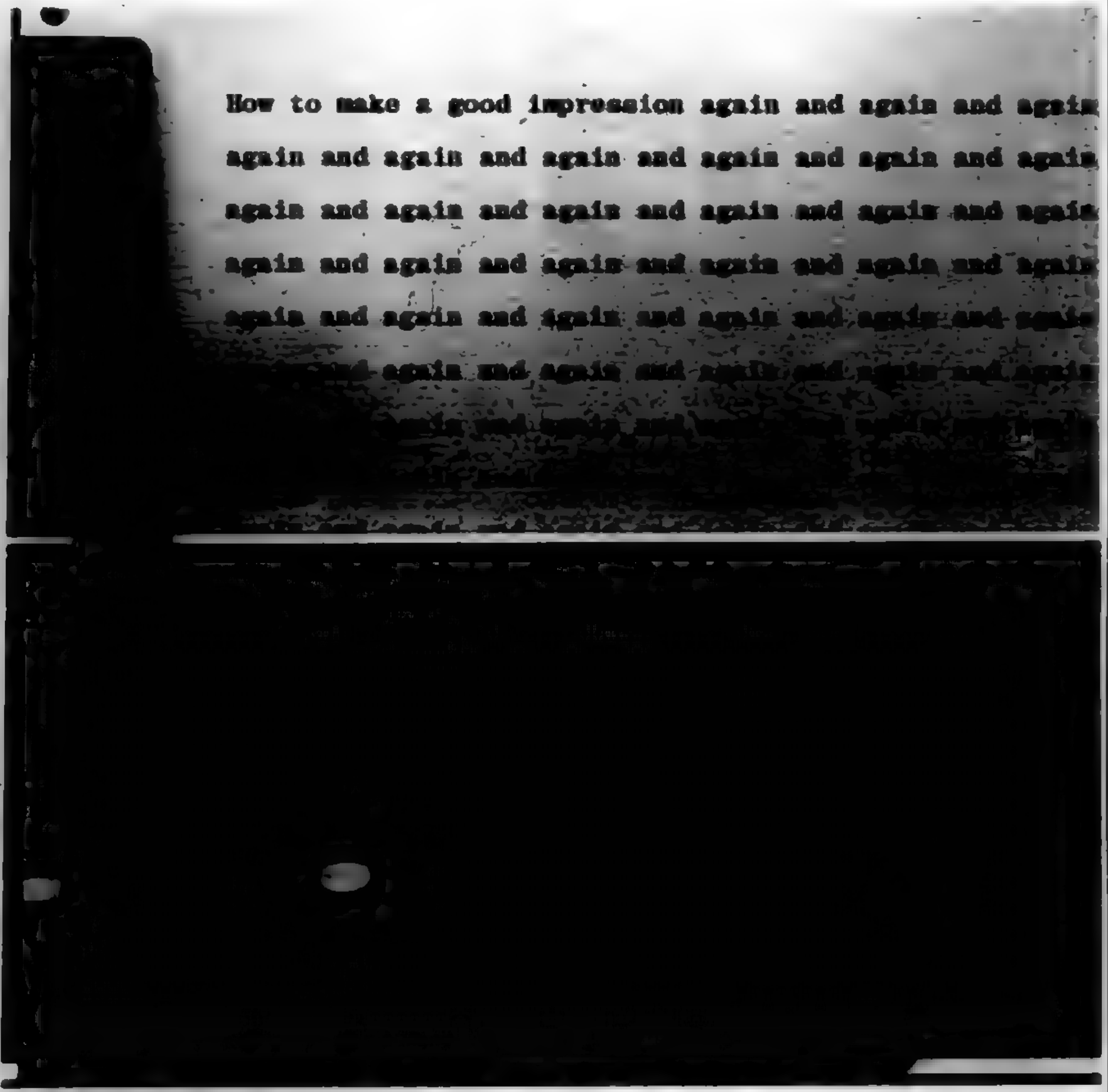
Personality test data from the sample of 140 male systems engineers who took the 16PF provides some interesting comparative information. The men showed themselves to be significantly more aloof, detached and reserved than the average male, preferring to work alone or work with things rather than with people. Unlike the women, their scores were different enough from average to contribute to the stereotype of the unsociable programmer.

Another sex difference in personality pattern is noteworthy here. Compared with men in general, the male in data processing is significantly more self-assured and self-confident, projecting a high degree of optimism about his ability to do a job.

The women systems engineers, on the other hand, do not differ from the average woman. Since, in our society, women in general tend to have less self-confidence than men, it is somewhat disturbing that these very intelligent, dedicated and achievement-oriented women, who are atypical in so many ways, would not also stand out in self-confidence.

The findings suggest the need for workshops to develop self-confidence and to bring women's feelings about themselves more closely in line with their abilities.

Data on job satisfaction was obtained from the 1983 annual survey conducted by Computer Task Group. For the 113 female technical employees who responded to the anonymous questionnaire, a high degree of satisfaction (more than 70% of the responses) was found in areas consistent with the dominant trends in the women's personality. If the woman in DP can correctly be described as a person who seeks challenge, strives for achievement and values independence and responsibility, then the data suggests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that the work itself fulfills these needs.

The women were highly satisfied with:

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- The way their work makes use of their abilities.
- The opportunity to work independently.
- The chance to be creative and develop their own ideas about how to do the job.
- The freedom to use their own judgment and take responsibility for their work.

Another stereotype is that women are "better with detail" — an excuse to remain on the technician level.

However, as in most surveys of job satisfaction, compensation and advancement were the areas of lowest satisfaction.

There is a striking degree of agreement between men and women regarding what aspects of the job are satisfying and which are not. These results are congruent with the preliminary findings of Philip Kraft and Steven Dubnoff, who surveyed 677 software specialists in the greater Boston area [CW, Nov. 14, 1983]. Those investigators also reported no overall difference in job satisfaction between men and women and a high degree of job satisfaction with the software field in general.

A sample of women at Computer Task Group, Informatics General Corp., Walker Interactive Products and Xerox Computer Services also responded to a brief survey on the issues or concerns they felt were facing women in the computer field. Their responses are revealing.

At the nonmanagerial level, when asked about their concerns with job satisfaction issues, women consistently and typically replied, "No problems," or wrote statements such as, "This is the fairest occupation to women," "I see no difference between myself and men in the field," and, "The issues that face women are the same as those that face men in this industry."

Despite the steadfast belief of many in the fairness and equality of opportunity within the field and in their particular companies, there exists, nevertheless, a core of women whose experiences have led them to perceive their work situation differently and who openly express familiar reservations: "It's still a man's world, especially at the management level. Less competent men are acknowledged over more competent women." "I believe that there is some doubt as to whether or not experience and training carry as much weight for a woman for promotion to management." These concerns appear to be voiced more frequently by women at the higher technical or managerial levels of a company.

Some see the larger problems as residing not in their company's policies, which are judged to be fair to both sexes, but in the attitudes of particular managers who may block women's advancement. Others are concerned with the more general problem of societal stereotyping. "When I tell someone I'm in DP, they usually assume some sort of data entry job." Another stereotype is that women are "better with detail" — an excuse to remain on the technician level.

Women are especially aware of their credibility problems and the need for recognition and acceptance in the male-dominated business world. As one senior systems engineer stated, "Women face unique credibility problems when sent to work at customer sites. Many times the customer feels 'ripped off' for having to pay so much for an 'obviously' inferior technical mind. I don't think we have the tools to deal with this problem effectively."

Or, as one woman who has moved into marketing said, "Credibility was always a question, as for six of my 11 years, I was the only woman programmer or analyst on staff. I had to work harder to even approach the 'equal' ranks." Finally, one marketing representative said, "While I have not generally felt any discrimination, there sometimes is an undercurrent of, 'Who is this

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broad — and why does she belong here?' " Some training in how to handle these situations is needed.

Implications for training

I cannot write a blank prescription for workshops or training programs to address specifically women's issues. The professional, independent-minded women I have studied are not likely to find that route acceptable. Ambitious, competitive and desiring equal opportunity to develop and use their abilities, they are likely to argue that it is the men, and not the women, who need the training to be able to accept competent women technicians and managers as colleagues.

Nevertheless, the concerns the women voice — about being accepted, for example, or showing self-confidence, even when they lack it, or handling difficult managers — are real and need to be addressed in an appropriate context.

Obviously, to be effective or even attended, training must meet the needs of its audience. Women in data processing see themselves first and foremost as professionals in their field. They seek and value professional autonomy and are committed to and identify with the data processing profession. They pride themselves on their technical knowledge and ability and want to be recognized and rewarded on those grounds. Training that segregates them by sex or calls attention to their gender detracts from their occupational self-image.

A technical manager at one computer service company advised, "Do not get hung up on being a woman." And advice from another one: "Don't wear feminist colors on your sleeve. Most people resent it." What counts is being the best at what one does; being a woman in the data processing field is not an issue they want to address directly.

What kind of training do women in DP want? Technical training, first. Developing and maintaining a substantial skill level is the prerequisite for advancement. Second, a solid base of business-oriented knowledge. In doing applications work in the computer service field, systems analysts need a broad business background in order to move freely in and out of different industries such as banking, insurance and manufacturing. Third, management education. Many who work in data processing perceive management as their career goal. They want training in general principles of management, specific training in their particular company's business and sales training.

Given these priorities, then, where is the place to address the undercurrent of issues affecting women in DP? The professional associations in the computer services industry would be an acceptable and appropriate sponsor of workshops and training for their members.

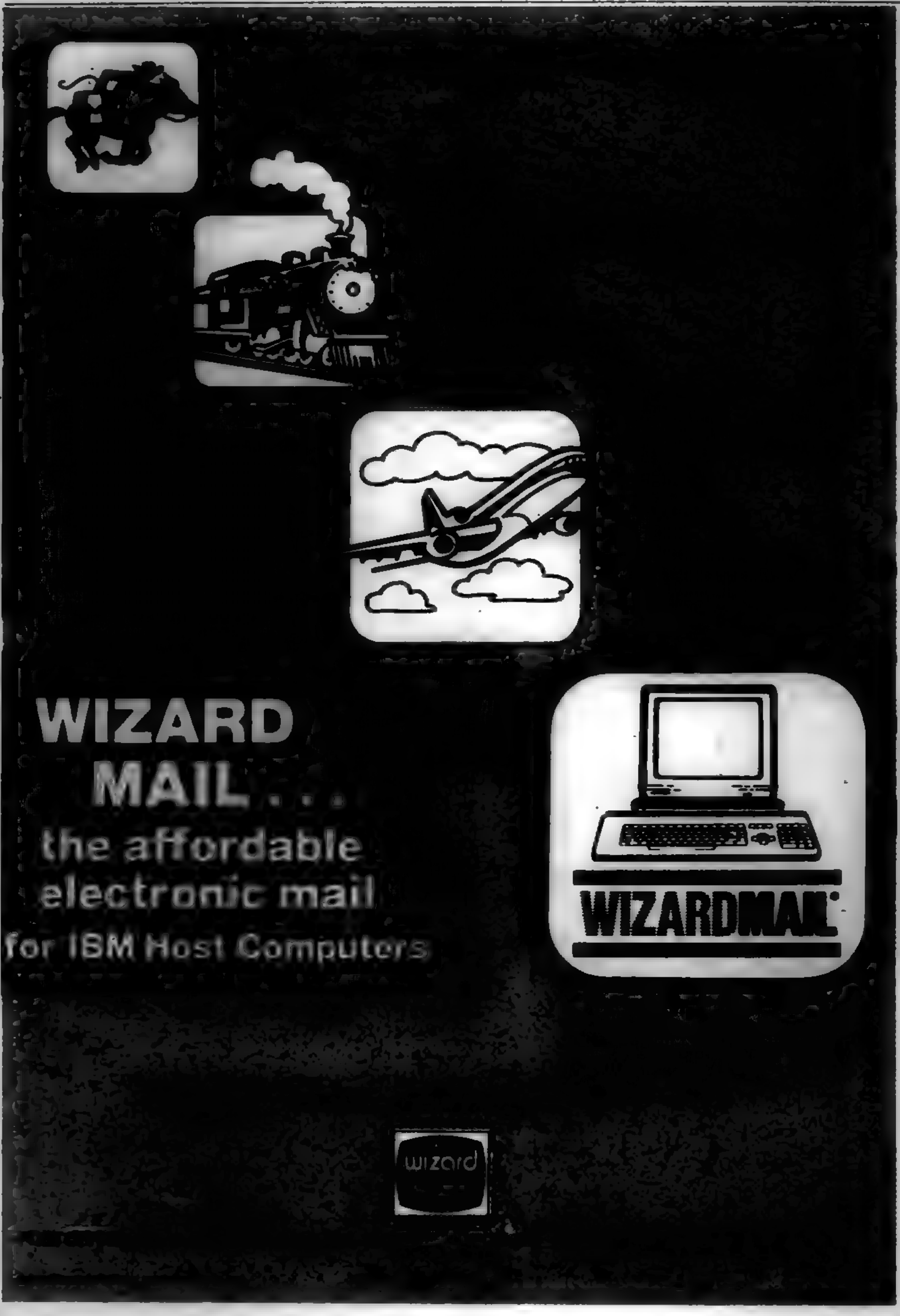
Within the context of professional development but away from the constraints of a particular company environment, women could learn constructive ways of handling problems such as credibility, stereotyping, lack of self-confidence and male chauvinist managers. These workshops might best include experiential activities such as videotaped role-playing sessions in which the participants could examine and experiment with their style of verbal and nonverbal presentation.

Some of the women's concerns fit into the category of communication skills and could be improved through in-house training offered to management candidates of both sexes. Within their own companies, management increasingly is recognizing that both men and women in data processing have emphasized technical training, perhaps at the expense of developing their interpersonal skills.

Yet, for the manager, interaction is a critical aspect of the job. Women who aspire to managerial careers may already have an advantage over men in the area of social skills but can benefit, too, from additional training in human relations skills. For both sexes, learning to communicate in a nondefensive way, to listen empathetically and express oneself openly and honestly — with superiors, subordinates and peers — is a first but important step in addressing business issues.

About the author

Judith Larkin is associate professor of psychology at Canisius College in Buffalo, N.Y.



SOFTWARE & SERVICES

Subject data bases prescribed for application portfolio ills

By Paul Gillin
CW Staff

BOSTON — Are the following statements true for your application portfolio?

- Development of new applications requires no modification of old applications.
- Data for new applications is largely predefined in old applications.
- Existing data bases need not be significantly restructured for new applications.
- There are few timing difficulties for installing new applications.
- Applications last a long time.

If so, do not bother to finish reading this article. But if your DP shop is like most, your application portfolio contains a lot of redundant data held together by a fragile web of interconnections. You would perhaps do well to consider restructuring that data into subject data bases.

That was the message of Ron Ross, editor of the "Data Base Newsletter," in a talk at TSI International's Information Exchange conference held here recently. Data base architectures should mirror the activities of the business, Ross said. But unfortunately, the data bases at many companies have evolved without much rhyme or reason.

The problem occurs in an application-oriented environment in which each application has a specifically defined data base, Ross said. Because data that is used by one application is not optimized for access by another, developers tend to copy and redefine pieces of the data base to make them usable. The resulting systems often contain significant amounts of redundant data and process-heavy methods like cross-file indexes, transaction files and

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SOFTLINE/STEVEN PFRENZINGER

Shopping for an application generator

By Steven Pfrenzinger
Special to CW

If you've been shopping for an application generator for IBM's IMS DB/DC or CICS/DL/1 lately, you may have noticed that the market is cluttered with vendors, all promising to have the solutions to your application backlog. The problem is that most of these productivity tools are currently unable to handle all of the processing situations (for example, simple through complex, low and high volume) represented in the backlog or are burdened with design restrictions (for example, screen or transaction flows) that limit their functionality. These tools also present learning curve and programmer acceptance problems that have threatened to turn some data processing organizations upside-down.

If you include concerns about the maintenance or conversion of existing systems, the problem gets even stickier. With most of your DP budget going to maintenance, a tool that only aids in new development does not really address the major issue.

Realistically, only a few of the applications generators available today are likely to gain general acceptance and mature to the point that they will address all of the varied applications waiting to be built or modified. As a result, a shakeout in the application generator market over the next two to three years can be expected. This means that buyers

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Pfrenzinger is president of IMS Consulting, Inc., an Encino, Calif.-based consulting firm that specializes in IBM's IMS DB/DC and CICS/DL/1. He has 15 years of data processing experience and is a regular contributor to Softline.

SOFTALK
Paul Gillin
CW Senior Editor

Distributing data: What you can do

The topic of distributed data base is one that appears occasionally in the trade press and on conference programs, but always with that ethereal quality that is attached to unrealized technologies. What is it, and why should you be concerned about it?

Technically, we are still a few years away from a viable environment that allows data to be distributed between — and used interactively by — both central and distributed nodes. Certain data base management systems, like Cullinet Software, Inc.'s IDMS/R, have some distributed capabilities, but not in real time, according to Robert Holland, president of Holland Systems Corp., a consulting and education firm based in Ann Arbor, Mich.

Holland said the industry has traveled about halfway toward the goal of distributed data bases. The rest of the road harbors some serious hurdles of both the technical and organizational kind.

For example, if you have separate pieces of your corporate data base divvied up between various departmental computers, what do you do about security? Data validation? Diverse data structures? What if more than one user wants to access a departmental data base at the same time? How do you handle the problems that arise if one node is down for a week?

These are issues that the vendors will have to work out, but you can begin to tackle an equally important issue right now: Figure out how your organization uses information and how it will use it when the information no longer resides in a single location.

The major organizational problem, as Holland sees it, arises from the multitude of data structures that have evolved in

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- TSI International's new information center product lets end users extract corporate data within limits set by DP/86
- Unix is now available on Stratus Computer, Inc. fault-tolerant systems/86
- Forte Data Systems, Inc.'s new microcomputer-mainframe link offers mainframe file access through IBM PC-DOS commands/87
- Uccel Corp. also announced a micro-mainframe link at the same time it introduced a loans management system/87
- D&B Computing Services, Inc. has added several optional features to its Nomad2 product/88

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Stratus offers Unix implementation for mainframes

MARLBORO, Mass. — Stratus Computer, Inc. has introduced its own implementation of the AT&T Unix operating system for its Stratus Continuous Processing series of fault-tolerant mainframes.

USF (Unix System Facility) is integrated with the Stratus VOS operating system at the kernel level, the company said. The integration allows Unix operations to use VOS capabilities that are designed specifically for the Stratus systems.

USF contains standard Unix System V features including the C language, shell, commands and applications, system calls and subroutines, productivity tools and program utilities. Because of the integration with VOS, existing Unix applications can be ported to the fault-tolerant system without major customization, a spokesman said.

Facilities available in VOS are also available for Unix. These include demand-paged virtual memory, indexed files, record locking, access-control lists and transparent networking. Both Unix and non-Unix applications can access the complete set of available Stratus software. Features are invoked using normal Stratus subroutine calls through any language supported by the computer.

Components include:

■ A C compiler that supports the latest features of Unix System V and allows Unix applications to run with little or no modification. The compiler is also compatible with applications written in other standard Stratus languages.

■ Shell Command Interpreter. The shell is the main interface to USF. It is a ported copy of the Unix shell with extensions that allow access to VOS commands.

■ Stratus debugger. This has been extended to handle C programs and improved to cover "pipelined" programs under Unix.

■ File system. The networkwide file system is based on VOS's distributed directory hierarchy structure. This allows a large number of files and directories to be grouped for access by VOS- or Unix-based applications. It reportedly includes multiple indexing, record locking and transaction protection while preserving Unix compatibility.

USF users have access to the full line of fault-tolerant networking and communications options supported by Stratus systems. These include IBM's Systems Network Architecture, X.25 and X.29 terminal support, the Stratalink local-area network and Stratanet wide-area network.

The Unix implementation will be available in March. The C compiler costs $7,500. USF for one to 16 users costs $8,000. Prices increase according to the number of users to $32,000 for 65 or more.

Stratus is located at 55 Fairbanks Blvd., Marlboro, Mass. 01752.

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***UCCEL** has selected Imagine for use with its application software products. Multiplications has offices in the following locations: Cambridge, MA. Atlanta, GA. New York, NY. Oakland, CA. Rochester, NY. Toronto, CN.*

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TSI Conductor boasts control for MIS

WILTON, Conn. — TSI International has announced an information center product that reportedly allows MIS departments to control the transfer of production data to end users while providing data integrity and security.

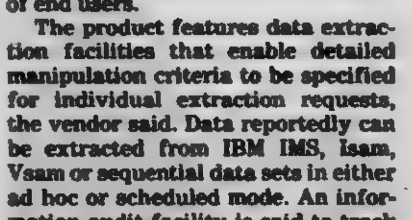
Called Conductor, the mainframe-resident package is not specific to any software package or data base, the company said. Conductor is driven by an active, self-populating dictionary that can be loaded from existing data base schemas. Menus are employed to allow maintenance and query facilities to be used.

Conductor also identifies data extraction requests and checks for security breaches, the vendor said. The dictionary is said to store information on source data base environments, data migration requirements and constraints and security profiles of end users.

The product features data extraction facilities that enable detailed manipulation criteria to be specified for individual extraction requests, the vendor said. Data reportedly can be extracted from IBM IMS, Isam, Vsam or sequential data sets in either ad hoc or scheduled mode. An information audit facility is said to track all access requests, data migration and reports extracted from the corporate mainframe.

Designed for IBM mainframes under IBM's MVS operating system with TSO and ISPF, Conductor ranges in price from $30,000 to $50,000.

TSI is located at 187 Danbury Road, Wilton, Conn. 06897.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Uccel offers link to its financial tools

DALLAS — Uccel Corp. has announced Perfect Link, a microcomputer-to-mainframe link that provides access to the company's mainframe financial and accounting applications packages.

According to a Uccel spokesman, Perfect Link was designed to link the IBM Personal Computer, Personal Computer XT, 3270 Personal Computer and compatible systems to all Uccel financial and accounting applications as well as IBM Vsam data bases, with selective data selection and downloading capabilities. The link is said to work with a variety of micro spreadsheet packages, including Context Management Systems, Inc.'s Context MBA, Lotus Development Corp.'s 1-2-3, Ashton-Tate's Framework and Microsoft Corp.'s Multiplan.

The link ensures data integrity through security controls and audit trail capabilities that provide control over who can retrieve data, what data may be retrieved and when it can be accessed, a spokesman said.

Uccel is currently offering a 30-day free trial period for Perfect Link and a $15,000 license fee. Following the special offer, the cost for Perfect Link will range from $20,000 to $30,000, depending on mainframe configuration.

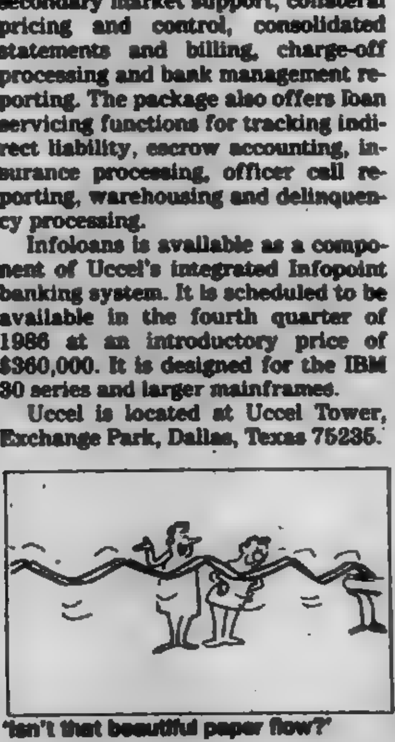
Loans management system

In addition to Perfect Link, Uccel announced a consolidated loans management software system — Infoloans — that combines mortgage, commercial, consumer and dealer floor plans into one package. The real-time, menu-driven system is said to provide full relationship lending for bank customers and total portfolio management for bank managers.

Major features of Infoloans include on-line collection capabilities, multiple-level and umbrella commitment processing, investor servicing, secondary market support, collateral pricing and control, consolidated statements and billing, charge-off processing and bank management reporting. The package also offers loan servicing functions for tracking indirect liability, escrow accounting, insurance processing, officer call reporting, warehousing and delinquency processing.

Infoloans is available as a component of Uccel's integrated Infopoint banking system. It is scheduled to be available in the fourth quarter of 1986 at an introductory price of $360,000. It is designed for the IBM 30 series and larger mainframes.

Uccel is located at Uccel Tower, Exchange Park, Dallas, Texas 75235.



'Isn't that beautiful paper flow?'

Forte Data product ties IBM micro, host

SAN JOSE, Calif. — Forte Data Systems, Inc. has announced Ecomnet, a micro-to-mainframe communications product that reportedly allows IBM Personal Computer users to access data and facilities on an IBM host through IBM PC-DOS commands. All functions of Ecomnet are said to be transparent to the user, including logon.

Ecomnet operates on IBM mainframes with either an IBM MVS 3.8, MVS/SP or VM/SP operating system. Micros are attached to the host via coaxial cable through IBM 3270-type control units. The Personal Computer must be equipped with either of Forte Data's emulator boards, the PC78-2 or the Forte-PJ card, and at least 256K bytes of memory.

A company spokesman said the initial release of Ecomnet consists of two elements. Ecomnet Virtual Peripherals (VP) offers a virtual hard disk approach that provides the user with up to 32M bytes of predefined on-line storage on the mainframe. Ecomnet VP also provides the user with access to host printer capabilities.

In the guise of locally stored files

The second element of Ecomnet, the Cross System Link, permits mainframe data files to be called from the micro as if they were locally stored files. The component differs from VP in that a user can access any standard operating system file on the host within limits defined by MIS. Mainframe file access or transfer is accomplished by using the PC-DOS copy command followed by the name of the host file.

The VP portion of Ecomnet is currently available and the Cross System Link is scheduled to be available in the first quarter of next year. Pricing for Ecomnet includes an $8,000 initial license fee plus a $500 monthly license for VP and a $300 monthly license for Cross System Link. The product can also be purchased for $30,000.

Forte Data Systems is located at 2205 Fortune Drive, San Jose, Calif. [illegible]

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D&B announces Nomad2 dictionary, interfaces, CBT

Enhanced applications development, accessing capabilities touted

WILTON, Conn. — D&B Computing Services, Inc. has announced a series of products based on its Nomad2 fourth-generation language.

According to a spokesman, the Nomad2 Data Dictionary ($5,000) is an interactive, menu-driven system that enhances applications development in Nomad2.

Among the product's features are the ability to create schemata for use outside the Nomad2 Data Dictionary, a report builder for simplified ad hoc data analysis, the ability to accommodate descriptions of external files that interface with Nomad2, including IBM's Isam, Vsam, Qsam, SQL and IMS, and the ability to resolve nested program calling sequences for up to 64 levels, the spokesman reported.

The company also announced a full-function interface between Nomad2 and IBM's SQL/DS ($10,000). The interface is said to allow end users to use Nomad2 to describe, maintain and report from an SQL/DS data base.

Among the capabilities the interface offers are complete read and write access to SQL data base tables, forward and backward movement within an SQL/DS table, in-place record deletion or modification using Nomad2 commands and an SQL-to-Nomad2 conversion feature acitivated by a simple utility, the spokesman said.

The company also introduced an IBM IMS interface ($6,000). The spokesman said information in IMS data bases can be accessed by IBM TSO users through the reporting capabilities of Nomad2.

The Nomad2/IMS Interface offers report preparation using Nomad2's List command, built-in functions for summing, counting, averaging, totaling and calculating percentages, more than 140 functions for handling statistical and financial reporting requirements and the ability to perform "what-if" analyses and consolidations within a single environment, the spokesman said.

Finally, the company announced a computer-based training (CBT) option (for approximately $15,000) to Nomad2 that reportedly offers end users hands-on instruction in the use of Nomad2. The Nomad2 CBT option runs under both IBM's VM and MVS operating systems and allows end-user access either through standard terminals or through an IBM Personal Computer.

D&B Computing Services is located at 187 Danbury Road, Wilton, Conn. 06897.

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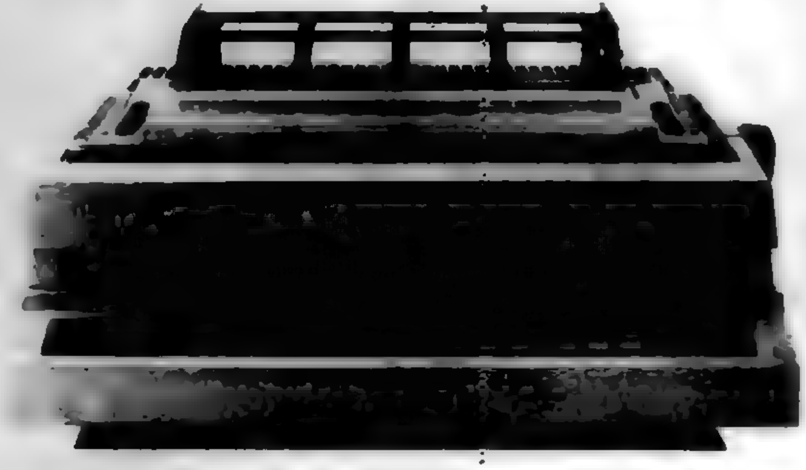

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DAS
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Geisco adds WPXchange to Quik-Comm

ROCKVILLE, Md. — General Electric Information Systems Co. (Geisco) has announced WPXchange, an information storage, retrieval and translation capability that reportedly allows dissimilar word processors and personal computers to exchange documents.

The service is offered as part of Geisco's Quik-Comm teleprocessing network.

The software is initially available for Wang Laboratories, Inc. VS and OIS systems and for IBM Displaywriters and IBM Personal Computers running Multimate International Corp.'s Multimate word processing software.

WPXchange has a global document storage and retrieval capability, a document translation capability and a link to Quik-Comm's electronic mailbox service. When connected with Geisco's worldwide network, documents can be stored, retrieved and exchanged between dissimilar equipment, said Ruann E. Pengov, general manager of GE's Office Communications Operation.

Geisco will also make the Quik-Comm network accessible to telex users in December.

A WPXchange user would pay $1.50 to transmit the first page of 1,000 to 3,000 characters with a translation charge of 50 cents and $1 for additional copies.

Geisco is located at 401 N. Washington St., Rockville, Md. 20850.

SYSTEMS SOFTWARE

JOINER ASSOCIATES, INC.
Jnet Version 1.1

Joiner Associates, Inc. has released Version 1.1 of its networking software product, Jnet, which allows users of Digital Equipment Corp.'s VAX-11 machines running under DEC's VMS operating system to exchange files, electronic mail and real-time messages with IBM's VM/CMS operating system users.

Version 1.1 works with DEC's Decnet local- and wide-area network and

IBM's Remote Spooling Communications Subsystem (RSCS) networking programming product. This release can use any Decnet connection for RSCS links between VAX-11 computers. Only one VAX-11 on a Decnet network needs a physical link to an IBM system.

Until Dec. 1, prices of the Jnet Version 1.1 range from $2,500 to $6,500 for DEC's VAX-11/725 through VAX-11/785.

Joiner Associates, P.O. Box 5445, 732 N. Midvale Blvd., Madison, Wis. 53705.

VM PERSONAL COMPUTING, INC.

Relay/TSO

VM Personal Computing, Inc. has announced a mainframe communications package that allows file transfer between IBM mainframes running under IBM's MVS/TSO operating environment and IBM Personal Computers and compatibles or Wang Laboratories, Inc. personal computers.

Used in conjunction with the VM Personal Computing's Relay software, which runs on the Personal Computer, Relay/TSO is installed on the mainframe to allow uploading and downloading of files of any length and format over asynchronous telephone lines, with error detection and correction in both directions.

Relay/TSO will be available Dec. 1 and is priced at $4,995.

VM Personal Computing, 475 Fifth Ave., New York, N.Y. 10017.

TANDEM COMPUTERS, INC.

Snax/HLS

Tandem Computers, Inc. has announced a high-level application interface for the company's IBM Systems Network Architecture Access Method (Snax) software that is said to reduce significantly the time required for users to develop application programs in the SNA environment.

According to a spokesman, the Snax/High-Level Support (Snax/HLS) software allows applications programs to be written without regard for the complexities of underlying SNA communications protocols.

The software is said to provide a comprehensive application interface for users of Tandem's Pathway transaction processing software and for non-Pathway systems. Snax/HLS provides the ability to communicate with a wide range of SNA intelligent controllers, such as the IBM 3600 and 4700 financial subsystems and IBM 3560 retail subsystems and IBM CICS and IMS software products, according to the vendor.

Snax/HLS is available for use on Tandem's Nonstop II and Nonstop TXP systems for a monthly usage fee of $250 per processor.

The software requires Snax software, which has a license fee of $2,750 per processor.

Tandem Computers, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

INFORMATICS GENERAL CORP.

Micro/Answer for IBM 3270 Personal Computer

Informatics General Corp. has announced that its Micro/Answer micro-mainframe link series is available for the IBM 3270 Personal Computer.

The Micro/Answer series includes Lotus/Answer, Visi/Answer and Dbase/Answer, which are compatible with products from Lotus Development Corp., Software Arts, Inc. and Ashton-Tate, respectively. They reportedly support compatible execution under IBM's Application Program Interface.

Informatics General said users of Micro/Answer products can now download data from an IBM mainframe data base to the IBM 3270-PC. A configuration consisting of an Answer/DB module for a single mainframe site and 50 Lotus/Answer or Dbase/Answer systems for the 3270-PC costs $42,500 or less, depending on the micro systems purchased.

Micro/Answer will be available Jan. 23, 1985, according to the company.

Informatics General, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

JACKSONVILLE SOFTWARE SERVICES, INC.

Remote Data Entry

Jacksonville Software Services, Inc. has announced a version of its Remote Data Entry (RDE) system.

This package is designed for use with the full line of Burroughs Corp. large systems from the A series to the B7900 running under Burroughs' Gemcos operating system. Written in the Algol language, the system enables users to provide data entry capability with any of the Burroughs family of terminals from the TD800 through the ET series, a vendor spokesman said.

System generation is provided through Burroughs' Cande command and edit system. Features of the RDE system reportedly include a full range of edits and data control capabilities, and backup and recovery capabilities.

Remote Data Entry is priced at $7,500, which includes the first year of maintenance.

Jacksonville Software Services, 790 B N. Ponce de Leon Blvd., Saint Augustine, Fla. 32084.

SYSTEM SUPPORT PRODUCTS, INC.

System/36 RPG Library Access Subroutine enhancement

System Support Products, Inc. has modified its IBM System/36 RPG-II Library Access Subroutines package.

According to the company, the package consists of two assembler-written subroutines designed to be linked to the System/36 RPG-II programs, providing direct access of Sys-

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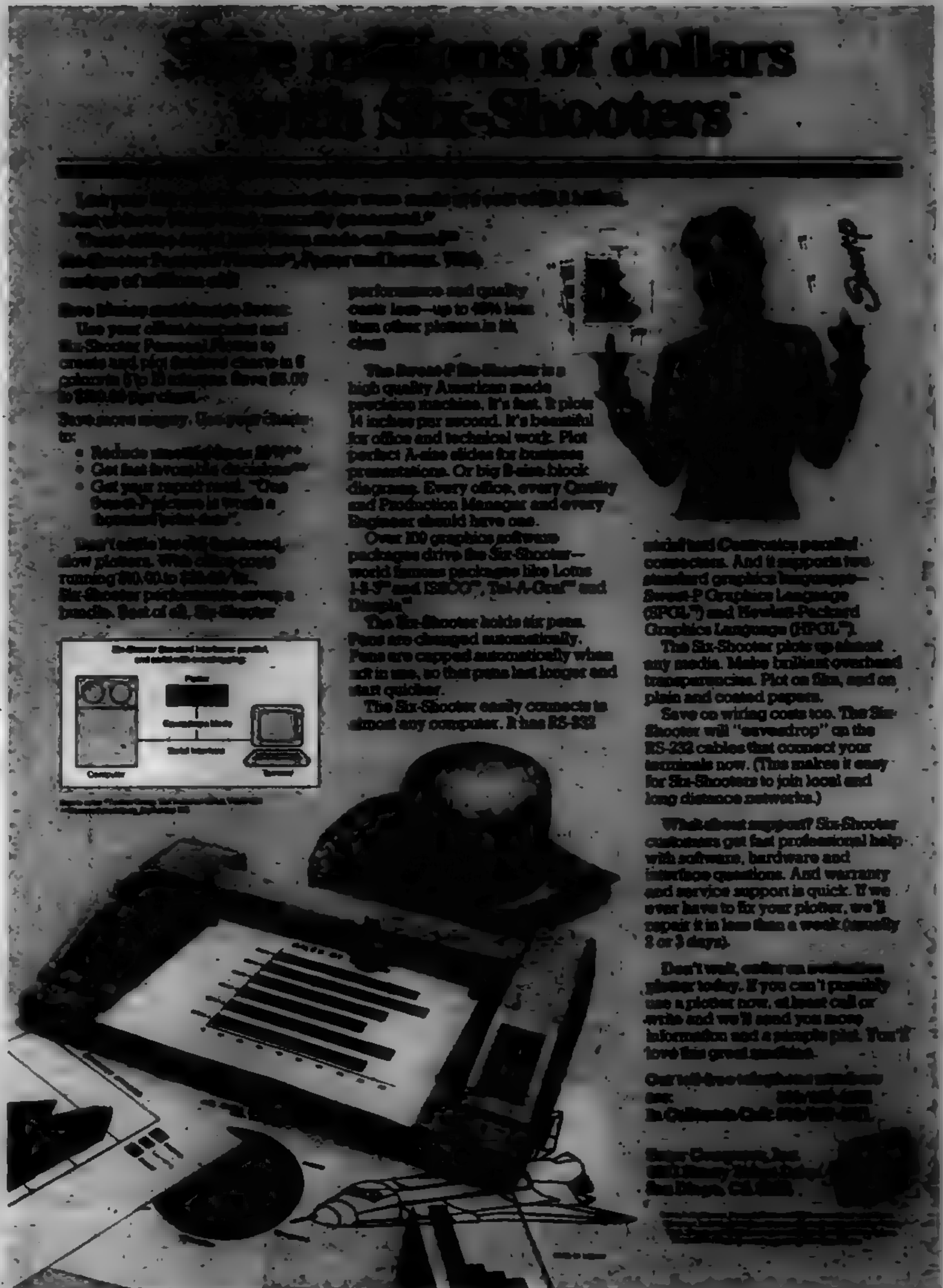

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[illegible]

SOFTWARE & SERVICES

Continued from page 89

tem/36 libraries from within a program. Source and procedure member read/write functions are said to be supported.

The modification level of the program is immediately available and carries a one-time license charge of $395.

Current licensees pay only a mailing and handling fee, the vendor said.

System Support Products, 7620 Arlen St., Annandale, Va. 22003.

CORNERSTONE SOFTWARE SYSTEMS
Disquick/32

Cornerstone Software Systems has announced Disquick/32 software, a series of enhancements for the file managers in Perkin-Elmer Corp.'s 32-bit superminicomputers running under PE's OS/32 operating systems. The product is compatible with PE's current R07-02 revision of OS/32.

Disquick/32 is said to eliminate overhead and wait states in the file managers. System performance becomes a function of the speed of the processor, rather than a function of disk access time, according to a spokesman. The product reportedly eliminates unallocated disk space.

Prices of Disquick/32 range from $2,000 to $7,000, depending on the processor.

Cornerstone Software Systems, P.O. Box 148, Murrysville, Pa. 15668.

SOUTHERN SYSTEMS, INC.
Mercurion Printer Management Facility

Southern Systems, Inc. has announced the Mercurion Printer Management Facility (MPMF) graphics software module. MPMF was designed for use with a forms overlay buffer on the Mercurion 1 electronic printer, which prints at the rate of 60 page/min.

MPMF is said to allow users to create and store output forms, then call them up for printing as part of a typical applications output. Users can create a form using a range of alphanumeric settings, varying densities of lines and shading and graphics including logos and signatures, the vendor said.

The price of MPMF is $5,000, and the support charge is $200/mo, the company said. The price for the Mercurion 1 printer is $65,950.

Southern Systems, 2841 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

PRODUCTIVITY AIDS

DBMS, INC.
DL1/Online

DBMS, Inc. has announced DL1/Online, a full screen, interactive productivity aid for users of IBM's IMS.

A spokeswoman said DL1/Online allows users to access an IMS data base, view its contents and structure and create, fix, modify, add and delete information on-line.

The package is said to support IMS DL/1 commands, and it reportedly reduces the need for users to work within the confines of batch processing or to write special, single-purpose programs to access and manipulate IMS segment data.

For application development, DL1/Online can verify data base calls and test search strategies, the spokeswoman said.

DL1/Online reportedly features overtype data in either hexadecimal or character portions of the screen, the capability to scroll through segments by line or page with single-key commands and the ability to equate lengthy segment search arguments with symbolic labels to eliminate keystrokes.

DL1/Online runs with IBM's IMS/VS under CICS or TSO and with DOS/DL/1 under CICS. It may be licensed for $5,900.

DBMS, 1801 Mill St., Naperville, Ill. 60540.

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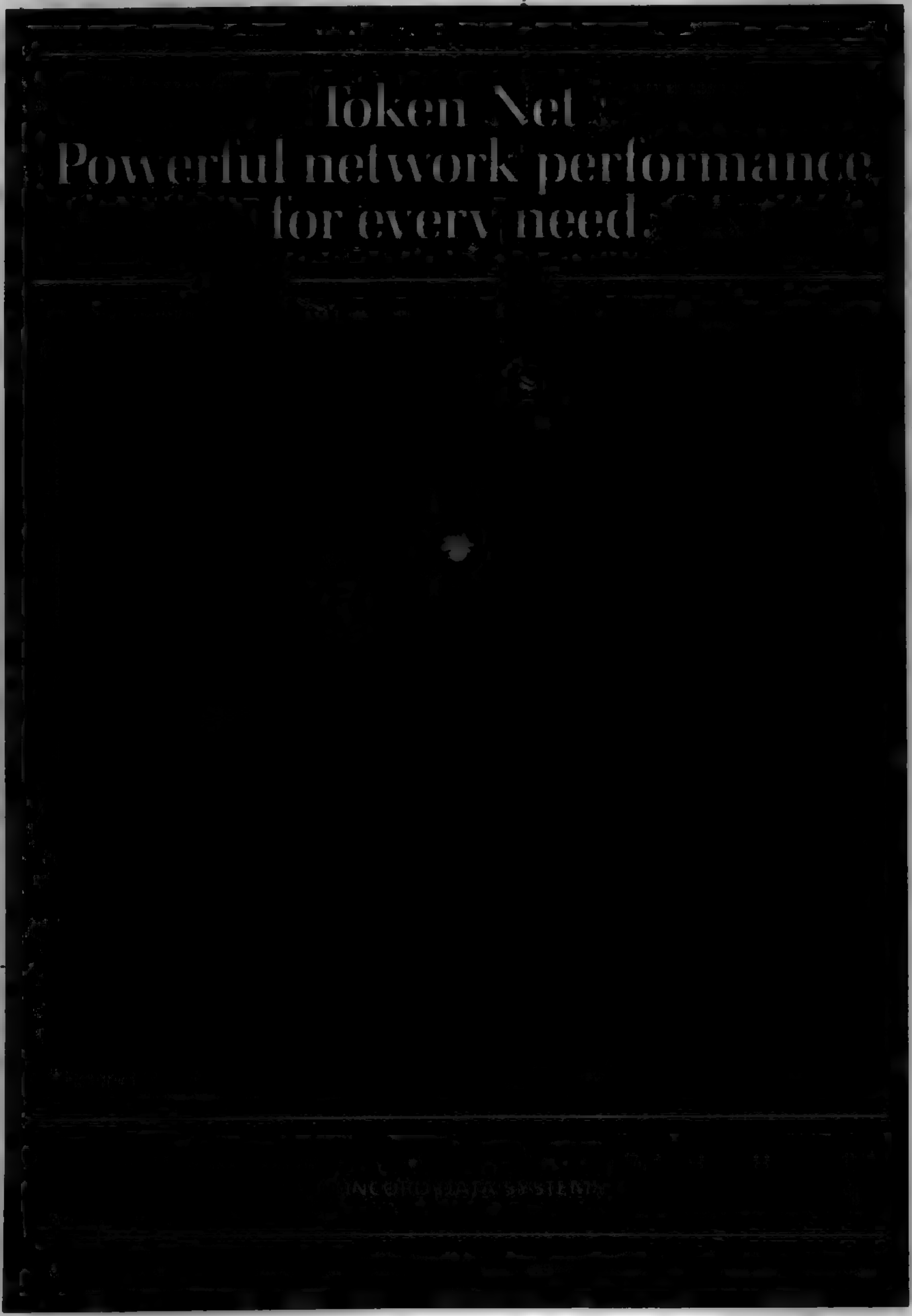
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We recognized the importance of maximizing worker productivity at a time when others were concerned about the high cost of machines. That's why we are the first to present an integrated series of products that use the same language.

We identified the need for a high volume product for VAX machines—while most still considered the DEC-VAX equipment only for low volume, low capacity applications.

We saw the necessity of having many machines working in coordination and developed our family of networking products to support this trend.

We realized the requirement for true distribution of data, so we carefully integrated data communication capabilities with our data base software.

By listening to our users, we anticipated the growing importance of 24-hour-a-day access to data. As a result, we now offer the first nonstop data base.

Today, while others are busy putting labels on our innovations, we are quietly moving on to our next innovation. And, that's the proper plan for the world leader in advanced systems software.

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SOFTWARE & SERVICES

AIDS

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GT SOFTWARE, INC.
BMS/GT Release 4.8

GT Software, Inc. has announced the availability of Release 4.8 of BMS/GT, its screen generator for IBM 3270 terminals running under IBM's CICS.

A Help screen processor/tutorial and an IBM Development Management System (DMS) conversion aid have been added to the package. According to the company, Tutor/GT is a tutorial facility for any new or existing application. It reportedly can be implemented without any changes to existing programs.

The DMS conversion aid is said to allow an installation to convert DMS panels to standard BMS screens.

BMS/GT is compatible with any release of CICS 1.4 or higher. The base permanent license for the BMS/GT is $5,500 for IBM's VSE and $6,900 for IBM VS/1 and MVS operating systems.

GT Software, 4411 E. Jones Bridge Road, Norcross, Ga. 30092.

APPLICATION PACKAGES

ISSCO, INC.
Iviss Megacalc

Issco, Inc. has announced the addition of the Mega Group, Inc.'s Megacalc mainframe spreadsheet to its Iviss visual information system software. Megacalc can also accept microcomputer spreadsheets uploaded from Lotus Development Corp.'s 1-2-3, Software Arts, Inc.'s Visicalc and Computer Associates, Inc.'s Supercalc.

According to a spokesman, Megacalc will also be linked to Issco's Tell-A-Graf graphics software. Both Iviss and Tell-A-Graf use IBM 3270-type terminals under IBM's MVS/TSO and VM/CMS.

With the addition of Megacalc, users of Iviss will be able to calculate and model data in spreadsheet format and communicate the data in graphics form, upload entire micro spreadsheet models to the mainframe, combine spreadsheets from various micros and move data from the mainframe to the micro via Issco's Data Connection software.

Megacalc is currently available at prices ranging from $19,000 to $24,000. Links to Issco software are set to be available early next year.

Issco, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

RATH & STRONG, INC.
CSD/AML

Rath & Strong, Inc. has announced a computer-aided process planning package for industrial and process engineers to develop, compute, document and maintain production operator job standards. The package runs on IBM 30 series mainframes under IBM's OS/MVS operating system and on IBM 4300s under DOS.

Both mainframe versions run under IBM's CICS with Vsam files and Cullinet Software, Inc.'s IDMS data base and data communications environment. It also operates on any Data General Corp. minicomputer under DG's Rdos and AOS operating systems and on any microcomputer under Microsoft Corp.'s MS-DOS or IBM's PC-DOS operating systems.

The Computerized Standard Data/Advanced Machining Logic (CSD/AML) package finds the combination of feed and speed that will produce the required finish and make full use of the horsepower available on the user's lathes, mills, drills, grinders and gear cutters, a spokesman said. CSD/AML considers the material and finish of the workpiece, setup rigidity, tool geometry and material, interrupted cut, eccentric weight, steady rest, coolant, hand feeding, machine condition, horsepower and actual available speeds and feeds.

The price of the mainframe or minicomputer versions is $60,000; the microcomputer version is $30,000. Source code, consulting and technical assistance are included.

Rath & Strong, 21 Worthen Road, Lexington, Mass. 02173.

LELAND COMPUTER SERVICES, INC.
Leland Purchasing Control System

Leland Computer Services, Inc. has announced the Leland Purchasing Control System (LPCS) for IBM mainframes.

According to a spokeswoman, LPCS is an on-line, interactive purchasing system that allows a purchase order to be created using only three transactions. The system pulls standard input data from its data base whenever possible, eliminating the need to input redundant information.

Any purchase order can be amended, even after closing, and LPCS maintains a historic audit trail of all user changes. It can be tailored to work with any materials requirements planning data base. It is written in command-level IBM CICS, utilizes IBM's DL/1 and processes in IBM's OS and DOS environments. LPCS is priced at $22,500.

Leland Computer Services, Suite 146, 8601 Dunwoody Place, Atlanta, Ga. [illegible]

CANTON AUTOMATED SYSTEMS, INC.
On-Line Loan Service Card

Canton Automated Systems, Inc. has developed an automated loan service for financial institutions using the IBM 370, 4300 and 30 series mainframes.

The On-Line Loan Service Card reportedly runs with IBM's DOS/VSE operating systems, IBM's CICS/VS

Continued on page 94

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SOFTWARE & SERVICES

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Vtam or Btam and Vsam files. It provides a central location for all loan service data, including service comments and follow-up notes.

Base price is $25,000.

Canton Automated Systems, 100 Central Plaza S., Canton, Ohio 44701.

PALETTE SYSTEMS, INC.
Palette Cadd software for Vaxstation I

Palette Systems, Inc. has announced that its Palette Computer-Aided Drafting and Design (Cadd) software now supports Digital Equipment Corp.'s stand-alone graphics workstation, the Vaxstation I, under DEC's MicroVMS operating system.

While viewing, drawing and modifying Palette files, the user can simultaneously plot a drawing or display a directory of drawings stored on disk. Palette provides an interface to DEC's LA50 and LA100 dot matrix printers.

The price for the Palette system is $9,999 for the two-dimensional module and an additional $2,500 for an optional three-dimensional module. An independent program interface costs $2,000.

Palette Systems, Two Burlington Woods Park, Burlington, Mass. 01803.

COLLIER-JACKSON, INC.
CJ/Advanced General Ledger update

Collier-Jackson, Inc. has announced that its CJ/Advanced General Ledger package now includes an updated allocation feature that is said to give users a choice of capabilities.

According to the company, the system, which is designed for Hewlett-Packard Co.'s HP 3000 minicomputers and Digital Equipment Corp.'s VAX-11 series, can automatically allot a sales tax expense for a department's percentage of the gross sales.

The time period can be determined by the customer.

A customer-defined processing sequence reportedly allows CJ/Advanced General Ledger to allocate according to a previous allocation procedure.

An $18,000 license fee for the product includes object code, source code, on-site training, installation, user documentation, implementation plan, a 90-day start-up warranty and support.

Collier-Jackson, 3707 W. Cherry St., Tampa, Fla. 33607.

BURROUGHS CORP.
Burroughs Distribution Partner

Burroughs Corp. has announced a software distribution system for use on Burroughs B1000, B5000, B6000 and B7000 series mainframes.

Burroughs Distribution Partner is developed with the Linc language. According to the company, the package incorporates on-line documentation as well as Help screens.

The Base Module, which includes order entry, inventory control, accounts receivable, inquiry and management reporting, is available immediately for $22,500.

Burroughs, Burroughs Place, Detroit, Mich. 48232

MANCHESTER SYSTEMS GROUP, INC.
Manchester Reinsurance System CICS version

Manchester Systems Group, Inc. has announced an IBM CICS version of its Manchester Reinsurance System (MRS).

The CICS version is an online, interactive reinsurance processing system designed to meet the functional requirements of professional reinsurers, intermediaries and the reinsurance departments of primary companies.

It tracks reinsurance from the initial offering through binding to accounting, claims and retrocessions. MRS processes all forms of domestic and international reinsurance.

According to the company, prices range from $282,650 for the basic reinsurance assumed without submissions to $468,750 for the fully enhanced version. (All options come with participant-level retrocession.)

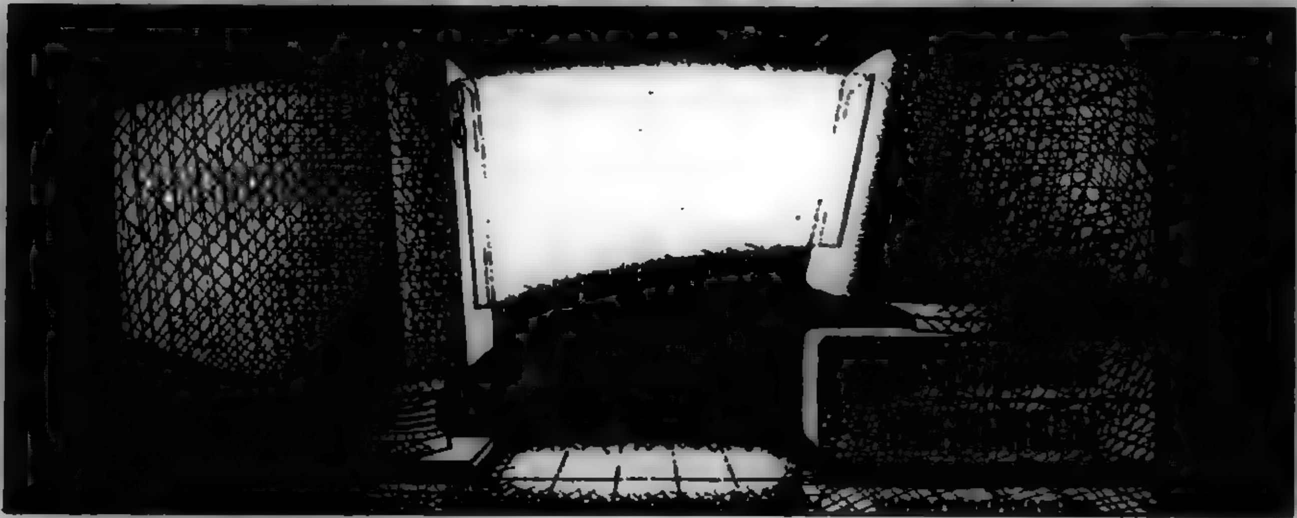
Manchester Systems Group, 8B, 395 South End Ave., New York, N.Y. 10280.

GREER SONTAG ASSOCIATES, INC.
Invest II for HP 3000 series

Greer Sontag Associates, Inc. has announced that modules of its Invest II financial portfolio management system will run on Hewlett-Packard Co.'s HP 3000 Se-

Continued on page 97

Now put your IBM® and WANG® word processors on speaking terms with each other.



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(Number of employees)
Number of WANG systems: ________
Type(s): (Check box) ☐ VS ☐ OIS ☐ PC
Number of IBM systems: ________
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GE INFORMATION SERVICES
General Electric Information Services Company, U.S.A.

THE 10 MOST IMPORTANT QUESTIONS YOU SHOULD ASK YOUR SOFTWARE VENDOR

"Many questions you would ask prospective application software vendors don't differentiate one vendor from another. The similarities between suppliers are not what's important — it's the differences that count. Here are ten questions you should ask prospective application software vendors before making your selection."

—John C. Gable,
Vice President of
Corporate Systems and Technology
for American Software, Inc.

	AMERICAN SOFTWARE	OTHERS
1. Can the application software you are considering be easily delivered in a variety of data processing environments (operating system, teleprocessing monitor, and data base) to permit easy migration and allow system software environmental independence?	Yes	?
2. Can the application software be delivered for VSAM and all popular data base management systems, rather than being tied to the application vendor's data base system — one which could be outmoded by new data base products developed by another vendor in this rapidly-changing high-technology industry?	Yes	?
3. Is the application software implemented using a "native" or direct approach to the operating system, teleprocessing monitor, and data base manager, without the inefficiency associated with "bridges" or the vendor dependencies of a "black box" approach?	Yes	?
4. Is the application product coded in an efficient, widely-used, and industry-standard language such as COBOL, rather than a vendor-dependent language unknown to the general data processing community?	Yes	?
5. Can the application product be "tailored" or streamlined to meet the specific functional and operational needs of a company through purchase of a basic package and selected optional features, thereby avoiding delivery of useless code?	Yes	?
6. Does the vendor retain a source version of each customer's uniquely tailored application software for emergency backup, problem determination, and client assistance?	Yes	?
7. Does the vendor have a broad, completely integrated line of application software which can be demonstrated on a single system instead of merely described?	Yes	?
8. Have all of the vendor's products been integrated by design and developed by a single organization, thus eliminating the need for inefficient interfaces and unknown "black boxes" to tie together unrelated or acquired applications?	Yes	?
9. Does the vendor clearly demonstrate a full commitment to the complex business of application software, rather than offer an incidental addition to its main product line?	Yes	?
10. Has the vendor been in the application software business a minimum of ten years with a successful track record of sustained profits and a strong financial posture?	Yes	?

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TOOLS

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are faced with the tough decision of picking one of the likely survivors.

Let us define a few terms relevant to this discussion. The subject is application generators to be used by programmers to build applications under IBM's IMS/DC and CICS and that access IBM DL/1 data bases. These generators are for predefined production systems, which are often built in a development center, but never in an information center.

Let us also avoid the terms fourth- and fifth-generation languages. Rather, we are looking at tools that potentially offer substantial productivity gains over traditional development and maintenance methods.

Last, when we talk of maintenance, we are referring to enhancement and adaptive, but not corrective, maintenance. Enhancement maintenance usually involves adding new functions and adaptive maintenance involves a change in environment. Corrective maintenance usually involves programming errors missed during testing and found late by computer operators.

> *Choosing a Cobol-based tool can be seen as an interim decision that represents a gradual turn in the direction of the high-powered application generators.*

With the apparent failure of the early application generators to live up to their billing, DP organizations are finding it difficult to commit to a generator for the five- to seven-year life cycle of the developed application. The lack of performance of many generators is also an issue.

If your organization likes the leading-edge image, then being a pioneer in the current market may be appropriate. But, if you don't like being a pioneer, the safest decision may be to select a Cobol-based application generator that you do not have to commit to in the long term. The Cobol-based tools also generally do not have long learning curves.

Choosing a Cobol-based tool can be seen as an interim decision that does not turn your organization sharply in one direction, but represents instead a gradual turn in the direction of the high-powered application generators in today's market.

Most of the Cobol-based application generators come with basic screen and report painter features to simplify what the user views as inputs and outputs. Most also have a feature to simplify building a skeletal version of a program that delivers data from screen to program and back again. They also include field-edit logic which is usually defined in a nonprocedural fashion soon after the screen is painted.

With screen, reports and skeletal programs ready, you can add procedural logic such as after-edit logic and application-specific logic using variations of Cobol that include powerful data base and data communications commands. This procedural logic is then processed through a precompiler and expanded into a complete Cobol program, ready to compile, link and execute. Reasonably complete program documentation is usually generated somewhere within this process as well.

Add to this a complete disconnect of the generated source code that the application generator creates, and you can also avoid a long-term commitment to the tool and its vendor. The disconnect feature also gives you greater flexibility.

Until the market settles and the next generation of tools is available, a Cobol-based application generator for the IMS DB/DC and CICS/DL/1 environment appears to be the best interim decision for most DP organizations.

Admittedly, the debate over Cobol's future rages on. However, the fact remains that there is a huge base of trained Cobol programmers and plenty of existing and newly developed Cobol systems for them to work on. And, if we can make substantial improvements in productivity and still use Cobol, then maybe we can make an evolutionary, rather than a revolutionary, shift to the next generation of productivity tools.

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UNIX SYSTEM V. FROM AT&T. ON TOP

Is your company's computing system an unmanageable muddle of isolated workstations and departmental computers?

You need a flexible means to integrate your system and get it under control. UNIX System V from AT&T.

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Don't worry about your stand-alone personal computers running on MS-DOS.* AT&T's PC Interface allows you to integrate your current machines into your system without costly disruptive change.

And, our COMMKIT™ Software links UNIX System V to the major networking protocols for data communications between computers based on UNIX System V and those that are not.

UNIX System V can support a number of users doing varied tasks at the same time. All sharing a central processing unit and peripherals. All benefiting from a larger base of information. All working as a manageable whole. All contributing to bottom-line cost savings because equipment and computing

Selection criteria help in choice of applications generator

SOFTLINE

Use the following list of considerations to assist in the selection process for Cobol-based applications generators. Each consideration shown may be given a weighting factor — high, medium or low — depending on your organization's requirements:

- A screen image painter to generate the Message Format Services or Basic Mapping Support source statements. It should be interactive and easy to use when creating or modifying screens.
- A screen flow painter for screen control and prototyping.
- Early prototyping feature (for example, soon after screen design) that allows data to be entered on the screen, not just viewed in a simple simulation.
- A report image painter for batch reporting requirements.
- Commands or macros to simplify data base and data communications interfaces. They should also be modifiable for use by senior technicians.
- An option of a complete and simple disconnect from the applications generator for maintenance of the generated source code.
- No runtime package that would affect portability to multiple CPUs.
- A minimal learning curve for programmers who already know Cobol.
- Allowance for leveraging of experienced IMS DC, CICS and DL/I development.
- No significant design restrictions that limit functionality.
- Handling of high-volume/highly complex processing efficiently.
- Acceptance of copybooks from an existing data dictionary.
- Accommodation of major conversions, enhancements and adaptations of existing systems as well as new development.
- Handling of complex data bases; for example, logical relationships, secondary indexes, Fast Path and eventually IBM's DB 2.
- High recommendations from current customers.
- Ensuring that developers generate standardized Cobol source code that follows structured coding techniques. A precompiler, the actions of which can be adapted to your organization's standards is a help.
- Generation of systems that may potentially run in both IMS DC and CICS.
- Ability to use a microcomputer as a programmer workstation for at least some of the development process — for example, screen painting and prototyping.
- Good documentation.
- Comes from a stable and responsive vendor.
- Reasonable initial and recurring costs.
- Does the tool currently, or will it eventually, offer a migration path for existing systems?

Continued from page 94

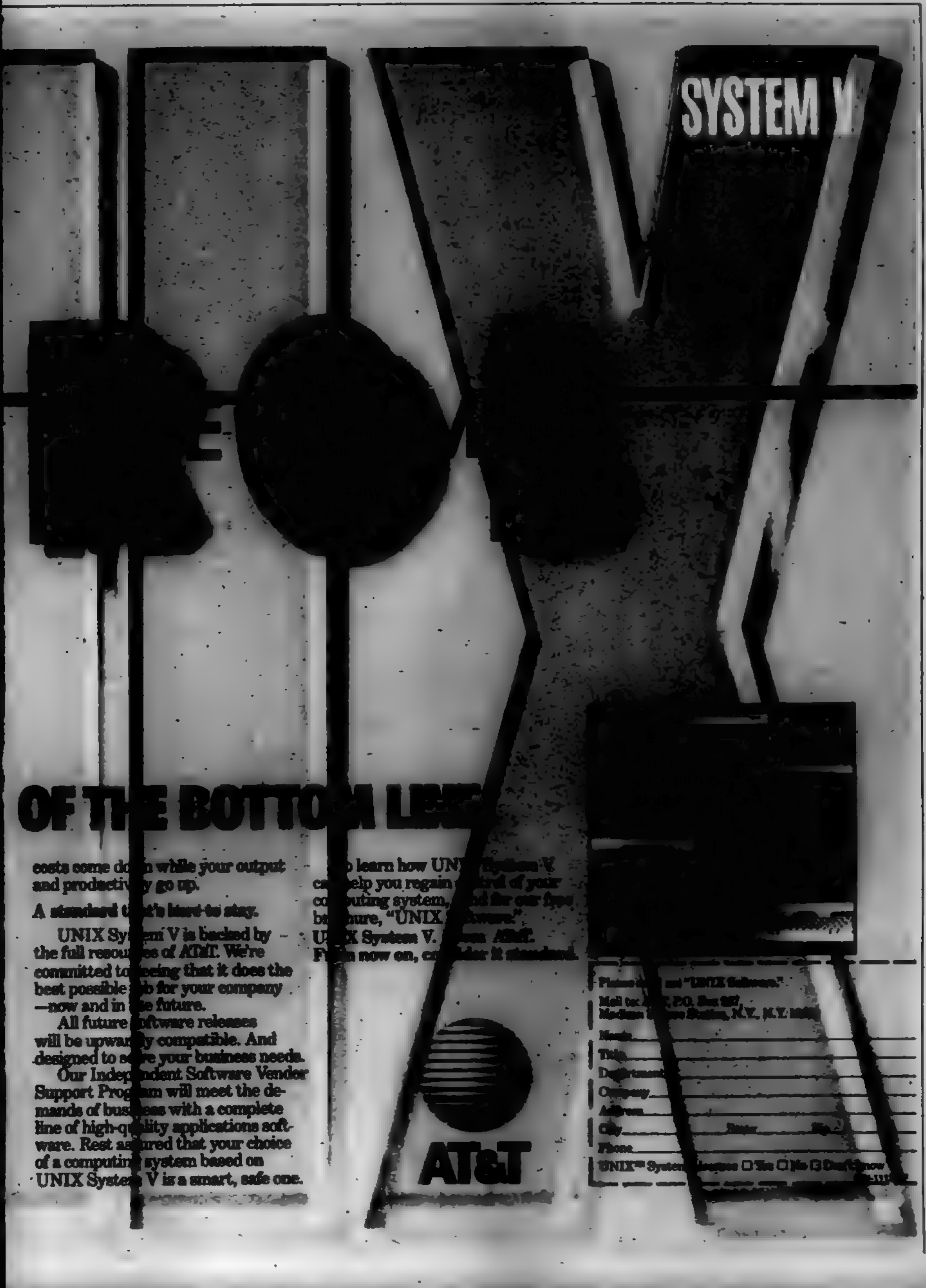
ries/37 minicomputer.

The system reportedly can handle all asset categories including options, futures, repurchase agreements, mortgages, fixed income securities and common stock.

The product's performance measurement subsystem is said to provide portfolio analysis and allows the user to select a daily rather than monthly cash weighting. User-defined tables and a report writer enable each firm to customize the system without extensive programming, the vendor said.

The software package for existing Series/37 systems costs $40,000. Turnkey installations are also available.

Greer Sontag Associates, 6 E. 45th St., New York, N.Y. 10017.



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UNIX™ System Licensee ☐ Yes ☐ No ☐ Don't know

SUBJECT

from page 85

spin-off files to hold it all together.

Subject data bases are a way of defining one data structure that can be accessed by all applications. "Subject data bases represent discreet chunks of the data resource," Ross said. "[They have] to be highly integrated, sharable by multiple applications and used as a building block for the entire information architecture."

Subject data bases must be built from the ground up. More important, they have to be thoroughly planned. That up-front planning time can pay back handsomely, Ross said. If well implemented, subject data bases require little modification. Application development and installation time can be speeded dramatically and both CPU and disk space resources saved.

To plan for a subject data base, you first need to identify the discreet functions of your business. "We're basically looking for seams we can use to cut the data base into pieces," Ross said.

Look at the organization as a user of information and try to identify how data flows through it, he said. If you take that broad, functional view — sometimes called functional decomposition — a matrix will begin to emerge showing how data is used by various operations.

Start building the data base in pieces with a structure that can be accessed by other applications when needed. Your department's application development plan should revolve around your data base plan, Ross said. For example, build two subject data bases while creating an application that uses them. Your next application may require parts of both data bases plus a new one. If properly structured, you should only have to build the new data base to implement that application.

"When applications need to communicate, they draw from the subject data bases rather than from each other's application data bases," he said. As a result, the code needed for validation, manipulation and editing is also reduced.

Ross conceded that the most difficult aspect of organizing subject data bases may be political. Management is not accustomed to thinking of the company as a user of information and may be reluctant to approve the costs of development. DP managers can start the ball rolling by putting together a project team to analyze information needs and then presenting that, along with suggestions for improvement, to executives.

[redacted]

DATA

from page 85

most corporations. For example, the sales department knows its customers by corporation names, billing sees them as invoice numbers and production knows them in terms of the products they order. Thus each operation uses different keyed fields to look at the same data.

In many companies this spiderweb of views is held together by tenuous bridges that have been built between the files. In fact, Holland estimated that the average Fortune 500 company has 400 man-years invested in its data base and another 300 man-years sunk in the bridges between the records.

The most important requirement for achieving the promise of distributed data base is standardization. Compatibility is needed across hardware, data, application systems, networks and systems software, Holland said. "There are standards right now, but manufacturers aren't sticking to them," he said. But he added, "Ultimately the business world will demand them, and they will be achieved." In fact, certain vertical industries like air travel, banking and manufacturing have already defined a certain level of standardization within their companies.

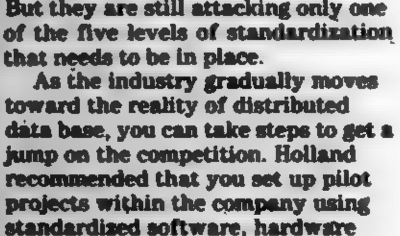
Establish standards

What data processing and corporate management in general can do is establish some standards for how data will be used and then test them. Multiple data base management systems (DBMS) are the wrong way to go, Holland said. Companies like Relational Technology, Inc. and Oracle Corp., which advocate standardizing on a single DBMS (theirs), are heading in the right direction, he said. But they are still attacking only one of the five levels of standardization that needs to be in place.

As the industry gradually moves toward the reality of distributed data base, you can take steps to get a jump on the competition. Holland recommended that you set up pilot projects within the company using standardized software, hardware and local-area networks. Evaluate the alternatives and see which ones are best for you. "The key is for companies to go with one standard and not three or four different ones," he said.

More important, MIS managers have to start thinking more like business people. As trite as that phrase now sounds, the success of distributed data base depends upon your willingness to learn how your company uses data.

Multiple-keyed fields will not be successful in the distributed environment of tomorrow. A personal computing environment that lets a hundred species of dissimilar flowers bloom will fail as well. You will have to lead your business into this new generation with the confidence that your data model is in tune with the company's business model.



'This is not a recording, but I have an excellent memory.'

COMMUNICATIONS

Enhancements out for AT&T's high-end PBX

Central processor redesign quadruples capacity, voice mail system debuts

By John Dix
CW Staff

NEW YORK — AT&T Information Systems has nearly quadrupled the maximum capacity of its high-end private branch exchange and introduced enhanced management capabilities, a voice mail system and higher speed data support for that switch.

Capacity enhancements to the System 85 were achieved by adopting a central processor that uses bipolar and bit-sliced technology, increasing cache and main memory to 32K bytes and 8M bytes, respectively, and using new software, said Bob Magnani, System 85 product manager. Previously limited to 7,000 lines, the expanded version of the switch can now support up to 32,000 standard analog telephones. By interconnecting systems using the company's distributed communications systems, up to 100,000 lines can be serviced, AT&T reported.

Voice/data workstation support has been increased from 5,000 to 8,000 devices, and the number of trunks the switch can support has been increased from 2,250 to 6,000. The processor can reportedly handle 45,000 busy-hour calls, whereas its predecessor could support only 20,000, Magnani said. With the Remote Group feature, some of these stations can be clustered at remote locations up to 100 miles from the central switch.

The enhancements will be made available in the first quarter of 1985 and will cost from $10,000 to $50,000, depending on the system configuration.

Also announced was the 3B5 Application Processor (AP). Based on the AT&T Unix V operating system, this optional attached processor will enable System 85 users to support a variety of applications, the company reported. The initial program for the processor is the Centralized System Management application, which provides switch control and administrative functions. Also compatible with the System 75

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■ A network executive outlines three approaches companies can take when installing local-area networks/100

■ Comdesign, Inc. has unveiled an integrated modem option for its line of statistical multiplexers/101

■ Network Systems Corp. has announced three interfaces to attach low to medium-speed asynchronous peripherals to its Hyperbus local-area network/102

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Western Union's Easylink service available on-line

NEW YORK — Western Union Corp. recently announced enhancements to its Easylink electronic communications service that include an on-line communications capability, a session control feature and a digital paging system.

The on-line capability reportedly will provide users with direct communications with other users and with the Western Union Telex system.

Online Conversation is said to give users the capability to converse directly on screen with another Easylink user if the addressee has an autoanswer terminal registered with Easylink, regardless of the brand of terminal. Messages can be sent from personal computers, word processors and terminals to the 1.5 million Telex system machines worldwide.

Session Control is a service enhancement that reportedly provides access to all Easylink services with a single telephone call and sign-on procedure, eliminating the need to redial when users want to switch services. Session Control reportedly provides a menu of options, including Easy-

See LINK page 104

MCI's Datanet packet-switching service to make debut at Calif.-based bank

By James Connolly
CW Staff

NEW YORK — Security Pacific Corp. and MCI Communications Corp. recently announced here that Security Pacific National Bank will be the first user of MCI's Datanet packet-switching service.

The Security Pacific Automation Network (Span) will provide the Los Angeles-based bank with packet-switched financial data services in 110 markets containing 85% of the U.S. population and eventually will be expanded worldwide, according to the bank and MCI.

"Span gives Security Pacific the capability to be the low-cost provider of specialized financial services to the customers of our $42 billion diversified corporation," said DuWayne J. Peterson, chairman of Security Pacific Automation Co.

The customized network is being tested now and will be commercially operational in January.

It will link the bank and its correspondent banks, corporate and individual customers, 1,100 consumer and commercial finance offices, mortgage banking offices and wholesale and retail securities offices.

Early applications will be automobile loan financing; point-of-sale; On-Line Advantage, a personal computer network for discount brokerages; and Specifics, the bank's on-line cash management and treasury workstation.

"Span is the first of what we anticipate will be many large corporate networks providing customer financial services, as well as meeting the internal data communications needs of corporations," said MCI Digital Information Services Corp. President J. Robert Harcharik.

He said Datanet allows a large user, such as Security Pacific National Bank, to tailor the value-added facilities and services of a public packet-switching network to its own needs.

> *'Span is the first of what we anticipate will be many corporate networks providing financial services.'*
> — J. Robert Harcharik, president, MCI Digital Information Services Corp.

Electronic mail revenue seen doubling annually through 1988

NEW YORK — Revenue from electronic mail services will soar by an annual average of over 100% through 1988, according to a report by Link Resources Corp., a market research firm based here that studies electronic media.

"Overall electronic mail services revenue will grow from $80 million at [the end of] 1983 to more than $2.1 billion in 1988. This represents an exponential average annual growth rate of 107%," according to the study, titled "Electronic Mail Services."

Computer-based messaging services that offer terminal-to-terminal messaging will be more successful in the long term, but mixed mode services that offer terminal-to-terminal and facsimile transmission will be spectacularly successful over the five-year forecast period, according to the Link study.

Trends spurring growth

The mixed mode services are a $22 million market in 1984, but will jump to $800 million in annual revenue in 1988, according to Link.

Link cited a series of trends that will spur the growth of electronic mail, including the following:

■ New hardware and software to accommodate the proliferation of microcomputers via easy-to-use communications software packages.

■ Customized pricing to offer the best mix for large users and transactional pricing to give users a sense of start-and-finish use, instead of open-ended use of time-sharing.

■ Expected approval before the end of 1984 of the CCITT-recommended Series X.400 interface protocols to reduce equipment compatibility problems.

■ Marketing of customized messaging applications that are part of specific organizational processes rather than a substitute for the telephone message or memorandum.

■ The growth of communities of users with services for small businesses and consumer users and closed users group services for people of common interest, such as lawyers.

The report noted that new categories of electronic mail vendors have developed to challenge the traditional providers, which are computer time-sharing firms and value-added network operators, service bureaus that provide intersite compatibility between different vendors.

New providers

New types of providers include vendors that are becoming more communications-oriented; independent software houses; and mass market voice and record carriers, including MCI Communications Corp., Western Union Corp., Federal Express Corp. and AT&T, Link said.

Link reported that some of the growth will be at the expense of existing telex systems, whose cost, speed and character set limitations make them unsatisfactory for time-sensitive business communications.

More information on the study is available from Link, which is located at 215 Park Ave. S., New York, N.Y. 10003.

Single-vendor local-area nets seen topping OA mart

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — General-purpose local-area networks will dominate the office automation market by the year 1990, according to Ralph Ungermann, president and cofounder of Ungermann-Bass, Inc.

Addressing an audience of analysts, investment bankers, OEM marketing managers and financial planners here, Ungermann said companies can take three approaches when installing local-area networks — use a single-vendor turnkey system, interconnect proprietary products from different vendors or use a general-purpose local-area network from a single vendor.

The last method is becoming most prevalent because proprietary local-area networks lock users into a single vendor over long periods of time, and using systems from different vendors poses integration problems because gateways between networks do not exist yet. IBM's token-ring product, for example, is still two to three years away, he said.

Ungermann, whose firm manufactures local-area networks, said optical fiber clearly will dominate the media over the long term.

Although optical fiber is not currently as cost-effective as coaxial cable because of the high cost of equipment like connectors and splicers, costs will plummet in the next several years, he predicted.

New York-based Fiber Track is already selling time on fiber-optic circuits for 6 cent/circuit (per minute/per month), while 10 years ago it cost $1/min, he said. IBM will use optical fiber in its token-ring strategy, Ungermann predicted.

Applications software will drive the local-area network market in 1985, Ungermann said. He predicted a trend toward server and application-specific software, distributed data bases and distributed word processing programs that are able to move files from mainframes to personal computers. Such software will let personal computer users describe what is needed from the mainframe, provide data security and transpose information into the proper format.

With the emerging software, about half the system's intelligence (diagnostics, for example) will reside on the network, and the remainder (such as data bases and format converters) will reside on the host and attached devices, Ungermann added.

In order for local-area networks to become more prevalent in medium to large businesses, applications software must resolve incompatibility issues, local-area network companies must focus on meeting future demands for high-bandwidth capacity, and local-area networks must be restructured so that multivendor systems are always available on a network, Ungermann said.

A local-area network standard will not emerge in this century, Ungermann predicted, because vendors — protective of their installed bases — do not want a single standard. The advantages to standards are lower costs, low risk of product obsolescence and product compatibility.

In the Japanese and European markets, Ungermann said, separate standards are developing. The Japanese are rallying behind Ethernet because they do not want IBM to dominate their market, and Europe is leaning toward International Standards Organization standards.

General-purpose, standardized local-area networks in factory automation will be one of the fastest growing market segments through the end of the decade, growing from less than $20 million now to $1 billion by 1991, he predicted.

VOICE/DATA COMMUNICATIONS

VOICEMAIL INTERNATIONAL, INC.

Version 2 Voicemail

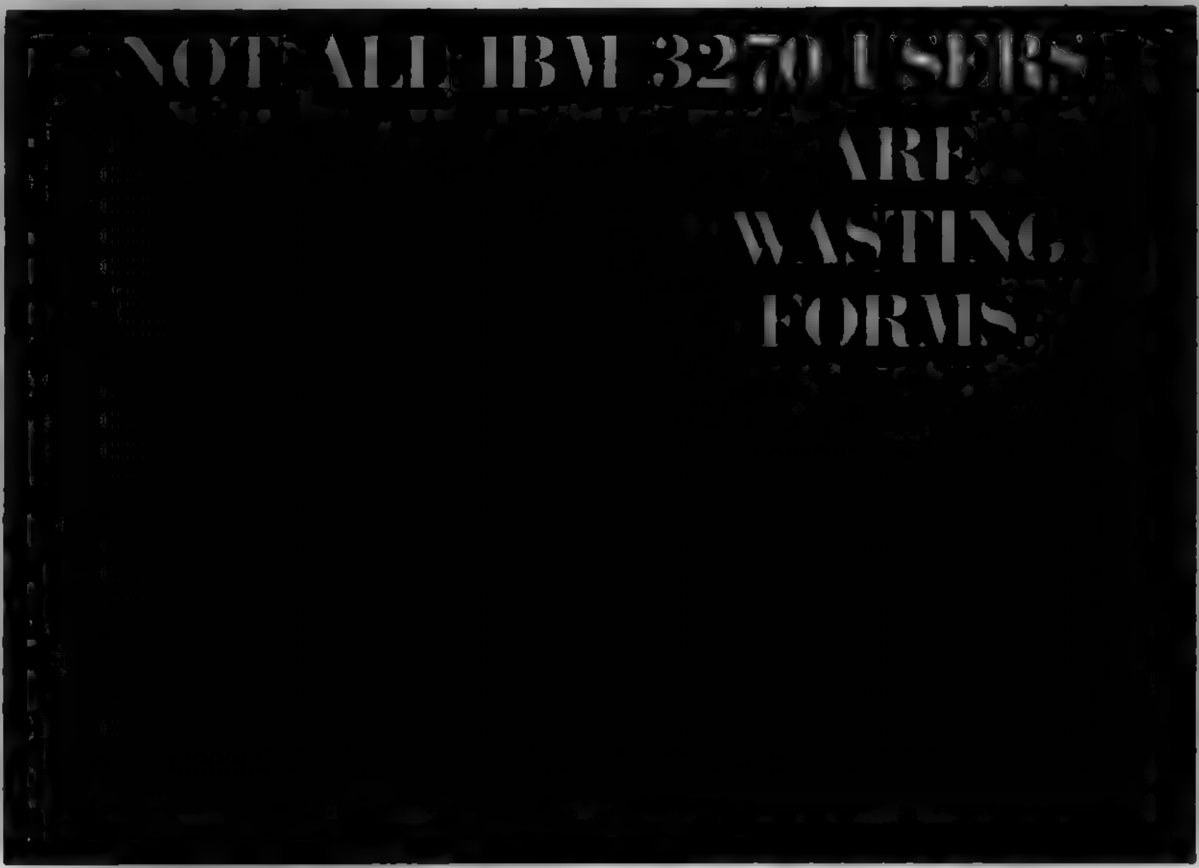
Message redirect, multilevel prompting, password security and reverse messages are among the enhancements announced in Version 2 of the Voicemail voice message storage and retrieval system from Voicemail International, Inc.

In addition to 11 enhancement features, Voicemail has added six new voice mailbox options including a two-way communications box that allows a user to correspond with a specific individual or group without requiring the other user to learn system commands. Also added were a drop box, a single box or group of boxes with a single-message life for commercial applications. According to the company, once the single message is received, the box is no longer valid.

The Voicemail system reportedly does not require private branch exchange (PBX) supervision, although it can be integrated with PBXs and Centrex. According to the company, modular design allows for expansion from an eight-port to a 64-port system with up to 207 hours of storage.

According to the vendor, Version 2 is free to current customers. A standard eight-port Voicemail package sells for $[illegible].

Voicemail International, Building 49, 3350 Scott Blvd., Santa Clara, Calif. 95051.



THE ISI 487 CONSERVES.

Not long ago, all IBM 3270 users were treated alike. Anyone that needed immediate access to a printed form was forced to waste a form for each form removed. Simple tasks turned into costly and frustrating procedures on the IBM 3287 printer.

Then the ISI 487 arrived. With tractors tucked neatly away and a tear-off scale positioned conveniently up front, the ISI 487 allows users to tear-off forms right after printing without any waste. Designed to fulfill any application, the ISI 487 handles continuous forms or single sheets and delivers dot matrix, near-letter quality, and incredibly sharp large character label printing.

The ISI 487 has satisfied a variety of IBM 3270 users. Isn't it time you joined them? This plug-compatible replacement for the IBM 3287 carries a price tag as low as $3,350 and belongs anywhere forms are dispensed immediately after printing. *Hospitals, insurance companies, manufacturers, and ticket outlets* — put an end to unnecessary waste!

For more information about the ISI 487 and our other IBM compatible (fully integrated, *no box*!) printers, like the ISI 736 letter quality printer with twin sheet feeder, call, write, or TWX us today!

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TWX: 810-223-6058

COMMUNICATIONS

PROTOCOL CONVERTERS

INNOVATIVE ELECTRONICS, INC.

MC 80/900

Innovative Electronics, Inc. has announced a protocol converter that is said to allow any personal computer or Ascii terminal to access IBM mainframe environments and Ascii hosts concurrently in either local or remote configurations.

The MC 80/900 reportedly is a microprocessor-based, stand-alone unit that lets Ascii terminals and personal computers appear as IBM 3278 display stations. It connects directly to an IBM 3274/76 cluster controller or to the display/printer adapter of the IBM 4331 by coaxial cable. It is said to support bisynchronous or Systems Network Architecture/Synchronous Data Link Control communications.

An auxiliary RS-232 port allows an attached personal computer or Ascii terminal to have simultaneous pass-through access to an asynchronous minicomputer or public data base without requiring the user to log off the active IBM host session..

The MC 80/900 costs $1,095.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

SOFTWARE

CLEO SOFTWARE

3780Plus

Cleo Software has announced 3780Plus for high-speed computer-to-computer file transfer for the IBM Personal Computer, Hewlett-Packard Co.'s HP 150 microcomputer and AT&T's 3B2 and 3B5 minicomputers.

The product is said to support IBM 3780 and 2780 binary synchronous protocols and to transfer at up to 19.2K bit/sec. As a 3780 emulator, 3780Plus is said to offer transparent mode, space compression, device selection, printer forms control, spooling, configurable line parameters and line trace for diagnostics.

Prices range from $500 to $1,499.

Cleo Software, 461 N. Mulford Road, Rockford, Ill. 61107.

LEGIST AUTOMATION, INC.

Step/IV

Legist Automation, Inc. has introduced a software package that allows the IBM Personal Computer to access Motorola, Inc./Four-Phase Systems, Inc. Series IV office automation system.

Specific Terminal Emulation Program/Series IV (Step/IV) is said to allow IBM Personal Computers and compatibles, with asynchronous connections at any line speed from 300 bit/sec to 9.6K bit/sec, to operate as if they were locally attached terminals on the Series IV running under Four-Phase MFE operating system.

The personal computers reportedly can use any of the programs running on the Series IV, including Four-Phase Foreword word processing and Vision data entry and processing and graphics, Cobol or Legist's Then-If spreadsheet.

The product also supports networking of Series IV processors, allowing the inbound personal computer user to go through the nearest Series IV and attach to an application running on another Series IV using either asynchronous or bisynchronous communications.

The component running on the Four-Phase host costs $3,500; the networking option, $1,500; and the first copy of the personal computer component, $160. The package will be available in January.

Legist Automation, Suite 6, 2214 Michigan Ave., Arlington, Texas 76013.

MULTIPLEXERS/ MODEMS

COMDESIGN, INC.

IM-4800, IM-9600 modems; TX-700; TS-600

Comdesign, Inc. has introduced advanced integrated modems as an option for its line of statistical multiplexers. Also announced was a microprocessor-based assembler/disassembler and a switching statistical multiplexer.

The Integral Modems (IM) series products are said to be compatible with CCITT recommendations V.27 or V.29. According to the vendor, the IM-4800 and IM-9600 operate full-duplex, point-to-point over four-wire, unconditioned private lines.

Front panel touch-key controls or optional executive port supervisory channels reportedly let configuration monitoring and diagnostic functions be performed through the intelligent networking device. Primary operating speeds are 9,600 bit/sec (V.29) and 4,800 bit/sec (V.27). Pricing is $2,595 and $1,795 respectively.

The TX-700 assembles data in packets via a packet-switching network and disassembles the packets at the receiving end. All TX-700 programming can be performed from a standard terminal connected to the system's supervisory port. Pricing starts at $2,600.

The TS-600 reportedly multiplexes up to 32 remote devices onto a single link at speeds up to 19,200 bit/sec and provides channel switching and port connection capabilities.

The price is $3,100 for an eight-channel unit.

Comdesign, 751 S. Kellogg Ave., Goleta, Calif. 93117.

MULTI-TECH SYSTEMS, INC.

MT224AD

Multi-Tech Systems, Inc. has introduced MT224AD, a modem that oper-

Continued on page 102

The UNIMUX 832 provides 128 ports of fiberoptic firepower for total systems solutions in voice management, data processing, and office and factory automation. The UNIMUX 832 is a universal time division multiplexer so multidisciplined, it has *solutions looking for problems to solve.* For limited-distance multiplexing in large data centers, or high density LAN nodes where bulk hauling of voice and data presents major problems, the UNIMUX 832 offers more ports-per-system, higher data transmission, and fully independent ports. Your needs are met for easy integration, complete network flexibility, and cost-effective expansion.

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Continued from page 101

ates at speeds of 300, 1,200 or 2,400 bit/sec.

The product can store up to six 37-digit telephone numbers and can detect busy signals and dial tones, according to the vendor. The modem reportedly operates in either synchronous or asynchronous modes and can be connected to either dial-up or dedicated telephone lines. The product's commands allow the unit to redial a busy number until there is a connection or dial a second number, the vendor said.

MT224AD is compatible with Hayes Microcomputer Products, Inc.'s Smartmodem 1200 and is able to run communications software written for the Hayes product.

MT224AD costs $[illegible].

Multi-Tech Systems, 82 Second Ave. S.E, New Brighton, Minn. 55112.

CODE-A-PHONE CORP.
Tel-A-Modem

Code-A-Phone Corp. has announced Tel-A-Modem, an intelligent modem that is integrated into a two-line telephone.

Tel-A-Modem reportedly combines a full-featured key telephone with an intelligent command modem device that provides simultaneous voice and data communications. The modem provides audio and visual status indicators, automatic redialing of a last number, nine-number memory automatic dialer and volume controls for ring signals and line monitors, according to the vendor.

Tel-A-Modem features tone or pulse dialing and transmission speeds of 300 or 1,200 bit/sec.

Tel-A-Modem costs $695.95.

Code-A-Phone, P.O. Box 5656, Portland, Ore. 97228.

THEALL ENGINEERING CO.
Modemphone

Theall Engineering Co. has introduced a full-duplex modem and memory redial telephone in a desktop housing.

The Modemphone is said to contain an asynchronous, 300 bit/sec, full-duplex AT&T 103-compatible modem with an RS-232 port. The product reportedly uses large-scale integration design and has LED indicators for data carrier detect, receive data and transmit data signals. It was designed for either Touch-Tone or pulse dialing with a 10-number redial capacity. Prices start at $110.

Theall Engineering, P.O. Box 336, Oxford, Pa. 19363.

LOCAL-AREA NETWORKS

BRIDGE COMMUNICATIONS, INC.
CS/1 server

Bridge Communications, Inc. has announced an Ethernet local-area network terminal server that implements the Transmission Control Protocols/Internet Protocol (TCP/IP) network protocols.

The CS/1 server with TCP/IP software performs the function of a terminal or host server, allowing up to 32 asynchronous devices to access host computers that support TCP/IP and are attached to an Ethernet local-area network. The protocols have been standardized by the U.S. Department of Defense and are a standard part of the AT&T Unix 4.2 bulk storage device operating system.

When attached to Ethernet, the CS/1 reportedly is needed only on the terminal side of the terminal-to-host switch. Asynchronous devices can be connected via Ethernet to host computers that do not support TCP/IP by using CS/1 units running TCP/IP software on both the terminal and host sides of the network, the vendor said.

The CS/1 with TCP/IP is available for $9,900 with eight serial ports; additional eight-port expansion boards for up to 32 ports are $1,900 each. A one-year TCP/IP license is $250, and the software comes on a 5¼-in. diskette.

Bridge Communications, 1345 Shorebird Way, Mountain View, Calif. 94043.

NETWORK SYSTEMS CORP.
Hyperbus interfaces

Network Systems Corp. has announced three interfaces to attach low- to medium-speed asynchronous RS-232 peripherals to its Hyperbus local-area network.

The Models B113, B114 and B116 are said to support four, eight and 16 ports, respectively, at a simultaneous 9.6K bit/sec per port transmission speed.

Hyperbus is a baseband coaxial system using carrier-sense multiple access/collision avoidance contention.

According to the vendor, the B116 costs $292.50 per port and provides more capabilities than units in the $350-$650 price range.

Network Systems, 7600 Boone Ave., Minneapolis, Minn. 55428.

TEST EQUIPMENT

INFINET, INC.
NIS 90/60; EMS-II Network Control System

Infinet, Inc. has announced a series of network management, control and performance measurement products integrated into a single data base.

The NIS 90/60 decision support system is based on a Digital Equipment Corp. VAX-11/730 processor running AT&T Unix. According to the vendor, the system has user-definable screen formats, open architecture and a report generator.

The 90/60 reportedly has 456M bytes of fixed Winchester disk storage, a streaming tape drive and support for 16 terminal devices.

Toward Clearer Communications:
InteCom discus

The NIS 90/60 works with the PMS-II, a performance measurement system that monitors network performance and protocol-regulated parameters. Cost of the system is $150,000.

Infinet also announced an upgrade from its EMS-I product, the EMS-II Network Control System that reportedly allows users to monitor, test and control both digital and analog lines and devices from one console. According to the company, the unit provides advanced analog parameter measurements, such as phase jitter, signal-to-noise ratio and received-signal level. Line quality is measured by generating a 1,003-Hz tone, the company said.

Modem speeds and multiplexer channels can be reconfigured from a central-site EMS console. The console is menu-driven and has color-coded function keys.

The system, which can be integrated into the data base or used separately, sells for $16,500. Price includes the microcomputer system, operating console and printer.

Infinet, 6 Shattuck Road, Andover, Mass. 01810.

AUXILIARY EQUIPMENT

RACAL-MILGO, INC.
Datacryptor II Model 1027

Racal-Milgo, Inc. has announced an encryption device said to protect sensitive unclassified government data and to meet Federal Standard 1027.

Datacryptor II Model 1027 implements the U.S. National Bureau of Standards' Data Encryption Standard algorithm, according to the vendor.

The encryptor/decryptor reportedly operates with protocol transparency at data rates up to 9,600 bit/sec, synchronously or asynchronously, in full or half duplex modes and on leased or dial-up lines.

It operates in conjunction with an accessory key writer, which enters cryptographic key values. The unit features self-test and operator-test diagnostics.

Available now, it costs $2,800.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

BLACK BEAR ELECTRONICS, INC.
DLV11-J Distribution Panel

Black Bear Electronics, Inc. has announced a distribution panel that is said to facilitate the changing of speeds supported by Digital Equipment Corp. DLV11-J asynchronous boards as used in DEC PDP-11 minicomputers.

The DLV11-J Distribution Panel has a 40-pin flat ribbon cable connecting it to the PDP-11 Q-bus and four eight-position dip switches that allow the user to select speeds from 300 to 9,600 bit/sec.

Modular connectors across the top reportedly allow the user to attach a Black Bear modular distribution system using RJ-11 cables. It also is said to feature surge protection on transmit and receive lines, five RJ-11 female jacks for distribution and 30 insulation displacement terminals designed to solve the problem of interconnecting discrete wires.

It costs $99.95 without a speed regenerator and $225 with one.

Black Bear Electronics, 3201 Santa Monica Blvd., Santa Monica, Calif. 90404.

AMERICAN PHOTONICS, INC.
AFM3270

American Photonics, Inc. has announced a fiber-optic interface designed to convert data from RG62U cable for fiber-optic cable.

The AFM3270 was designed to screw into IBM 3270 series multiplexers, including the 3M Corp. 6600 multiplexer and the Astrocom Corp. 3274 Squeeziplexer. It is said to be a transparent link that converts data between two IBM terminal multiplexers from RG62U cable to fiber optic.

It reportedly can be rack-mounted or supplied in a tabletop model.

A unit designed to handle up to 32 terminals costs $1,250. They are available six weeks after receipt of order.

American Photonics, 71 Commerce Drive, Brookfield Center, Conn. 06805.

ITT DIALCOM, INC.
Xmail

ITT Dialcom, Inc. has announced an electronic service said to provide a direct connection between its electronic mail system and the worldwide telex and telegram network.

Xmail enables Dialcom users to send and receive messages on personal computers, word processors or terminals. Xmail links those users to about 200,000 public telex terminals in the U.S. and more than 1.8 million terminals overseas. Messages can also be sent simultaneously to other Dialcom electronic mailboxes.

One of Xmail's benefits is said to be that it eliminates the need for a special telex terminal. A telex message can be sent using a personal computer and a telephone. Another feature is Xmail's ability to transmit the same message to as many as 500 addresses simultaneously.

Xmail's price includes Dialcom's normal hourly rate of $16.50 to $20.00 during prime business hours and $16.50 at off-peak times, plus the telex transmission rates.

ITT Dialcom, 1109 Spring St., Silver Spring, Md. 20910.

TELEPROCESSING PRODUCTS, INC.
TP-511

Teleprocessing Products, Inc. has introduced a network-compatible

Continued on page 104

ses voice/data integration.

The manufacturer of the first integrated voice/data switching system considers the issues.

Data is a major factor in office communications today. It's projected that within the next five years, data transmission will increase from the present 2% to 40% of total PBX traffic. That's explosive growth. And it means that companies must accommodate this increase by expanding their present systems or by planning now to replace obsolete systems with ones that can meet those needs.

A look at alternatives.

To keep pace with this change, an organization has two basic choices. First, it can stay with a limited voice-only PBX and create separate data networks. This, however, is a costly, inefficient method, and it becomes increasingly difficult to manage multiple expanding systems.

The second alternative is an integrated voice/data system. By installing one network, a company can have voice and data capabilities at every outlet.

Key benefits are the sharing of resources—devices and software—and consolidated network management. An integrated system is an investment in the future that can pay for itself in the savings of single network administration.

A definition of terms.

Integrated voice/data is sometimes thought of as simply combining voice and data in one switch. But it's really much more. It's the total integration of voice and data through a twisted pair network.

Because a digital system does not distinguish between voice and data, both look the same as they pass through the switch. So it's possible to apply sophisticated voice features to data—least cost routing, conference calls between workstations, callbacks on data terminals and other aids to productivity that are normally associated with voice-only systems.

Major considerations.

Universal Connectivity

One of the greatest challenges facing communications professionals today is the management of changing technology. In an environment where many approaches to office communications call for complete flexibility, only a system designed to be compatible with multi-vendor equipment is a safe choice. Such a system provides the format and protocol conversion capabilities for dissimilar devices to communicate with each other, freeing a company from the need to choose all its equipment from one vendor.

A system should be capable of connecting numerous dissimilar devices to a common network, allowing them to share peripherals, data and functions. This flexibile connectivity also protects your investment in equipment, ensuring its continuing value.

Non-Blocking Traffic

In voice systems, many calls can share one path through the switch because conversations are short and not everyone uses his telephone at the same time. However in data communications each device needs full access through the switch, and the long holding times of data calls place heavy demands on a network. As more data circuits are added to meet growing user needs, a system founded on voice-only design can't handle the traffic and begins to block calls from completion, or to degrade the quality of transmission.

Non-blocking matrix architecture, however, places no restrictions on voice and data access. As the data-to-voice proportions change, the system is reconfigured at the host controller. And there's no new cabling required. In non-blocking systems, savings are soon realized in simplified administration.

Processing Capacity and Speed

Many installed systems operate on 16-bit processors. While this may be adequate power for today's voice-only systems with few data options, it may not be sufficient for tomorrow.

Since a system's processors are the limiting factor, they must offer enough capacity for growth. A system offering 32-bit processors can handle both present and future capacity requirements. It's valuable insurance against obsolescence, with unlimited potential for applications like video and future developments.

The office automation industry is introducing more and more devices that operate at speeds up to 10 Mbps. Only an integrated voice/data system that offers 10 Mbps connectivity and integrated local area networking can successfully carry a company into the automated office environment now evolving.

A view for the future.

In 1979 InteCom introduced the first integrated voice/data system, the IBX™ Integrated Business Exchange, and since then has been setting the pace for the office communications industry.

The system has been proving its merits in installations all across the country for more than three years. It's backed by comprehensive support and refined through an ongoing program of research and development. Software-oriented, adaptive to new technology and protected from obsolescence, the IBX offers you the connectivity needed for tomorrow's automated office.

We hope this look at the issues of voice/data integration will be useful to you in your system selection. InteCom has met the communications requirements of companies in a wide range of industries. And today, our representatives are ready to help you evaluate your specialized needs.

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Continued from page 103

asynchronous digital termination unit for use with digital data service (DDS) networks.

The TP-511 is based on the vendor's synchronous TP-501 channel/digital service unit and is said to require fewer components and reduce the number of devices required to implement asynchronous DDS.

The device is said to feature circuit status indicators and front-panel switches for line control, business equipment loopbacks and pattern generation for user-controlled, end-to-end testing.

It is available in a stand-alone desktop version or a high-density, rack-mount version. The price is $1,175.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063.

HADAX ELECTRONICS, INC.

Data switching system

A manual data switching system that lets users switch data lines between active and fall-back equipment was introduced recently by Hadax Electronics, Inc.

The system reportedly enables test and monitoring equipment to be placed on-line for data diagnostics. It also reportedly provides a means of centralizing data line routing.

The standard 19-in. rack-mount unit accommodates up to 16 card modules. Card interfaces include RS-232/V.24, RJ-11C and RJ-45C, Coax BNC, IBM Twinaxial, Wang Laboratories, Inc. BNC/TNC and V.35/CCITT. The standard rack-mount unit sells for $170.

Hadax Electronics, 79 Hazel St., Glen Cove, N.Y. 11542.

ALPHA MICROSYSTEMS, INC.

AM-316 I/O controller

Alpha Microsystems, Inc. has announced a 17-port, I/O controller designed for use in its multiuser business microcomputers.

The AM-316 controller is said to provide 16 RS-232 ports and one Centronics Data Computer Corp.-compatible parallel port on Alpha Microsystems S-100 bus. According to the vendor, the controller uses only one slot rather than the three slots required to provide the same number of ports on the company's previous model, the AM-300.

It is said to feature a watchdog timer and a reboot on break key function. Available now, it has a suggested retail price of $1,325.

Alpha Microsystems, 17332 Von Karman Ave., Irvine, Calif. 92714.

AT&T

from page 99

and the Dimension 2000, the 3B5 AP can reportedly be used to manage up to 15,000 station moves and changes. To be made available early in 1986, the 3B5 AP will be priced from $170,000.

The voice system the company introduced, called the Audio Information Exchange, or Audix, is the first phase of the newly created unified messaging scheme. As part of the company's Information Systems architecture, unified messaging is meant to, eventually, provide for the integration of different message systems, such as voice and electronically displayed text.

Audix is compatible with the System 85, Dimension 2000 and Dimension 600 PBXs. Designed to be integrated into these switches, Audix essentially provides individual users with capabilities similar to an answering machine. Audix can be configured with 32 ports, which is reportedly adequate to service up to 4,000 users.

Audix systems range in price from $140,000 to $430,000, depending on the number of ports and hours of storage provided. It will become available in 1985.

LINK

from page 99

link Instant Mail Service, Online Conversation, Western Union's FYI News service, an on-line directory of Easylink subscribers, Help messages and information on new services.

Western Union also announced Mailbox Alert, a digital paging service said to provide Easylink users with instant notification when messages are received in their electronic mailboxes. Users will receive a flash-and-beep digital pager that will be signaled by local paging carriers when a message is received.

Mailbox Alert, priced from $15 to $20 per month, will become available in 30 areas throughout 1985.

Prices for Easylink are dependent on the time of day and the length and speed of transmission. A Western Union spokesman said a 1,200 bit/sec peak-hour transmission costs 45 cent/min, with a 40% discount for off-peak hours. There is no minimum usage for the first three months, but there is a $25 minimum monthly usage fee after three months.

Western Union also announced that Businessland, Inc. has agreed to offer Western Union's Instant Mail Manager Software, designed for use with Easylink, in Businessland stores. Instant Mail Manager has a suggested retail price of $95.

Western Union is located at One Lake St., Upper Saddle River, N.J. 07458.

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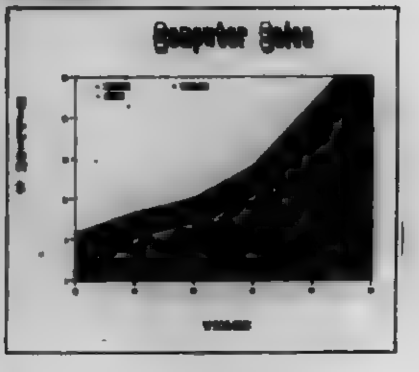

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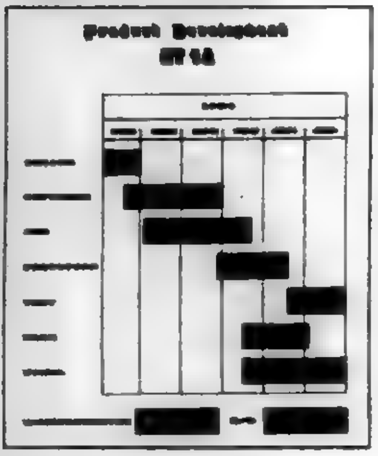
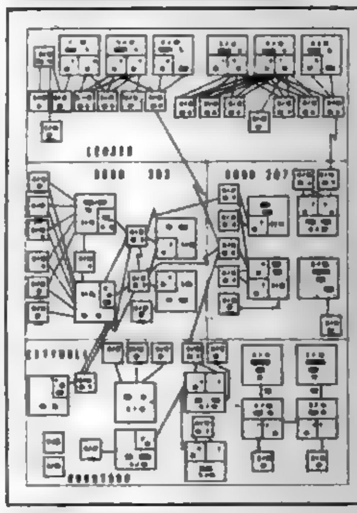


FLOW CHARTS
ORGANIZATION CHARTS



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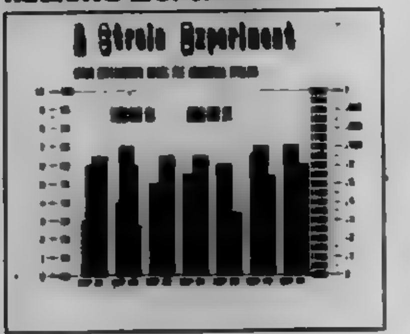

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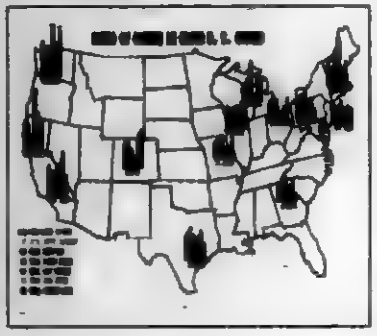

3-DIMENSIONAL
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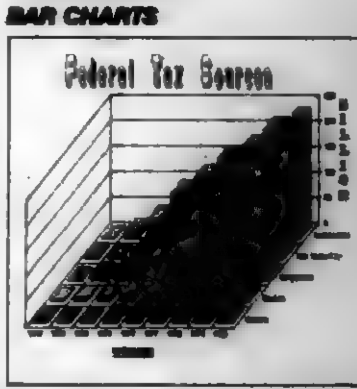

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HARD TALK
Tom Henkel
CW Senior Editor

IBM CPUs lauded but ploy suspected

Strong performance enhancement and a political ploy is how industry analysts summed up IBM's two most recent mainframe announcements, the 4381 Model Group 3 and the 3083 Model CX [CW, Oct. 29].

The long-predicted dual processor version of the 4381 processor was generally received by industry watchers as a well-priced addition to the 4300 line. The 4381 Model Group 3 processor, which IBM said offers internal performance between 1.7 and 1.9 times greater than the 4381 Model Group 2 processor, appears to have the ability to serve a dual role for IBM, noted Frank Gens, an analyst for the Boston-based Yankee Group market research firm. Gens said larger commercial users of the 400 processor line can take advantage of the increased performance of the Model Group 3.

But at the same time, Gens noted, IBM appears to have positioned the Model Group 3 to offer engineering-oriented performance to rival Digital Equipment Corp.'s newly announced VAX 8600 and Data General Corp.'s MV/1000 superminicomputers. Gens added that IBM's 4381 Model Group 3 plus DEC's recent VAX 8600 announcement may put more pressure on Data General and Prime Computer, Inc. to unveil more powerful top-end processors.

IBM's 3083 Model CX was given less favorable reviews by industry analysts, largely because it appears unclear whether many users will ever buy the unit. Charles Greco, an analyst with the Framingham, Mass.-based market research firm International Data Corp. (IDC), said IBM claims the entry-level 3083 Model CX was designed for users who expect to experience a 75% annual growth in processing power. IBM said the advantage of the Model CX is that users who install the system have the option of gaining a tenfold field-upgradable power improvement if they were to migrate up the 3080 line to IBM's top-of-the-line with a 3084 Model QX processor.

But Greco pointed out that

See IBM page 117

Sun Microsystems unveils two graphics workstations

Unix-based Sunstations support Ethernet

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. has announced the Sun-2/50 Desktop Sunstation and the Sun-2/160 Color Sunstation, both for graphics applications and both based on the Motorola, Inc. 68010 microprocessor. The company also announced the Sun Network File System.

The two workstations run Version 4.2 of AT&T's Unix operating system and support the Ethernet local-area network. The Sun workstations also support the C, Fortran and Pascal programming languages and offer the company's Suncore graphics and Sunwindows window manager software, according to the vendor.

The Sun-2/50 features from 1M to 4M bytes of main memory and up to 16M bytes of virtual address space per process. A floating-point accelerator for computer-intensive applications is optional. The 2/50 features a 19-in. screen with 1,152- by 900-pixel resolution and noninterlaced display.

The 2/50 is said to operate without a local disk drive by demand paging over the network to mass storage on the file server. Several diskless machines can share the

See SUN page 116

Datamedia introduces supermicros, terminals for Unix, Pick environments

By John Desmond
CW Staff

NASHUA, N.H. — Datamedia Corp. has announced five 932 supermicrocomputer models and the Elite 60 and Elite 90 display terminals.

The 932 Models 1610, 1620 and 1624 run on the Unisoft System Corp. Uniplus+ operating system, a derivative of AT&T's Unix System V.

The 932 Models 20P and 30P use the Pick operating system from Pick & Associates, Inc.

The Elite 90 display terminal was designed for use in a Unix environment with the 932, and the Elite 60 is a Digital Equipment Corp. VT100-compatible display terminal designed for use with the Pick operating system.

See MICROS page 114

IBM controller links processors, finance system

RYE BROOK, N.Y. — IBM has announced the IBM 4701 Finance Communication Controller Model 3. The unit allows users to attach 4700 Finance Communication System terminals to IBM 3080 series, 4300, 8100 and System/34, 36 or 38 processors.

IBM also announced enhancements to the 4700 Finance Communication System that allow the unit to support the Model 3 controller, as well as X.25 packet-switching networks.

The 4701 Model 3 provides a maximum

See FINANCE page 112

AM-1000X micro debuts, prices cut on AM-1000E line

IRVINE, Calif. — Alpha Microsystems, Inc. has announced the AM-1000X desktop microcomputer for the AM-1000 desktop family. It features a 5¼-in. Winchester disk drive with a formatted capacity of [illegible] bytes.

The company also announced price reductions on the AM-1000E systems, which feature a 30M-byte Winchester disk drive.

The AM-1000s are based on the Motorola, Inc. 68000 microprocessor and the company's Amos multiuser, multitasking operating system. The price of the AM-

See ALPHA page 112

- Collier-Jackson, Inc. introduces Hewlett-Packard Co.-based personnel information system for business/108
- Mohawk Data Sciences Corp. announces three printers for its MDS Hero Intelligent Workstation/111
- Able Computer Co. reveals bus converters said to increase the performance of Digital Equipment Corp.'s PDP-11 minis/111

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SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

COLLIER-JACKSON, INC.
CJ/Personnel for HP 3000

Collier-Jackson, Inc. has introduced a Hewlett-Packard Co.-based turnkey system for personnel departments in medium and large companies.

CJ/Personnel uses the HP 3000 superminicomputer. Its capabilities include storage and retrieval of personnel information, current and historical job-related data, skills inventory, resume information and attendance graphics.

The system also uses applicant listings, employee status notice, attendance reports, benefit statements, federal Occupational Safety and Health Administration standards and employee transfer information, the company said.

The system also reportedly provides the ability to share information with other systems, the vendor said. For example, if an applicant becomes a full-time employee, the information can be transferred directly into the payroll system.

Cost of the system is $38,500, including CPU, 55M-byte disk with cartridge tape, a printer and three CRTs. Larger configurations are available.

Collier-Jackson, 3707 W. Cherry St., Tampa, Fla. 33607.

K/W CONTROL SYSTEMS, INC.
Monitoring and Management System

K/W Control Systems, Inc. has announced the Monitoring and Management System for centralized users of multiple hardware systems.

The system is intended for use with large DP and communications facilities maintaining multiple electrical, electronic, pneumatic or engine-driven systems, including uninterruptible power supplies, motor generators, frequency converters, telecommunications equipment and lighting systems.

The system consists of the IBM Personal Computer XT with 10M-byte fixed disk, color monitor, floppy disk drive, graphics printer and System Interface Unit (SIU). The SIU provides all communications links to attach the, Personal Computer XT and up to 128 Remote Device Controllers (RDC). RDCs are available in three types: analog input, up to 32 inputs; digital input, up to 16 inputs; and event recorder, up to 15 inputs.

System software is loaded into the Personal Computer XT's hard disk via a 320K-byte diskette and is resident in the Personal Computer XT's 10M-byte fixed disk. All system displays are provided on the Personal Computer XT's 13-in. color monitor, which provides up to 16 colors.

The price for the Monitoring and Management System with one analog input RDC is $17,000.

K/W Control Systems, Department MMS, South Plank Road, Middletown, N.Y. 10940.

FLEXSTAR CORP.
FS8500 Analog/Digital Test System

Flexstar Corp. has announced the FS8500 Analog/Digital Test System, said to perform subassembly-level tests on any head/disk assembly used in any 5¼-in. or 3½-in. Winchester disk drive running Seagate Technology Inc.'s ST-506/412-type interfaces.

The tester is controlled by an IBM Personal Computer or compatible microcomputer, the vendor said.

The system includes a single-board disk drive tester that reportedly performs digital read/write testing via the ST-506/412 interface; a Personal Computer interface card that plugs into the I/O card slot to interface the Personal Computer with the drive tester card; and the analog probe. The test software runs under IBM's PC-DOS 2.11.

The system can be incorporated into a Personal Computer with 256K bytes of main memory, dual floppy disk drives for test data storage, a monitor and printer. The tester performs functional status, read/write and timing tests for hard disk drives, the firm said.

The single-unit price of the FS8500 is $24,000, the vendor said.

Flexstar, 780 Trimble Road, San Jose, Calif. 95131.

DATA STORAGE

COMPUPRO CORP.
Floppy/hard disk subsystem

Compupro Corp. has announced a 5¼-in. floppy/hard disk subsystem for use as a mass storage option for its System 816 family of IEE 696/S-100 bus-compatible microcomputers.

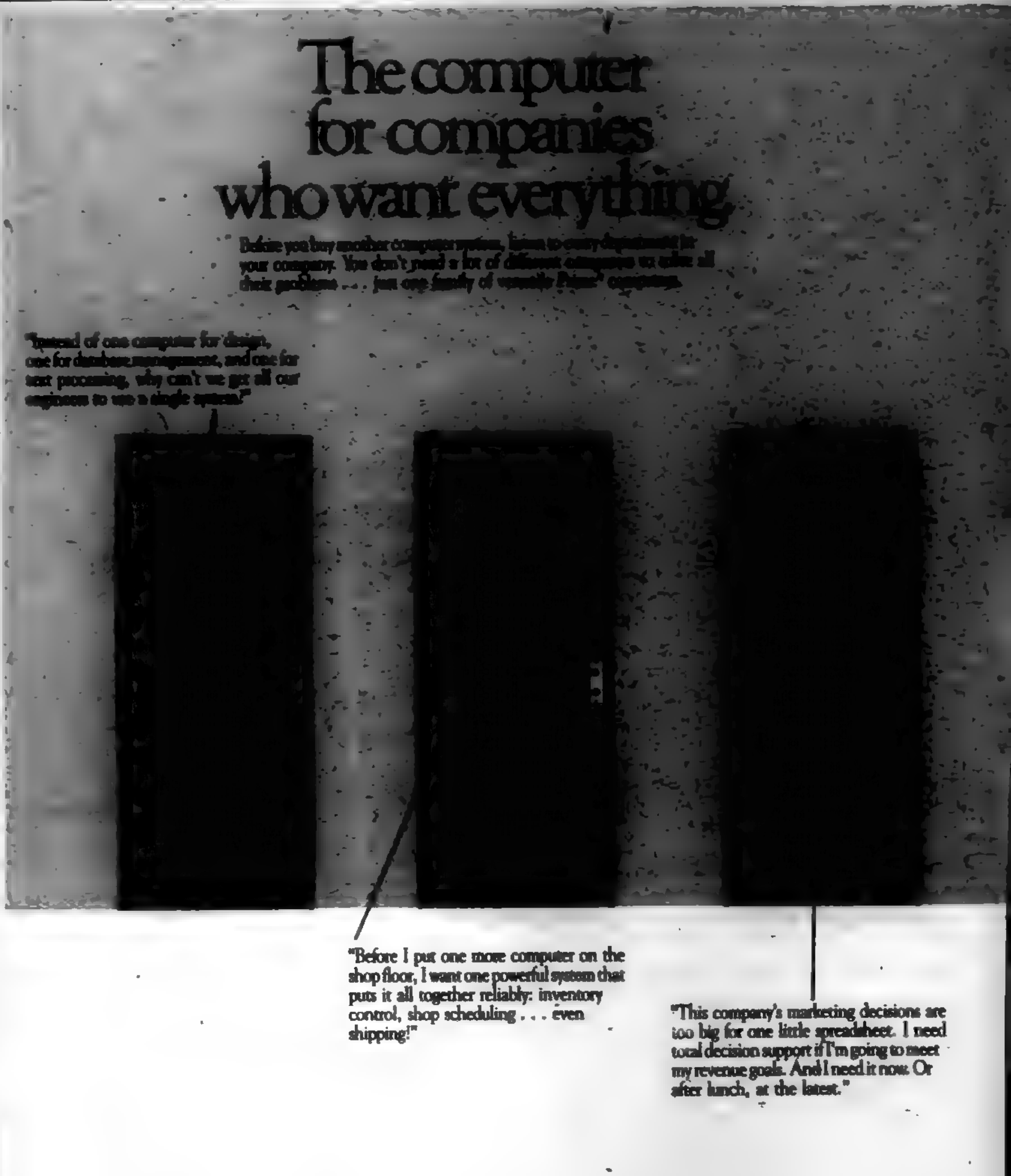
The disk subsystem features two 5¼-in. Mitsubishi Electronics America, Inc. double-sided, double-density 96 track/in. half-height floppy disks with a total of 1.6M bytes of formatted storage and a hard disk with either 20M, 40M or 80M bytes of storage. It also includes Compupro's Disk 3 direct-memory access disk controller and Digital Research, Inc.'s Concurrent DOS 8-16 operating system.

Double-sided 5¼-in. disk formats supported include Epson America, Inc.'s QX10, the IBM Personal Computer, NEC Information Systems, Inc.'s PC-801A and Zenith Data Systems Corp.'s Z-100.

Single-sided 5¼-in. disk formats supports include IBM, NEC's PC-8801A single-density, Xerox Corp. 820-II and Osborne Computer Corp. double-density, Texas Instruments, Inc.'s Portable Professional and Zenith's Z-90.

The 5¼-in. disk subsystem with a 20M-byte hard disk is priced at $4,995; with a 40M-byte hard disk, $5,495; and with an 80M-byte hard disk, $9,495.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.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COMPUTER AUTOMATION, INC.
Winchester drive for Datacase/5

Computer Automation, Inc. has announced that a 140M-byte 5¼-in. Winchester disk drive is now available for its Datacase/5 multiuser minicomputer system. The unit brings the total capacity of the system to [illegible] bytes.

The drive is compatible with Seagate Technology, Inc. 506/412 fixed disk drives and features a transfer rate of 5M-bit/sec and ferrite recording heads, according to Computer Automation.

A typical configuration for a 140M-byte system supporting eight users is approximately $12,000, the company said.

Computer Automation, Computer Products Division, 2181 DuPont Drive, Irvine, Calif. 92713.

TERMINALS

TEKTRONIX, INC.
CX4100 series

Tektronix, Inc. has announced its CX4100 series of computer display terminals, which were designed for IBM 3270 plug-compatibility.

The terminals reportedly include the feature set of the Tektronix 4105, 4107 and 4109 terminals, while providing direct coaxial connection to an IBM 3274 cluster controller, 32-line 3278/3279 alphanumeric emulation, an IBM-style keyboard and an expanded range of drivers for Tektronix peripheral devices.

The series was intended to let IBM host users utilize Tektronix Plot 10 graphics commands while retaining IBM 3270 alphanumerics and keyboard. The CX series reportedly carries out a greater portion of the graphics tasks at the terminal than the programmed symbol-cell graphics in an IBM environment. According to Tektronix, Plot 10 graphics commands locally perform vector-to-raster conversions and rapid area fills, relieving the host CPU burden.

The terminals — the CX4106, CX4107 and CX4109 — are said to retain their RS-232C connection and are able to switch between IBM and RS-232 hosts without ending either session.

They reportedly feature a 60Hz noninterlaced display with 4,096- by 4,096-pixel addressability in a 640- by 480-pixel matrix, the ability to draw solid or dashed lines in up to 16 colors using eight line styles, 11 marker types, zoom and pan, user-defined fonts and macros and local picture storage. The series also supports Digital Equipment Corp. VT100 extensions and Ansi X.3.64 editing and word processing standards, according to the vendor.

The CX4106 costs $7,950; the CX4107, $8,950; and the CX4109, [illegible].

Tektronix, P.O. Box 1700, Beaverton, Ore. 97075.

SOLARIS COMPUTER CORP.
Solaris 1000

Solaris Computer Corp. has announced a hardware and software package that adds IBM Personal Computer capabilities to asynchronous terminals such as the Digital Equipment Corp. VT100, CIE Systems, Inc. CT-101 and Televideo Systems, Inc. Televideo 970.

The Solaris 1000 is said to provide concurrent operation of host and personal computer applications, a multiwindowing feature for viewing host and Personal Computer functions simultaneously and bidirectional file transfer using Microsoft Corp. MS-DOS commands or off-the-shelf file transfer software.

The Solaris 1000 plugs into the communications line between the host computer or modem and the terminal. It features a 45-key pad that provides the keys needed to make up an IBM Personal Computer keyboard and Solaris special function keys.

It consists of the keypad and a system unit housing an I/O card with an Intel Corp. 8088-2 microprocessor, two dual-sided, double-density floppy disk drives for 720K bytes of storage, an optional 10M-byte hard disk and internal memory of 128K bytes, expandable to 640K bytes. It also offers four RS-232C I/O ports, a printer port and seven expansion slots.

It can run in full-screen host mode, full-screen Personal Computer mode or split-screen mode, the vendor said. Screen image size reportedly is controlled by grow keys on the Solaris keypad, allowing the user to increase or decrease the size of each window.

Information reportedly can be exchanged between the system and the host computer, with results such as spreadsheet calculations developed on the Solaris-equipped terminal being sent to the host and host data being used by Solaris 1000 programs.

The software includes the real-time and multitasking Solaris Operation System and MS-DOS 2.11.

The Solaris 1000, with 128K bytes of random-access memory and a single floppy disk drive, costs $2,125.

Solaris Computer, 1994 Tarob Court, Milpitas, Calif. 95035.

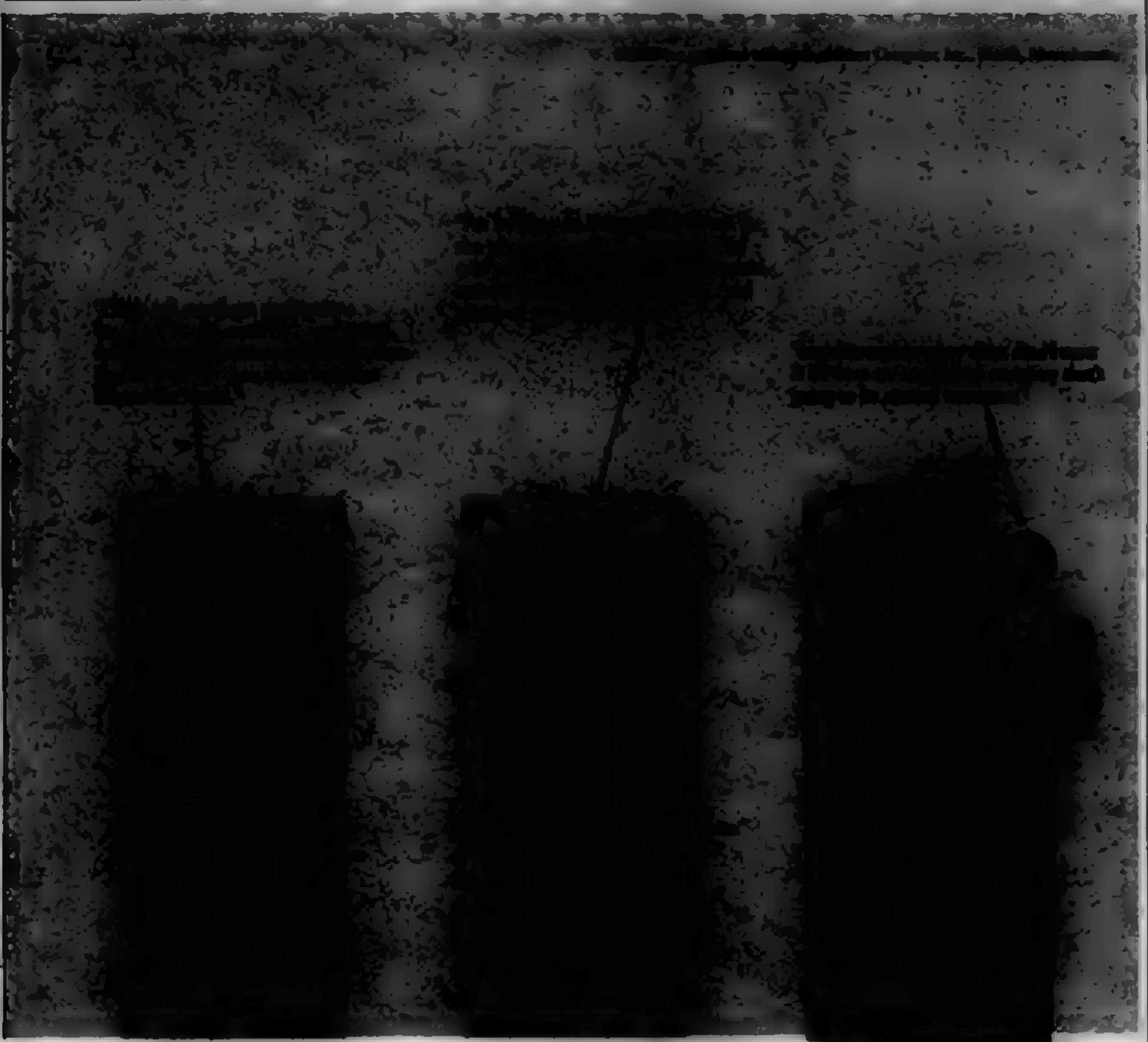
PRINTERS/PLOTTERS

EXTENDED SYSTEMS
Laser Right printer controller

Extended Systems has announced the Laser Right laser printer cluster controller for use with the Hewlett-Packard Co. 2686A Laser Jet printer.

Laser Right is said to allow up to three workstations to share one Laser Jet printer. The controller is said to work with either parallel Centronics Data Computer Corp.-type interfaces or serial RS-232 or RS-422 interfaces. The product also works with Lotus Development Corp.'s 1-2-3 and software for IBM Personal Computers, the vendor said.

Continued on page 111



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ADDS

SYSTEMS & PERIPHERALS

Continued from page 109

Laser Right comes with 128K bytes of buffer memory and can be expanded to 512K bytes. The HP Laser Jet printer prints 300 by 300 dot/in. resolution at up to eight page/min., the company said.

The price for Laser Right is $4,495, the vendor said.

Extended Systems, P.O. Box 4937, 6062 Morris Hill Road, Boise, Idaho 83711.

CALCOMP
Model 1044 plotter

Calcomp has announced the Model 1044 dual-mode pen plotter, featuring eight pens and a plotting capability up to Ansi Size E or International Standards Organization Size AO standards.

The Model 1044 is aimed at mechanical design, architectural, engineering and construction, integrated circuit design, printed circuit board design and mapping applications.

Features include an eight-pen turret said to exchange pens automatically over the plotting surface; an Integrated Communications Interface that allows plotter compatibility with Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M-based systems. Built-in diagnostics are said to run five tests each time the plotter is turned on.

The Model 1044 is said to provide a plotting speed of 14 in./sec, the company said. The plotter offers three interfaces — RS-232, RS-449 and IEEE-488. It is scheduled to be shipped in December. The price for the 1044 is $11,995, the vendor said.

Calcomp, 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

MOHAWK DATA SCIENCES CORP.
MDC 160, 200 series printers

Mohawk Data Sciences Corp. has announced two MDS 160 printers and one MDS 200 series printer for use with the MDS Hero Intelligent Workstation and the company's Super 21 communications processor.

The 160 series printers are dot matrix printers and the 200 series models are correspondence-quality printers. The 160 series, featuring 80- and 156-col. models, is intended to print drafts, near-letter-quality text, graphics and reports. The 156-col. model is said to be suited for spreadsheet applications such as Microsoft Corp.'s Multiplan and MDS' Plan 21. Both 160 series printers print bidirectionally at 160 char./sec for drafts and 27 char./sec for business correspondence.

The price of the 80-col. printer is $995, and the 156-col. printer costs $1,295, the vendor said.

The 200 series operates at 200 char./sec for draft quality and 50 char./sec for letter quality. The price of the 200 series printer is $3,495.

Mohawk Data Sciences, Seven Century Drive, Parsippany, N.J. 07054.

POWER SUPPLIES

CLARY CORP.
UPSjr.

Clary Corp. has announced a series of on-line uninterruptible power supplies called UPSjr., intended for supermicrocomputers, minicomputers and local-area networks.

The Clary UPSjr. is available in 750-VA, 1.25-kVA and 2.5-kVA ratings. The cabinet measures 33.5-in. high by 17.4-in. wide by 20-in. deep.

Prices for the UPSjr. start at $3,495, the vendor said.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776.

BOARD-LEVEL DEVICES

INTERCONTINENTAL MICRO SYSTEMS
WS80X

Intercontinental Micro Systems has announced a board that converts a dumb terminal into an intelligent independent workstation.

The WS80X board has 128K bytes of random access memory, a Zilog, Inc. Z80 microprocessor operating at 4 MHz or 6 MHz, two serial ports, one parallel port and an Datapoint Corp. Arcnet interface.

According to the company, the parallel port allows the WS80X to act as an independent processor. Shugart Associates Standard Interface and Small Computer Systems Interface permit peripheral additions such as floppy drives, hard disks, removable cartridge drives or streaming tape drive backup.

Intercontinental's Micronet network architecture and subsystems allow the WS80X to interface with 8- and 16-bit processors.

Cost of the 4-MHz board is $995; the 6-MHz board is $1,045.

Intercontinental Micro Systems, 4015 Leaverton Court, Anaheim, Calif. 92807.

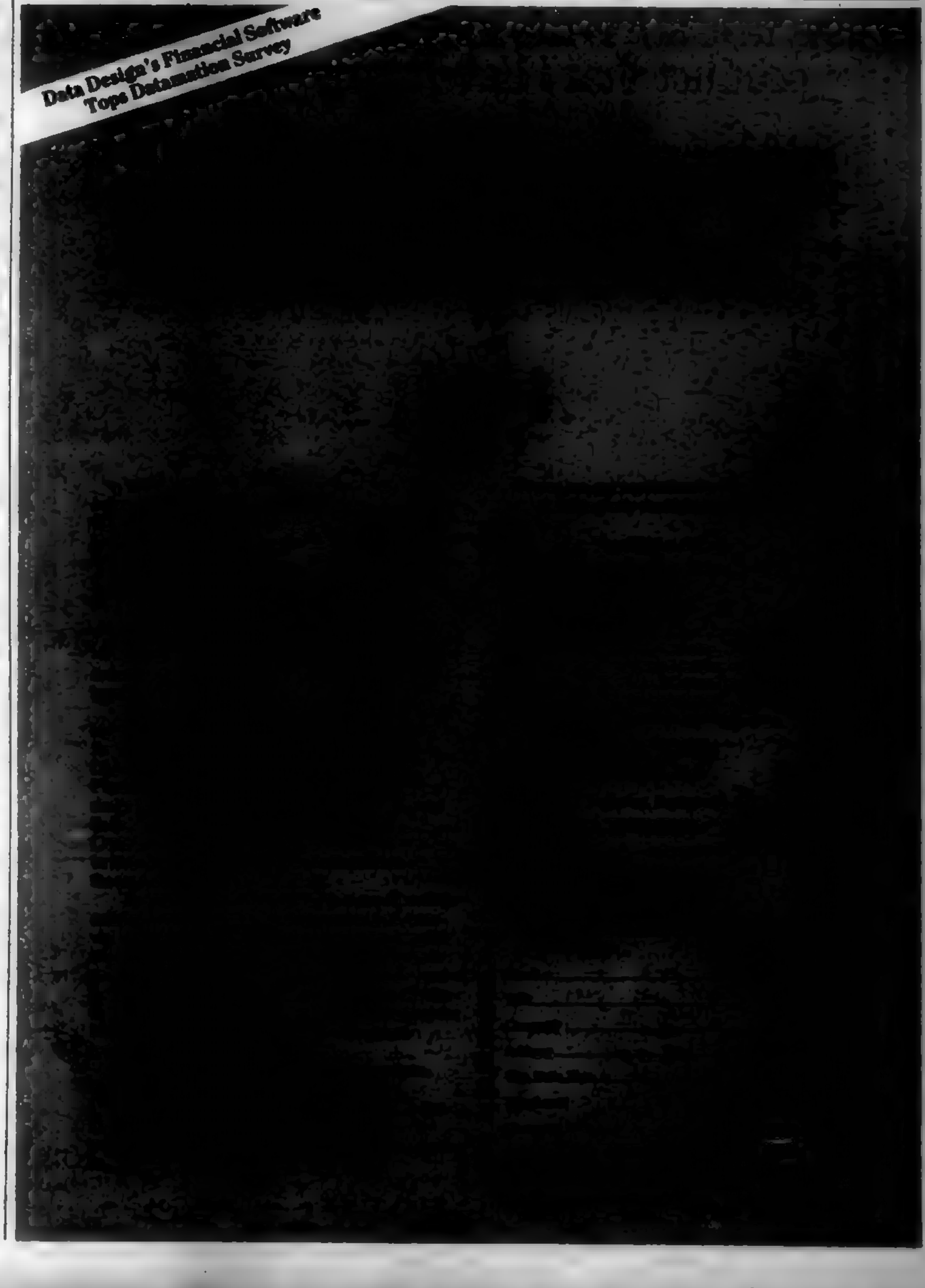
ABLE COMPUTER CO.
Microverter; Microverter Plus

Able Computer Co. has announced two bus converters designed to increase the performance of Digital Equipment Corp. PDP-11 minicomputers.

The Microverter is said to be a quad-width card that plugs into a PDP-11's Q-bus backplane and addresses up to 4M bytes of Q-bus memory while driving 19 DEC Unibus loads.

The Microverter Plus consists of a modified Unibus backplane, voltage regulator and Microverter board. When coupled with a DEC PDP-11/73 or PDP-11/73+, it can transform an older processor into a higher speed Unibus system, according to the vendor.

Continued on page 112



Continued from page 111

The products are said to be compatible with current versions of DEC RSTS/E and RSX-11.

Scheduled for October shipments, the Microverter costs $2,300, and the Microverter Plus costs $3,575, the vendor said.

Able Computer, 1732 Reynolds Ave., Irvine, Calif. 92714.

HOUSTON COMPUTER SERVICES, INC.
MCPU/300

Houston Computer Services, Inc. has introduced the MCPU/300 interface board, said to allow Texas Instruments, Inc.'s Business System 300 to expand its support from seven CRTs and/or printers to 15.

The MCPU/300, an updated version of the firm's MCPU/8 front-end processor, is said to allow up to 12 RS-232 devices to connect directly to the interface card.

The product, which incorporates both hardware and software, acts as a front-end processor for the System 300's CPU.

The MCPU/300 is available in either a 12- or six-channel version and consists of the company's 16-bit microprocessors, 32K bytes or 64K bytes of memory and RS-232C interfaces. Using the software supplied with the board, the System 300 can be connected to most Ascii CRT terminals and personal computers, the company said.

The price for an MCPU/300 is $2,750, according to a vendor spokesman.

Houston Computer Services, Building C, Suite 101, 11221 Richmond Ave., Houston, Texas 77082.

MACROLINK
Macro-3 disk controller

Macrolink has announced the Macro-3 disk controller, said to be compatible with Perkin-Elmer Corp.'s 3200 series of superminicomputers.

The single-board module is said to offer simultaneous emulation of PE's Intelligent Disk Controller and older Mass Storage Module disk system. PE users previously had to buy two different disk controllers to read both formats, the vendor said.

All drive configurations are supported in microcode by a single set of erasable programmable read-only memory devices, according to the company.

The price for the Macro-3 is $3,475.

Macrolink, 1150 E. Stanford Court, Anaheim, Calif. 92805.

MOSTEK CORP.
MK75702 board

Mostek Corp. has announced a 1M-byte dynamic random-access memory VMEbus-compatible board, the MK75702, that features a long-word cache with typical read access time of 135 nsec on a cache hit and 300 nsec on a cache miss rate.

The product is available with or without parity generation and checking and is capable of 8-, 16- or 32-bit data transfers, the company said. Additional features include 23-bit address, programmable starting address and access and status LED indicators.

The price of the MK75702 board is $3,500, the company said.

Mostek, 1215 W. Crosby Road, Carrollton, Texas 75006.

See BOARDS page 114

EasyPROCLIB is the most stable, error-free product that I have in my system.*

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And consider what these solutions will do for you and the people who use your system.

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If you're in charge of your data center's procedure library, EasyPROCLIB works for you by taking the responsibility for maintaining, controlling and repairing the system PROCLIBs off your shoulders, freeing up time to get other work done.

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And data center management likes EasyPROCLIB because it increases overall productivity, and if a user crashes his private library, it doesn't affect the system or other users. An EasyPROCLIB diagnostic message notifies the user, and he is responsible for repairing or restoring it.

"What would I do if they told me I had to give up EasyPROCLIB? I'd fight them!"*

There's no limit to the number of procedure libraries that may be established with EasyPROCLIB. There can be a private procedure library for each department, each development group, each programmer—for as many different divisions as you need. This means that you don't have to worry about deciding whether a procedure should be included in the installation's procedure library—and users don't have to try to accomplish specific applications using less efficient general purpose procedures.

Because EasyPROCLIB is completely transparent, many users don't know that they have it. But the data center management and staff know—because it simplifies their job, cutting down housekeeping time and giving them more time to manage. Since it was introduced six years ago, EasyPROCLIB has been installed at hundreds of IBM sites, and wherever it's been installed, it's still in use.

"We'll give you thirty days to see what EasyPROCLIB can do for you. Free!"**

You can try EasyPROCLIB in your own facility for thirty days on us. Installation takes about an hour of system programmer time and fifteen minutes of machine time.

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Software Corporation of America

*Comments from interviews with EasyPROCLIB users.
**Comment from Software Corporation of America.
EasyPROCLIB (for IBM, MVS/XA, MVS, SVS, VS1, MVT)

FINANCE

from page 107

storage capacity of 1.5M bytes and a minimum capacity of 512K bytes. Performance improvement over the Model 2 is provided by expanded main memory and hardware error correction. The Model 2 can be upgraded to the Model 3 in the field, IBM said.

Shipment of field conversion kits is scheduled for March, and shipment of new units is scheduled for August 1985. The price for the Model 3 with 512K bytes main memory is $15,370, IBM said. The charge to convert from the Model 2 with 192K bytes of memory to the Model 3 with 512K bytes of memory is $5,075, IBM said.

The enhanced 4700 Finance Communication System Controller Data Support provides disk/diskette enhancements that include the ability to update the header label of a keyed data set and to do so by any station when the data set is closed. The local configuration facility has been enhanced to support the Model 3 controller and the Systems Network Architecture feature on the 4701 Models 2 and 3, IBM said.

Enhancements for system start-up include loading of optional modules that are optimized for more efficient storage and selective elimination of loading of one or more optional modules at initialization, IBM said. They are included in the Model 3 price.

More information may be obtained from IBM, 900 King St., Rye Brook, N.Y. 10573.

ALPHA

from page 107

1000X, which features 128K bytes of main memory, ranges from $12,165 to $15,985, the company said. Backup configurations offered include the company's videocassette recorder (VCR) backup, a combination VCR and floppy disk backup or a VCR combined with a 40M-byte streaming cartridge tape.

Alpha Microsystems also announced a 55M-byte Winchester disk storage subsystem for use with the AM-1000X desktop. The price of the subsystem is $5,985.

Prices for the AM-1000E systems are now $9,665 for systems with the VCR backup, $10,835 for the VCR and floppy disk backup and $12,835 for the VCR and 40M-byte streaming tape backup, the company said.

Alpha Microsystems is located at 17332 Von Karman Ave., Irvine, Calif. 92714.

Introducing the Kodak WHIZ KIDS

New Kodak IMT-250 microimage terminal

New Kodak Reliant 2000 microfilmer

The smartest and fastest microfilmer and retrieval terminal Kodak has ever made.

Inside the new Kodak Reliant intelligent microfilmer 2000 and the IMT-250 microimage terminal lie the brains of powerful microprocessors.

Taking instructions from software programmed to match your operation, they automate most of the functions once performed manually by an operator.

They monitor themselves continuously. Communicate with each other. The Whiz Kids even stop if something goes wrong, and tell the operator—in plain English—what went wrong and how to correct it.

They allow more detailed coding than ever before offered by Kodak, retrieve faster and more accurately than ever before.

Since this new image recording device and new retrieval terminal are compatible with future systems, they won't become obsolete.

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BOARDS

from page 112

ANDROMEDIA SYSTEMS, INC.

MM11 board for DEC Q-bus

Andromedia Systems, Inc. has introduced a memory board for the Digital Equipment Corp. Q-bus.

Compatible with DEC's LSI-11/23, 11/73 and Microvax I processors, the MM11 is a dual-width module that has a typical access time of 30 nsec in the block transfer mode, the company said. The MM11 is compatible with both 256K- and 64K-byte random-access memory chips.

The MM11 includes user-programmable jumpers for 22- or 18-bit addressing, 16- or 256-word block-mode capability and standard or optional control status register address, the company said.

The price of the MM11 with 512K-byte capacity is $1,295, the vendor said.

Andromeda Systems, 9000 Eton Ave., Canoga Park, Calif. 91304.

CLEARPOINT, INC.

Q-COM-BO card

Clearpoint, Inc. has announced the Q-COM-BO card that combines 1M byte of memory, two serial lines and 128K bytes of erasable programmable read-only memory on a dual-height card.

The Q-COM-BO is said to offer the same functionality of Digital Equipment Corp.'s MXV11-B with eight times the memory, block-mode direct memory access, on-board control status register for full parity support and a 90-nsec access time.

The card has two 28-pin universal sockets, giving it the capacity to achieve up to 64K bytes of progammable read-only memory and allowing users to configure DEC PDP-11/23 or PDP-11/73 minicomputers with three dual slots.

The single-quantity price ranges from $1,295 to $3,195, depending on configuration, the vendor said.

Clearpoint, 106 South St., Hopkinton, Mass. 01748.

AUXILIARY EQUIPMENT

PITNEY BOWES, INC.

8100 facsimile machine

Pitney Bowes, Inc. has announced the 8100 facsimile machine, said to be capable of transmitting copy at a speed of 20 sec/page with a 9.6K bit/sec modem.

Standard features of the machine, which weighs 22 lb, include automatic contrast control, a 40-line activity journal and turnaround polling, the vendor said. The product's document feeder is said to be capable of stacking up to 30 pages.

An RS-232C attachment, allowing the machine to receive telex messages or act as a remote printer from personal computers, is optional.

The price of the 8100 is approximatley $4,000, the vendor said.

Pitney Bowes, 163 Crosby St., Stamford, Conn. 06926.

WILSON LABORATORIES, INC.

Floppy Drive Test Station

Wilson Laboratories, Inc. has announced the Floppy Drive Test Station, or FTS-500, said to accommodate four 5¼- or 3-in. floppy drives for testing and calibration.

FTS-500, when combined with the company's MFX-500 Floppy Drive Analyze, is said to provide all mechanical and electronic test functions and calibration measurements with a minimal requirement for an oscilloscope.

Tests include read margins, full step, write data and read data. Calibration operations include head radi-

Continued on page 116

MICROS

from page 107

Features of the 932 supermicro include a maximum of six 512K-byte random-access memory (RAM) boards, a 20M-byte cartridge tape and maximum unformatted disk storage of 572M bytes. The system supports up to four disk drives, serial and parallel printer ports and an IEEE 488 interface bus.

Models 1620 and 1624 are based on the Motorola, Inc. 68010 microprocessor and feature hardware-assisted demand paging, a 2K-byte cache and 1M byte of RAM.

The price for Model 1620 with Unix, a 52M-byte hard disk and support for six users is $16,675, the company said. The price for Model 1624 with Unix, a 143M-byte hard disk and support for 16 users is $22,435, the company said.

The price for Model 1610, which is based on the Motorola 68000 microprocessor and can support up to six users in a configuration with Unix and a 52M-byte disk, is $12,930, the company said. The 1600 series also supports the Pick operating system and up to 26 users, the vendor said.

The Models 20P and 30P, which both incorporate the Pick operating system, are based on the Motorola 68000 microprocessor and feature a 20M-byte cartridge tape, 52M bytes of unformatted disk storage, storage capacity to 572M bytes, serial and parallel printer ports and an IEEE 488 interface bus. Each model supports up to 26 users, the vendor said.

The price for Model 20P, with a 512K-byte main memory and support for up to six users, is $12,005, the vendor said. The price for Model 30P, with 1M byte of main memory and support for up to 16 users, is $14,380, the vendor said.

The price for the Elite 60 purchased separately is $1,095, and for the Elite 90, $1,045, the company said.

More information may be obtained from Datamedia, 491 Amherst St., Nashua, N.H. 03063.

"We can't afford to lose data! That's why we bought insurance... Data Check Recovery."

Marv Harop
Systems Programmer
CADAM Inc.,
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"Before we got Data Check Recovery, we more or less threw up our hands in desperation when we had an I/O error–all that pack analyzing, reinitialization, restoring. It all takes time; it's cumbersome.

"Since we installed Data Check Recovery, I've cut down the amount of time I spend on those problems.

"Historically, we've had quite a few problems with data checks on the 3380 packs we use on our MVS system. And as a software R&D firm, being able to get at the latest version of our software is critical to us; having to devote programmer time to correcting DASD errors is wasteful.

"So we bought Data Check Recovery as an insurance policy. And it's paid off.

"For instance, one morning the SYSLOG data set indicated data checks had occurred during the nightly backup of the packs. All I had to do was take the information from the error message and plug those parameters into the DCR procedures–and what could have been a permanent disaster became a very minor inconvenience.

"Data Check Recovery is so easy to run that operations will soon run it themselves, without having to check with the systems group.

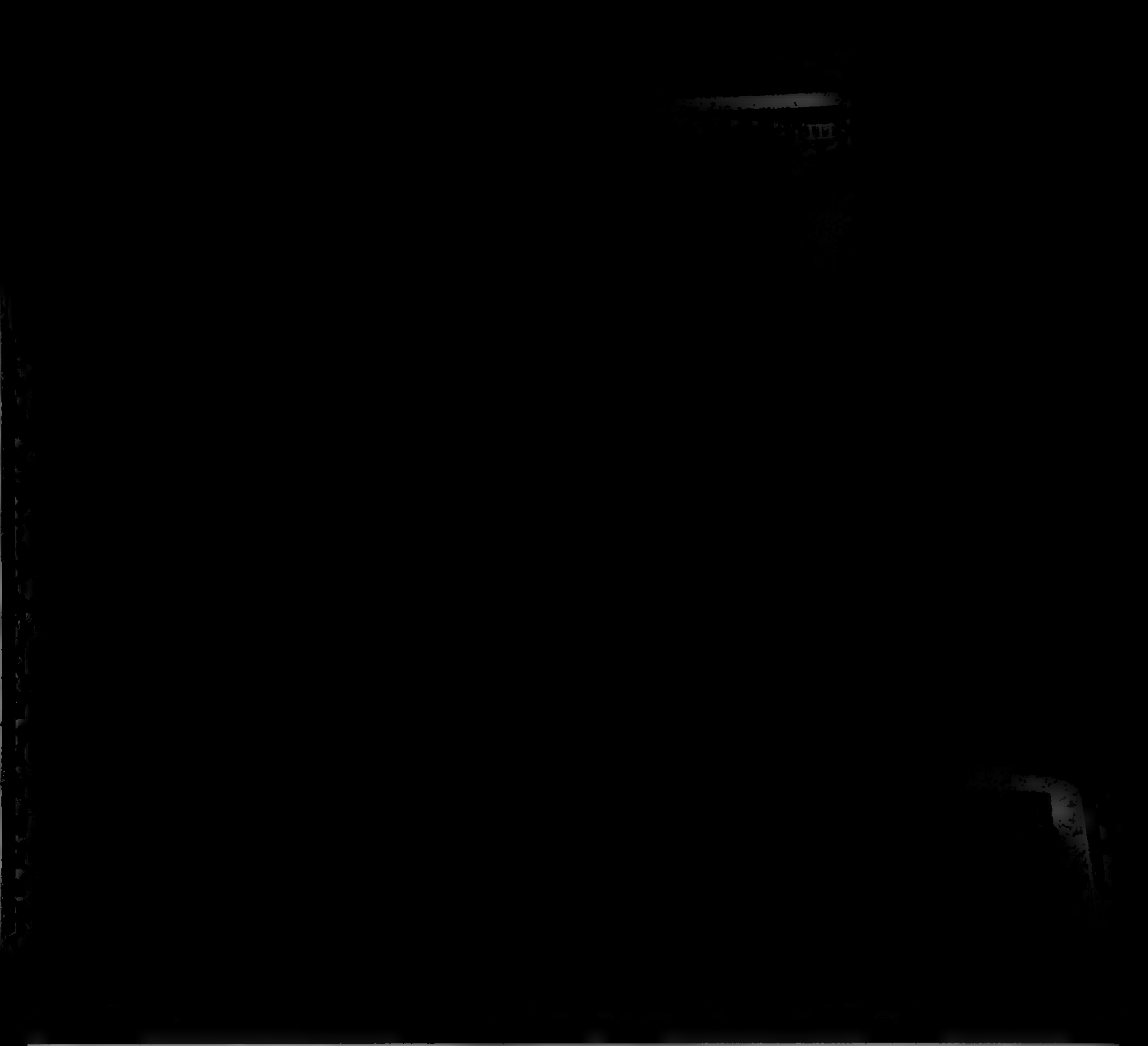
"DCR is our first line of defense against disk I/O errors. And it just keeps paying for itself!"

Data Check Recovery is a powerful, dependable utility that recovers data that has become unreadable due to permanent I/O errors–hard data checks, track overruns and several types of equipment checks. Data Check Recovery supports all OS operating systems.

For more information about how DCR can keep permanent I/O errors from turning into permanent disasters, call Software Corporation of America toll-free at 800/368-7638. In Virginia, call 703/471-1545.

455 Carlisle Drive
Herndon, VA 22070
(703) 471-1545

Software Corporation of America



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IT HAS THE FUNCTIONS YOU WANT TODAY, THE FLEXIBILITY YOU'LL NEED TOMORROW.

When it comes to extended functions, our new 9236 display has everything.

For instance, it gives you dual logical units that let you change applications with a single keystroke.

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It offers the ergonomic benefits of a non-glare matte finish. A compact, low-profile keyboard. And a flicker-free, high-resolution, 14-inch screen that tilts and swivels.

On top of all this, our 9236 gives you extended data stream and programmed symbols for color graphics. Plus a long list of exclusive ITT productivity features, like automated keystrokes, built-in notepad, dynamic color assignment, and auto log off/power off.

But perhaps the most important thing we've built into our 9236 is a flexible, open architecture. The kind of architecture that'll take you into networking, the electronic office, or wherever else you want to grow.

Of course it wasn't easy designing in all this and keeping the 9236's price competitive, too.

But, then again, giving you more display for your money has always been what ITT Courier is all about.

For more information, contact your nearest ITT Courier Representative. Or call the ITT Courier Sales Support Dept. at 1-800-528-1400, toll-free.

ITT
COURIER

Continued from page 114

al alignment, head amplitude test, drive speed adjustment, index-to-data alignment, write protect switch and track-zero sensor adjustment.

The price for the FTS-500 is $1,495, the company said.

Wilson Laboratories, 2237 N. Batavia St., Orange, Calif. 92665.

COMPUTER SECURITY SYSTEMS, INC.
Arbiter

Computer Security Systems, Inc. has announced the Arbiter random data encryption and terminal authentication system, said to employ patented hardware circuitry to encrypt and decrypt data transmissions.

Arbiter is a self-contained peripheral that reportedly works simultaneously in real time with data entry. It is said to require no software programs, key locks, password, magnetic cards or other accessories.

One Arbiter is connected to the host computer or CPU, and another to a remote terminal. The telephone connection of any unauthorized transmission is automatically broken. Anyone attempting to eavesdrop on a transmission receives random encryption in a scrambled pattern.

The single-unit price for one Arbiter is $4,000; at least a pair is required for operation, the firm said.

Computer Security Systems, Suite 1C07, One Huntington Quad, Melville, N.Y. 11747.

ANALOGIC CORP.
Ands 5600

Analogic Corp. has announced the Ands 5600 distributed data acquisition system (DAS), an enhancement of the Ands 5400 DAS for use with Digital Equipment Corp.'s Q-bus and Hewlett-Packard Co.'s direct memory access interfaces.

The 5600 is said to cut the burden on the host computer. Two fiber-optic cables provide a 2-MHz serial link at up to 2,000 feet between sites.

Typical applications for the 5600 include fossil and nuclear power plant monitoring, pipe vibration analysis and aircraft R&D.

The price for a basic Ands 5600 is $6,890, the company said.

Analogic, 8 Centennial Drive, Centennial Industrial Park, Peabody, Mass. 01961.

SUN from page 107

disks of a Sun-2/120 or Sun-2/170 file server, the company said.

The price of a Sun-2/50 with 1M byte of memory is $9,900, the vendor said.

The Sun-2/160 has a 19-in. screen with 1,152- by 900-pixel resolution and noninterlaced display. Eight color planes are said to be capable of simultaneously showing 256 colors selected from a palette of 16 million. The 2/160 is also capable of accessing up to 16M bytes of virtual memory per process, the vendor said.

The 2/160 can operate either as a stand-alone workstation or in a local-area network with other Sun workstations and other vendors' equipment, according to the company. A 12-slot card cage and VME bus reportedly allow the 2/160 to be customized. Sun also provides an Intel Corp. Multibus-to-VME adapter board.

The 2/160 can be configured with mass storage options from 71M bytes to 380M bytes of formatted capacity, the company said. Both ¼-in. streaming cartridge and and ½-in. tapes are available for backup, and a hardware floating-point accelerator option is available for computer-intensive tasks.

The price for a Sun-2/160 with 1M byte of main memory is $32,900.

The Network File System reportedly supports transparent networkwide read and write access to directories and files. Sun is publishing the file system and supporting protocol specifications, which the vendor said are hardware- and operating system-independent.

Sun Microsystems is located at 2550 Garcia Ave., Mountain View, Calif. 94043.

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IBM

from page 107

while IBM has announced that the Model CX will be field upgradable, those field upgrade kits will not be available until 1986 — a prospect that may be distasteful to users expecting rapid growth. For that reason, Greco speculated, some users may choose the larger 3083 Model EX processor. Upgrade packages for that processor are currently available.

The Model CX announcement gives users a hint that the 3080 line may remain a viable product when the so-called Sierra line of mainframes is announced.

The 3083 CX "was an IBM-selfish announcement," noted Ken Harvey, president of Computer Systems Planning by Ken Harvey, Inc. in Toronto. Harvey noted that the Model CX may reflect an ongoing struggle between internal IBM development groups.

Since IBM funds many internal development projects, there is often a political power play to move development projects out to users as products.

While not a strategic product for IBM, the Yankee Group's Gens said, the 3083 CX also made a political statement to users. Gens noted that there has been a concern building among 3080 series users that they may be left out in the cold by IBM's rumored announcement of a new line of high-end processors.

The Model CX announcement, Gens said, gives users a hint that the 3080 line may remain a viable product when the so-called Sierra line of mainframes is announced. Since the Model CX appears to be simply a scaled-down version of other 3080 machines, Gens noted, offering the product does not really increase IBM's costs.

While the sweeping Oct. 25 product announcement did not contain any major hardware enhancements to IBM's System/36 small business system, the unit may have undergone a significant transformation as a result of several software announcements. By giving the System/36 the capability to act as a controller for IBM microcomputers, IBM appears to have made a major switch in emphasis in its distributed processing strategy, noted IDC's Hank Jenson. Since 1979, IBM has offered the 8100 as its showcase distributed data processing (DDP) system. Now IBM appears to have bestowed the System/36 with the top DDP title, Jenson said.

"The 8100 has at least four broken legs and should be shot," Harvey said, noting that the unit has never been one of IBM's more successful products.

But IDC's Jenson said that while he believes IBM has switched its DDP focus to the more popular, less expensive System/36, IBM will not abandon 8100 users. Jenson noted that the 8100 still appears to be IBM's best offering in a Systems Network Architecture loop environment.

William Ackerman, president of DPX, Inc., a Cupertino, Calif., software development and consulting firm for 8100 users, said the System/36 will share a dual role in the IBM DDP picture with the 8100. Ackerman stressed IBM also made several software and hardware enhancements to the 8100 as part of the Oct. 25 announcement, which indicates the company is not about to abandon the 8100 system.

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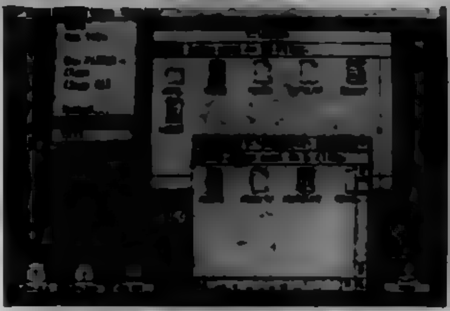
MICROCOMPUTERS

GEM user interface bows

Tool eases interaction for nontechnical users

By Eric Bender
CW Staff

MONTEREY, Calif. — Digital Research, Inc. has announced the Graphics Environment Manager (GEM) software family, designed to bring a common graphics-oriented user interface to personal computers based on the Intel Corp. 8086 family of microprocessors running Microsoft Corp.'s MS-DOS operating system.



Graphics Environment Manager application

GEM, an operating system extension, will offer an easy-to-use interface for MS-DOS applications similar to the access provided by Apple Computer, Inc.'s Macintosh, Digital Research officials said. "Because people find it easier to interact with a computer in a visual manner, GEM will effectively open up the personal computer market" to those who do not want to learn complicated commands, claimed company President John Rowley.

Acting as an application programming interface, GEM is said to supply overlapping windows, data interchange facilities, graphics device support, pull-down menus, icons and support for pointing devices such as a mouse. The software will be offered to OEMs in the first quarter of 1985.

GEM software reportedly can run on any MS-DOS-based or Digital Research Concurrent DOS-based machine "once the small amount of software code that controls the graphics screen display and pointing device has been written." Because of this, independent software vendors can write one version of their programs that can be quickly ported to other machines, the vendor said. In some cases, GEM software written for one system, such as the IBM Personal Computer, will run without modification on other microcomputers, Digital Research said.

As one Digital Research executive said, GEM initially is being released as a single-tasking package because with four graphics applications running at once, Intel 8088-based computers "just don't give you enough horsepower." Software hooks have been built into GEM to allow multi-

See GEM page 134

Two Wordstar packages out from Micropro

By Kathleen Sullivan
CW West Coast Bureau

SAN RAFAEL, Calif. — Micropro International Corp., which launched word processing on personal computers five years ago with Wordstar, unveiled two successors to its flagship product on Oct. 31.

Wordstar 2000 and Wordstar 2000 Plus reportedly feature mnemonic commands (for example, pressing "C" to copy), simplified menus, an UNDO command, context-sensitive on-screen Help and user-definable function keys. In addition, the Wordstar 2000 family is said to include:

■ Format sheets. Users can choose from a variety of preformatted page styles or create their own styles, eliminating the need to reset tab and margin settings continually or retype frequently used headings.

■ Keystroke glossary. Users can store text or a series of commonly used commands and retrieve the information or execute the command with a single keystroke.

■ Windows. Users can move text among

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■ Microsoft Corp. announces Basic Version 2.0 for the Apple Computer, Inc. Macintosh/120

■ Thoughtware, Inc. launches Trigger decision-modeling software/120

■ Softbridge Microsystems Corp. unveils an integrated package for personal financial planning/120

■ Altos Computer Systems introduces a network package connecting IBM Personal Computers to Altos multiuser systems, along with a Xenix integrated office automation package/121

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October offensive advances Big Blue's office strategy

By Eric Bender
CW Staff

On the Personal Computer side of IBM's recent barrage of product introductions [CW, Oct. 29], most industry observers gave strongly favorable reviews to the new Office System Family links to larger IBM machines, but downplayed the importance of enhancements to the 3270 Personal Computer and Personal Computer/370 families.

At the time of the announcement, Joseph Guglielmi, vice-president for general and office systems marketing for IBM's National Accounts Division, claimed the new offerings would "integrate the Personal Computer family fully into IBM's office system strategy."

Industry analysts generally commented that the introductions would move IBM a significant distance toward that goal. In particular, most also agreed with Guglielmi that the Office System software gives the System/36 new potential to act as a departmental computer, connecting various Personal Computer family members or other workstations.

The new software "significantly enhances the ability of the System/36 to act as a [Personal Computer] cluster," Guglielmi said. "You can have eight virtual [Personal Computer] disks on the System/36, each with up to 32M bytes. You can get printing and file server capabilities; you can download and upload files."

IBM now gives customers multiple solutions for tying together Personal Computers, with the new PC Network positioned at "a stage preliminary to a full departmental processor," commented George Weiss of Quantum Science Corp. in New

See BLUE page 134

Utilizing micros can pay off for managers

MICRO BITS
Thomas Madron

One of the most pressing questions of the microcomputer era is, "Are managers and other professionals too stubborn to adapt to new technology?"

The answer given by software manufacturers, infatuated with mouses, pointing and other techniques to reduce the use of the keyboard, is an emphatic "yes."

But a more pointed question is whether organizations can afford old and unproductive modes of work when better ones are available.

The answer to this question may decide the fate of an entire generation of professional managers. Will they learn new techniques or be superseded by those who will adapt?

When managers and other professionals confront the microcomputer effectively, their work habits change drastically and productivity improves.

But how can one measure this improvement?

Productivity itself is a term better described than defined. In a broad sense, if a microcomputer allows us to do more work in a certain time or cuts the time needed to complete a task or provides information not previously available, then productivity has been improved. Productivity can be measured when new tools allow a job to be accomplished by fewer people or enable a set number of people to accomplish more jobs.

It is incumbent that managers and other professionals improve productivity. The frequently heard cry "My time is worth more than my secretary's time" ignores the fact that the old methods simply have longer throughput — it is

See ADAPT page 133

Madron is manager of computer services at North Texas State University, Denton, Texas.

Add-ons announced for Compaq Deskpros

HOUSTON — Compaq Computer Corp. has introduced 30M- and 10M-byte fixed disk storage units and an Intel Corp. 8087-2 coprocessor as options for its Deskpro family of IBM Personal Computer-compatible systems.

The 30M-byte fixed drive, offered as an option in place of the Deskpro Model 3's standard 10M-byte internal fixed drive, is said to be useful for handling large data bases, local-area networking and departmental accounting. The 10M-byte fixed disk drive is being offered as an external unit that would reportedly double the standard 10M-byte storage capacity of the Deskpro Model 3.

The 8087-2 coprocessor reportedly operates at 8 MHz and offers faster processing of calculation-intensive applications, such as those in engineering, science, financial analysis and forecasting. The standard 8087 processor operates at a speed of 4.7 MHz.

The 30M-byte fixed disk drive is priced at $2,995. The 10M-byte fixed disk drive costs $1,695. The 8087-2 coprocessor option is priced at $375.

Compaq Computer is located at 12330 Perry Road, Houston, Texas 77070.

Trigger bolsters management decision making

COCONUT GROVE, Fla. — Thoughtware, Inc. has introduced software that reportedly helps managers to focus on the most profitable areas of their operations.

Thoughtware's Trigger software is said to incorporate an expert system for management decision making, allowing managers to monitor key performance areas, to identify exceptions to performance guidelines and to issue memos regarding the problem and its solution. Thoughtware "becomes an expert system as you accumulate a knowledge base" within the software, explained Thoughtware spokeswoman Angie Niehoff.

Trigger reportedly can be used to set guidelines for measuring operations in terms of dollars, percentages, time, behaviors, actions and volume. It can also aid in determining sales quotas, staffing levels, retail sales by type, customer service effectiveness and project management control.

Trigger is priced at $495 and operates on the IBM Personal Computer and compatible systems with a minimum of 128K bytes of memory, dual disk drives and a printer.

Thoughtware is located at 2699 S. Bayshore Drive, Coconut Grove, Fla. 33133.

Microsoft adds Basic 2.0 for Macintosh

BELLEVUE, Wash. — Microsoft Corp. has announced Version 2.0 of its Basic programming language for Apple Computer, Inc.'s Macintosh microcomputer.

Version 2.0 can access various features of the Macintosh, including the mouse, pull-down menus, multiple windows and dialog boxes, buttons, sound effects and music, graphics and Quickdraw routines for font, text and cursor support, Microsoft said.

Programs can be customized to incorporate Macintosh-style features, the vendor said. Basic programs can include user-defined pull-down menus and specify the size, type and location of windows. Interactive devices like buttons and edit fields can be used to construct dialog and alert boxes, according to the vendor. The mouse function reads the horizontal and vertical position of the mouse pointer and the status of the mouse button.

Programs reportedly can be edited directly in the window with the standard Macintosh CUT, PASTE and COPY commands. A second program-listing window can be displayed, which makes it possible to view or edit separate parts of a program simultaneously, Microsoft said.

Search menu

A search menu reportedly provides options to find and replace program text. The user can search for specific text, a label or the current position of the editing cursor. Selected text reportedly can be replaced for a single occurrence or throughout the entire program.

The suggested retail price for Microsoft's Basic 2.0 is $150. Upgrades for current owners are available .

More information is available from Microsoft, Box 97200, 10700 Northup Way, Bellevue, Wash. 98009.

Softbridge Microsystems' financial planner debuts

CAMBRIDGE, Mass.— Softbridge Microsystems Corp. has unveiled Softbridge Financial Planner, an integrated package for personal financial planners that analyzes financial information, creates customized client plans and manages the planner's practice.

The system is divided into two areas, financial planning and practice management. A user interface featuring windows based on menus and forms reportedly is built into the system. A Rules-of-Thumb feature advises the planner on the client's financial condition by testing the planner's established criteria and by testing more than 50 rules that planners typically apply, all of which the planner can customize, according to the vendor. The Softbridge Customizer reportedly gives the planner tools to custom-tailor the system.

The Softbridge Integrator is said to allow planners to move from one productivity tool or task to another with keystrokes.

The Softbridge Financial Planner runs on the IBM Personal Computer XT and Personal Computer AT with IBM's PC/DOS operating system, a hard disk and 512K bytes of random-access memory.

Softbridge offers its system in several configurations: software only for $4,500; software and a streaming tape drive for $5,500; software, hard disk and streaming tape unit for $7,000; or full system with a personal computer for $11,000. A semiannual rate of $600 covers all product enhancements, new tax laws and other content updates, a newsletter and technical assistance. The system will be available in January 1985.

Softbridge Microsystems is located at 186 Alewife Brook Pkwy., Cambridge, Mass. 02138.

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Altos software links IBM micro to Xenix-based net

SAN JOSE, Calif. — In a flurry of announcements late last month, Altos Computer Systems, Inc. introduced a communications product tying IBM Personal Computers to the company's Microsoft Corp. Xenix-based network, an integrated office automation software package, a four-user system and graphics software for the Altos 186 workstation.

The new PC Path "is the industry's first communications product that ties Personal Computers and compatibles running [IBM's] PC-DOS to a Xenix-based network," said Phil White, senior vice-president of marketing. PC Path is said to allow Personal Computers and compatible machines to share disks and printers on Altos's 800K-bit/sec Worknet interface board.

IBM micros also can store files locally on Altos server units and spool printouts to shared network printers, Altos said. Users can access multiuser Xenix applications (including 3780 bisynchronous, Systems Network Architecture and X.25 communication gateways) directly from the Personal Computer, according to White. PC Path consists of a Worknet interface board and software and is priced at $395.

Altos Office Executive is a multiwindow, multiuser integrated package that combines word processing, spreadsheet, data base and electronic mail applications. The product "is the first integrated office automation product to combine proven productivity tools into one integrated package in an [AT&T] Unix environment," said product manager Sandra Caldwell.

The package features Redwood Software's Uniplex word processing program, Microsoft's Multiplan, Relational Database Systems, Inc's. File-it! software and a proprietary electronic mail offering. Other features "include enhanced merge capability between applications, on-line Help facilities and instant-view menus of the four application areas and choices within each area," Caldwell said. Altos Office Executive costs $695.

The new Altos 486 is a four-user, Xenix-based system built around an Intel Corp. 80186 operating at 8 MHz. A $6,490 standard configuration includes 512K bytes of random-access memory, 20M-byte hard disk drive, 1M-byte floppy disk drive, Xenix, Altos III terminal, Worknet port, printer port and two additional terminal ports.

The menu-driven Altograf program for the Altos 186 offers printing of graphs on up to three axes simultaneously, display of more than one graph per page and logarithmic scaling, according to the vendor. It costs $295.

Altos is located at 2641 Orchard Pkwy., San Jose, Calif. 95134.

SOFTWARE

LOGITECH, INC.

Modula-2 Runtime Debugger; Release 1.1 Modula 2/86; Modula 2 ROM; utilities package

Software updates and runtime debuggers for the Modula 2/86 base language system are two of several products announced recently by Logitech, Inc.

The Modula-2 Runtime Debugger is an interactive symbolic debugger for programs produced on the IBM Personal Computer by the Modula-2/86 base language Systems 1.1 or Modula-2/VX86 cross-development system. According to the company, it allows programmers to control and examine the execution of Modula-2 programs to find software errors. The Runtime Debugger sells for $250.

Release 1.1 of Modula 2/86 reportedly provides software emulation for the support of real data type operations in addition to Intel Corp. 8087 suppport, as well as Clock and Real-conversions modules. The product is said to improve performance of the compiler, linker and programs by 50%. The product operates under IBM's PC-DOS operating system. The version sells for $75 for registered users, according to the company.

Logitech's Modula-2 Read-Only Memory (ROM) package is said to allow programmers to prepare Modula-2 programs to be burned into ROM and ROM chips to be used in systems without operating systems. The product is priced at $350.

The company's utilities package is an extension of the standard library now available with Modula-2 development systems. Decimals for integer calculations and a decoder that provides assembly language listing of Modula-2 programs are among the utilities included. The package sells for $75.

Logitech, 805 Veterans Blvd., Redwood City, Calif. 94063.

INDIVIDUAL SOFTWARE, INC.

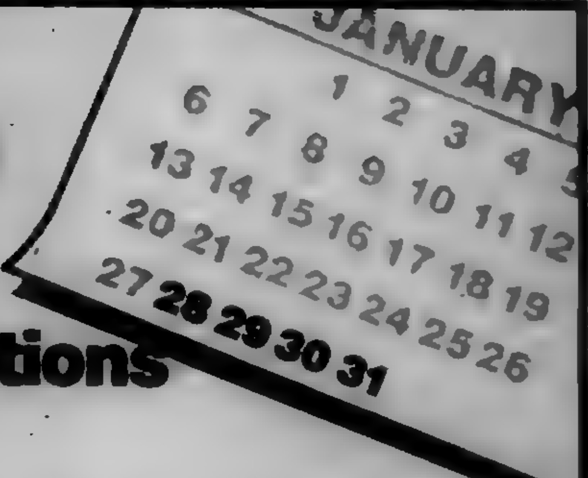
Professor DOS

Individual Software, Inc. has announced a menu-driven tutorial package to train users on IBM's DOS 3 operating system and on the IBM Personal Computer AT's hard disk.

Professor DOS is said to teach users to build an orderly hard disk and to use smart commands and advanced DOS commands such as

Continued on page 122

The four most important days of the new year for telecommunications users!



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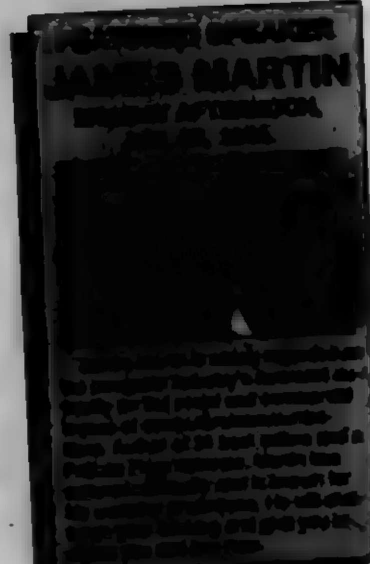

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Continued from page 121

BACKUP and RESTORE.

The product features interactive lessons on batch files, a dictionary of key terms, reference guides and a technical journal covering additional DOS features.

The program reportedly runs under all DOS versions on a minimum of 128K bytes of memory, one double-sided diskette drive and a monochrome or color display.

Professor DOS is priced at $59.95.

Individual Software, 1163-I Chess Drive, Foster City, Calif. 94404.

ANALYTICA CORP.
Reflex

Analytica Corp. has introduced its Reflex data base software for the IBM Personal Computer.

Reflex reportedly aids in the collection and retrieval of information and provides users with analytic capabilities. Under Reflex, information reportedly can be reviewed in a variety of formats, grouped, summarized and studied for trends and deviations.

The product is said to feature pull-down menus, screen windows and Help screens that can be accessed with a keystroke.

Relfex is priced at $495.

Analytica, 3155 Kearney St., Fremont, Calif. 94303.

MICROTEL, INC.
Micro-Talker I

Microtel, Inc. has introduced its Micro-Talker I, a voice mail system for the IBM Personal Computer XT.

Micro-Talker I reportedly allows up to 30 users to interface with the system from any Touch-Tone telephone. Voice prompts are said to guide users through the process of leaving and retrieving a message.

Micro-Talker requires a system with 256K bytes of internal storage and a 10M-byte hard disk.

Micro-Talker I is priced at $695.

Microtel, 4th Floor, 40 W. 27th, New York, N.Y. 1001.

RACAL-TELESYSTEMS, INC.
Linkage

Racal-Telesystems, Inc. has introduced Linkage, document translation software for the IBM Personal Computer.

Linkage reportedly translates files between the Micropro International Corp. Wordstar text editing package and IBM, Wang Laboratories, Inc. and certain other brands of word processing systems.

Under Linkage, a centralized word processing system reportedly can receive Wordstar documents prepared by several remote personal computers. The protocol into which Linkage translates can be transmitted asynchronously over voice-grade telephone lines at 300 or 1,200 bit/sec, according to the vendor.

Linkage is priced at $500.

Racal Telesystems, 410 N. Michigan Ave., Chicago, Ill. 60611.

STSC, INC.
APL Plus/PC Tools

STSC, Inc. has announced APL Plus/PC Tools, a set of software utilities for the company's APL/PC system application development system that uses the APL programming language.

The product features systems for constructing and using full screen menus and input forms, formatting reports and routing output, the firm said. APL Plus/PC Tools reportedly includes terminal emulation support for IBM 3278 terminals, file transfer capability and APL interfaces.

Other features consist of maintenance and configuration aids for program and work space searching and editing, work space documentation, work space cross-referencing and program and work space comparisions, the vendor said.

The product runs on a Personal Computer with IBM's PC-DOS 2.0 and 256K bytes of random-access memory.

APL Plus/PC Tools costs $295.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

MAGNUM GENERAL LTD.
Metapsych

Magnum General Ltd. has introduced Metapsych, hospital management software for clinical, administrative, research and education functions of a psychiatric service.

The package reportedly includes a nine-module master clinical data base derived from a data base developed by Strain & Associates. An activity data base manages patient-related services, and a literature data base gathers data, according to the vendor.

Metapsych runs on IBM's Personal Computer, XT and AT and compatibles with 320K bytes of random-access memory, a 10M-byte hard disk, monitor, printer and an asynchronous serial communications port.

The license fee for a single package is $6,500. Licensees receive the software, users manual, and the Metafile data base manager with hardware lock.

Magnum General, 180 N. Michigan Ave., Chicago, Ill. 60601.

OFFICE SOLUTIONS, INC.
Officelink/Wang PC

Office Solutions, Inc. has introduced its Officelink/Wang PC word processor for the IBM Personal Computer.

Officelink/Wang PC is said to allow diskette transfer between the IBM Personal Computer and Wang Laboratories, Inc. Professional computers. It reportedly allows documents created on any IBM Personal Computer to be transferred to a central Wang-based word processing deparment for further editing.

Continued on page 124

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Continued from page 122

Officelink/Wang PC costs $195.

Office Solutions, 5708 Odana Road, Madison, Wis. 53719.

CONTROL DATA CORP.
Situation Simulation Model; Drill and Practice Lesson Model

Control Data Corp. has announced two training aids for its Plato computer-based training author system that runs on the IBM Personal Computer: Situation Simulation Model (SSM) and Drill and Practice Lesson Model (DPM).

SSM enables users to design interactive training software that simulates business situations, according to the vendor. The product reportedly features menu-driven prompts and context-sensitive Help screens.

DPM allows training professionals with no computer experience to create interactive drill and practice courseware for the Plato system, the vendor said.

SSM costs $3,000 for a one-time license fee; a one-time DPM license fee sells for $1,500. Reusable student disks are available for $25 each.

CDC, P.O. Box 0, 8100 34th Ave., Minneapolis, Minn. 55417.

MANAGEMENT CONTROL SYSTEMS, INC.
Audit Advantage

Management Control Systems, Inc. has announced Audit Advantage, auditing software for the IBM Personal Computer, Personal Computer XT, Personal Computer AT and Compaq Computer Corp. microcomputers.

Audit Advantage is said to process annual, semiannual, trimester and quarterly audits. It includes six levels of operator password security, the vendor said. The product allows accountants to print or view financials on the CRT screen, automatically prepare analytical reviews using predefined and user-defined business rations and produce draft financial statements, the vendor said.

Minimum system requirements are a 256K-byte main memory and a 10M-byte fixed disk.

The price of Audit Advantage is $3,000, the vendor said.

Management Control Systems, 8701 Buffalo Ave., Niagara Falls, N.Y. 14304.

EDEN PRESS
Privacode

The Eden Press has introduced Privacode, file encryption software for the IBM Personal Computer.

Privacode reportedly is compatible with such programs as Lotus Development Corp.'s 1-2-3, Ashton-Tate's Dbase II and Micropro International Corp.'s Wordstar. It also encrypts files developed using those programs.

Privacode also includes a security module that automatcally erases the source version of a file when the file is translated from clear text to secured versions, according to the vendor.

Privacode is priced at $395.

Eden Press, P.O. Box 8410, Fountain Valley, Calif. 92728.

MICRO MRP, INC.
MAX, the Production Manager

Micro MRP, Inc. has announced that its inventory control and planning software is available for an IBM Personal Computer AT with a hard disk and the IBM's PC-DOS 3.0 operating system.

MAX, the Production Manager is a manufacturing resource planning system consisting of six modules that provide bill of materials control, inventory control, master scheduling, materials requirement planning, purchasing control and shop floor control.

The price of MAX is $16,000.

Micro MRP, 1065 E. Hillsdale Blvd., Foster City, Calif. 94404.

UNIPLEX INTEGRATION SYSTEMS
Uniplex II

Uniplex Integration Systems has announced an integrated applications software package for standalone or multiuser AT&T Unix-based micro and minicomputer systems.

The system includes a word processor, spreadsheet package and relational data base management system. Features include a menu system, screen builder, key function definer, print spooler, electronic mail and an application generator, according to the vendor.

Price of the Uniplex II software system ranges from $600 for the Altos Computer Sytems, Inc. Altos 586 to $4,000 for the Digital Equipment Corp. VAX-11/780.

Uniplex Integration Systems, Suite 500, No. One Galleria Tower, 13355 Noel Road, Dallas, Texas 75240.

INFOCENTER SOFTWARE
Ilink for 3270-PC

Infocenter Software has announced that its Ilink micro-mainframe formatter can be used with the recently enhanced IBM Application Program Interface (API) for the IBM 3270 Personal Computer.

Ilink can download, upload and cross-load files between information center products running on IBM mainframes and data base or spreadsheet applications on IBM Personal Computers. API will allow steps of a data conversion process to be automated so that Ilink procedures will appear transparent, the company said. Downloading procedures can then be accomplished with a single command, the vendor said.

Base price of the mainframe Ilink module is $12,500 for a configuration of 10 Personal Computers.

Infocenter Software, 171 Main St., New Paltz, N.Y. 12561.

U.S. DATA CORP.
Factory Link; Flexus Industrial Operator Station enhancements

U.S. Data Corp. has announced Factory Link, software that provides programmable controller communications and electronic spreadsheet interfacing between IBM 5531 computers and IBM Personal Computer XTs

Continued on page 126

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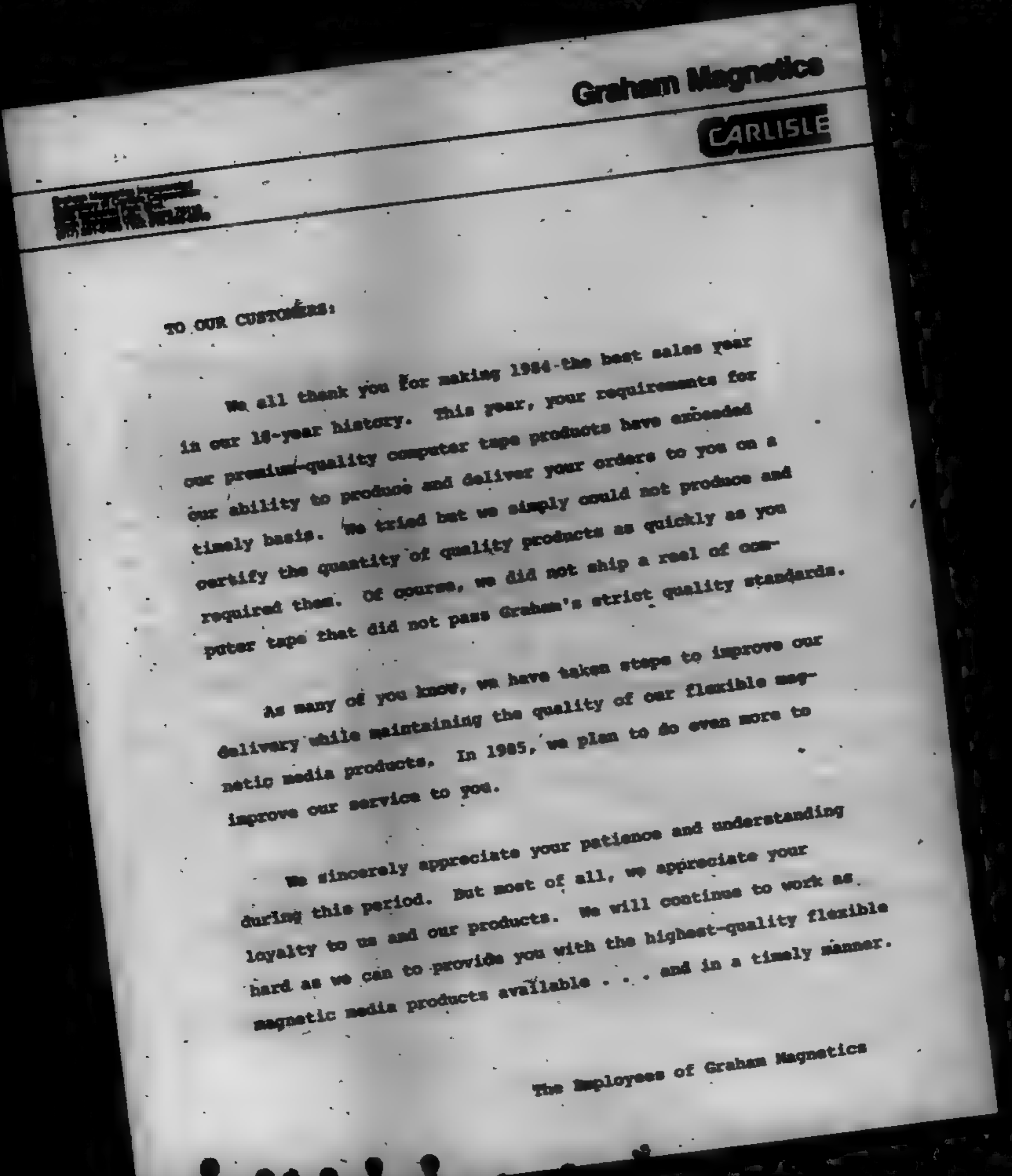

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Continued from page 124

running IBM's PC-DOS operating system.

The package reportedly allows bidirectional communications between the programmable controller and the industrial personal computer. The package allows users to access data from programmable controllers and generate reports and graphics using microcomputer packages such as Lotus Development Corp.'s 1-2-3 or Symphony.

Fill-in-the-blank instructional displays allow communications port setup and programmable controller memory access. U.S. Data has also announced enhancements to its Flexus Industrial Operator Station's operating system software.

The enhancements include a block transfer mode and a polled protocol feature.

Factory Link costs $2,995.

U.S. Data, 1551 Glenville Drive, Richardson, Texas 75085.

LANTECH SYSTEMS, INC.
Tool Kit

Lantech Systems, Inc. has introduced a software developer's tool kit for the IBM Personal Computer.

Called Tool Kit, the software reportedly provides a choice of text editors, a terminal emulator and windowing capability. The Tool Kit also provides a choice of three editors: the Bell Editor, VI Editor and ED Editor, the firm said.

Tool Kit also reportedly includes Lantech's Unetix, the Unix-compatible multitasking operating system.

Tool Kit is priced at $400.

Lantech Systems, 9635 Wendell Road, Dallas, Texas 75243.

MICRORIM, INC.
Enhanced Clout

Microrim, Inc. has announced an enhanced version of its Clout natural language query designed to work with files from software programs such as Lotus Development Corp.'s 1-2-3, Ashton-Tate's Dbase II and Software Publishing Corp.'s PFS:File.

Enhanced Clout also works with Data Interchange Format files, Sylk files from Microsoft Corp.'s Multiplan and mainframe Ascii files, Microrim said.

Clout's relational ability is said to merge and cross-reference information from different files and automatically scan up to 40 files and join up to five files to answer a question.

Clout requires a minimum of 256K bytes of memory and either IBM's PC-DOS or Microsoft's MS-DOS operating systems.

The price for Clout is $240.

Microrim, 3380 146th Place S.E., Bellevue, Wash. 98007.

SYSTEMS

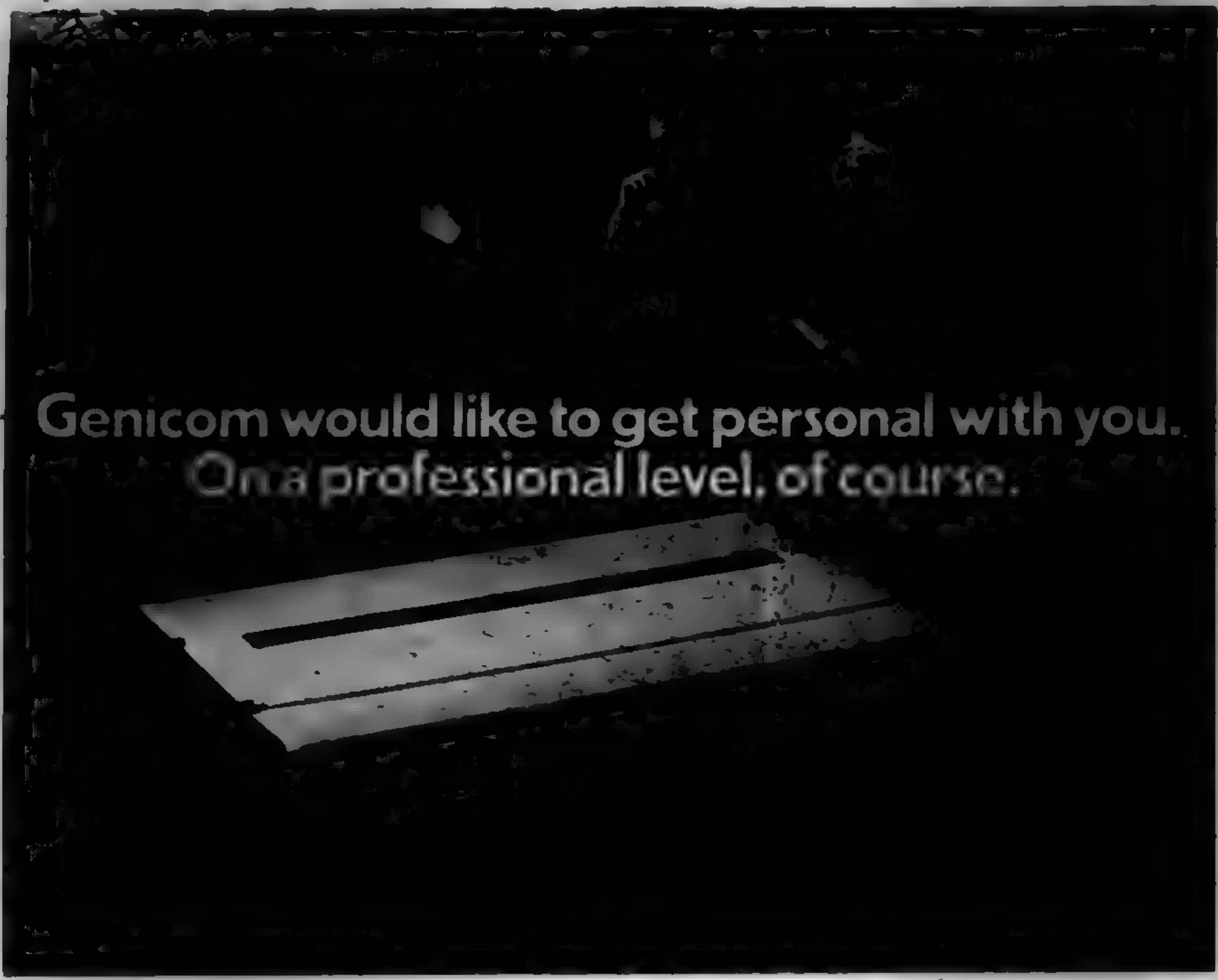
GENERAL DATA SECURITY SYSTEMS
Computer Intelligence Access

General Data Security Systems, a subsidiary of General Security Systems, Inc., has introduced its Computer Intelligence Access data security software system for the IBM Personal Computer and Personal Computer XT.

Computer Intelligence Access reportedly offers program and file protection and confidentiality of information. A multilevel password access feature is said to allow the system administrator to delegate files to users.

Also included are a protection system that prevents any user from erasing or deleting a protected file and an updated inventory list of all files, according to the ven-

Continued on page 128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Genicom 3000 PC printers feature switch selectable hardware, dual connectors and dual parallel or serial interfaces. Plus the 3014 and 3024 emulate popular protocols for both Epson MX with GRAFTRAX-PLUS™ and Okidata Microline 84 Step 2™, while the 3304 and 3404 emulate popular protocols for Epson MX with GRAFTRAX-PLUS™. So your current system is most likely already capable of working with these Genicom printers without modification.

Most important, the Genicom 3000 PC printers are quality-built, highly durable printers designed for rapid, continuous duty cycle printing. So take some personal advice. Get a Genicom professional printer for your personal computer today.

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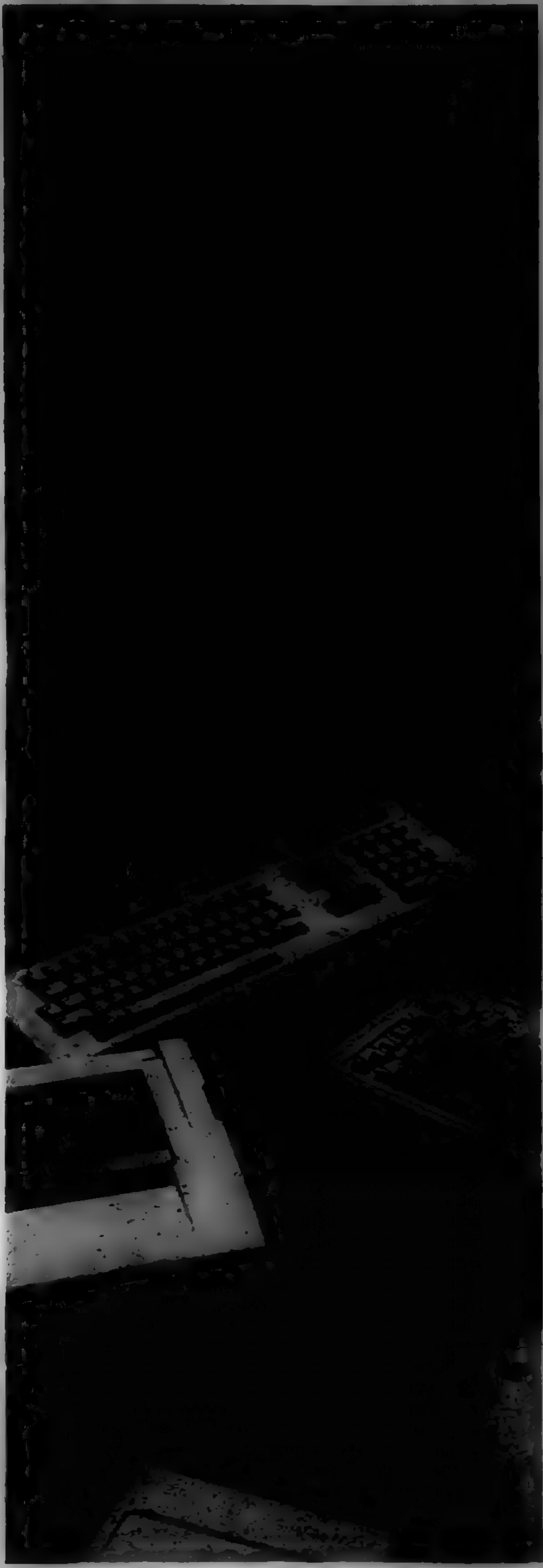

Continued from page 126

dor.

Computer Intelligence Access requires 256K bytes of random-access memory and is priced at $300.

General Data Security Systems, 1127 Loma Ave., Long Beach, Calif. 90804.

APPLIED DATA SYSTEMS, INC.

Vectorscan enhancements

Applied Data Systems, Inc. has introduced a series of enhancements to its Vectorscan 512 color graphics system.

The Vectorscan 512, reportedly now offers memory expansion from 128K bytes to 512K bytes; a business graphics package, providing line, pie and bar charts; and a long-persistence color monitor.

The color monitor is priced at $800. The memory expansion option is priced at $400. The business graphics reporting package is priced at $450.

Applied Data Systems, Suite 213, 9811 Mallard Drive, Laurel, Md. [illegible]

COMPUPRO SYSTEMS, INC.

Compupro 10 Plus

Compupro Systems, Inc. has introduced the Compupro 10 Plus, a low-end addition to its line of multiuser business systems.

The Compupro 10 Plus is said to be a four-user microcomputer with such features as concurrent execution of both 8- and 16-bit software and networking capabilities. The Compupro 10 Plus uses the Digital Research, Inc. Concurrent CP/M 8/16 operating system and is said to come bundled with a word processing program that resembles Micropro International Corp.'s Wordstar.

The Compupro 10 Plus is priced at $4,995.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.

COMMUNICATIONS

ZSTEM COMMUNICATIONS

Zstem EMPC-VT100

Zstem Communications, a division of KEA Systems, Ltd., has introduced its emulator of the Digital Equipment Corp. VT100 terminal for use with the IBM Personal Computer and the Zenith Data Systems, Inc. personal computer series.

The product, the Zstem EMPC-VT100, reportedly is available in speeds from 45.5K bit/sec to 38.4K bit/sec and supports both DEC VT52 and VT100 escape sequences, shifted and alternate keypad mode. All DEC VT52 and VT100 cursor-related functions, including application cursor keys, erasing and editing, scrolling regions, printer status, printer controller and print screen sequences, are also supported, according to the vendor.

The product is priced at $150, the vendor said.

Zstem Communications, KEA Systems, 311-811 Beach Ave., Vancouver, British Columbia V6Z 2B5.

INNOVATIVE ELECTRONICS, INC.

PC-80

Innovative Electronics, Inc. has announced PC-80, a communications board for the IBM Personal Computer.

The product uses an IBM Type A coaxial connection to attach a Personal Computer to an IBM 3274 or 3276 cluster controller or 4331 display or printer adapter, according to the vendor. PC-80 reportedly supports Binary Synchronous Communications or Systems Network Architecture/Sychronous Data Link Control communications protocols.

The product features dual-level password security, concurrent microcomputer and mainframe sessions, configurable Help screen and screen capture facility, Innovative Electronics said.

PC-80 costs $895.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

AMBI CORP.

Ambimail

Ambi Corp. has introduced its Ambimail electronic mail software for its Ambiset workstation.

The Ambimail system reportedly allows Ambi products to send and receive text messages with a single keystroke, communicate voice, data and text in unattended operation and transmit information to multiple addresses on a variety of distribution lists stored in memory.

Ambimail is said to offer point-to-point and point-to-multipoint messaging and to integrate with the clock/calendar of Ambi workstations, allowing them to send and receive messages while unattended.

Ambimail is priced at $300.

Ambi, 1033 Washington Blvd., Stamford, Conn. 06901.

WATERLOO MICROSYSTEMS, INC.

Waterloo Port

Waterloo Microsystems, Inc. has introduced Waterloo Port, an operating system that reportedly provides multitasking and networking to the IBM Personal Computer, Zenith Data Systems Corp. 150 and 160, and Compaq Computer Corp. Compaq personal computers.

Waterloo Port reportedly features concurrent activities, a mouse-driven user interface, integrated local-area networking and the use of IBM's PC-DOS as a concurrent activity.

The product is also said to offer a hierarchical tree-structured file system, a set of editing and formatting tools, an environment for developing systems and application software and an interprocess, message-passing system architecture.

Waterloo Port Version 2.1 reportedly includes a network interface board and documentation. It is priced

Continued on page 130

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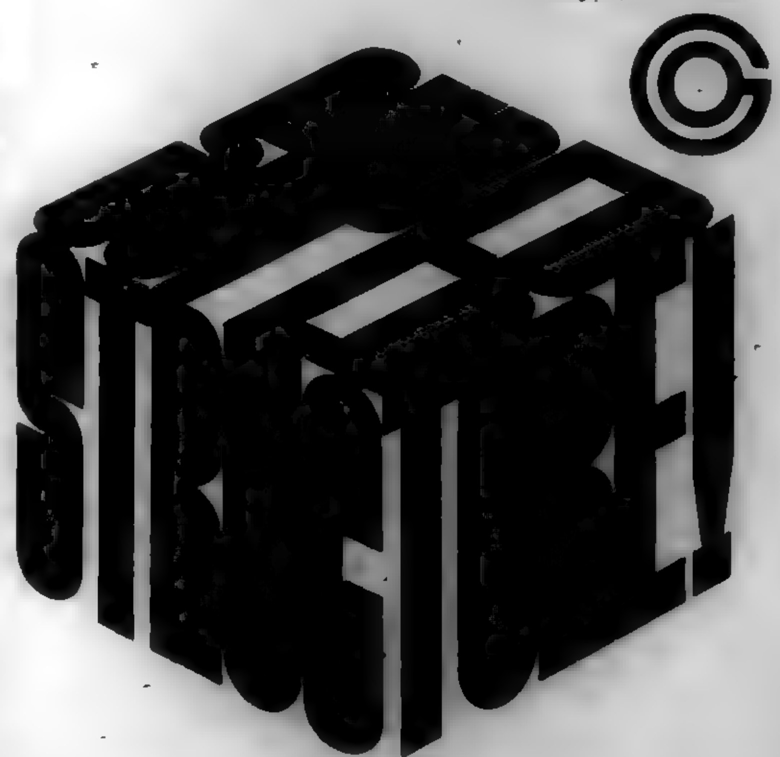

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Continued from page 128

at $515 in its stand-alone version. A one-network server version costs $1,540.

Waterloo Microsystems, 175 Columbia St. W., Waterloo, Ont., Canada N2L 5Z5.

GRANADA SYSTEMS DESIGN, INC.
PC/Sail

Granada Systems Design, Inc., has announced a software and hardware package that allows the IBM Personal Computer to act as a protocol translator that will transmit information from asynchronous devices to IBM System/34, 36 and 38 users.

PC/Synchronous/Asynchronous Interactive Link (Sail) reportedly uses the Personal Computer and an IBM 5251 Model 12 synchronous protocol to communicate between asynchronous devices and IBM systems.

The product, which consists of two micro hardware boards and a software diskette, sells for $1,650.

Granada Systems Design, 303 Fifth Ave., New York, N.Y. 10016.

PRINTERS/PLOTTERS/PERIPHERALS

PRINTEK, INC.
Model 930

Printek, Inc. has announced a series of options for its Model 930, a 200 char/sec dot matrix printer.

The options include several new fonts, memory expansion and print buffer. The fonts consist of pica/pica italic, elite/elite italic, courier/courier italic and optical character recognition Ansi (OCRA) and optical character recognition International Standards Institute (OCRB).

The fonts are priced at $99 each, except for the OCRA and OCRB fonts, which cost $49.

A memory expansion board, which supports all new fonts and fonts downloaded from a larger computer, costs $99. A 6K-byte print buffer runs $149.

Printek, 1517 Townline Road, Benton Harbor, Mich. 49002.

BOARD-LEVEL DEVICES

TSENG LABORATORIES, INC.
Colorpak

Tseng Laboratories, Inc. has announced Colorpak, a color graphics board for the IBM Personal Computer.

According to Tseng laboratories, Colorpak provides 640- by 400-pixel four-color resolution and it also supports 80-char. by 50-line displays.

In conjunction with the IBM color monitor, the product reportedly supplies 640- by 200-pixel resolution or 320- by 200-pixel resolution on an 80-char. by 25-line display.

The color graphics board product includes Grafix Partner, a graphics enhancement program that reportedly improves the graphics for Lotus Development Corp.'s 1-2-3. Grafix Partner runs in background and can be accessed by a single keystroke, Tseng Laboratories said.

The price of the Colorpak color graphics board is $580.

Tseng Laboratories, 205 Pheasant Run, Newtown, Pa. 18940.

SKY COMPUTERS, INC.
SKY320

Sky Computers, Inc. has introduced an arithmetic and I/O coprocessor for the IBM Personal Computer based on the Texas Instruments, Inc. TMS 320 processor.

The SKY320 coprocessor is said to be a single add-in board with up to 128K-bytes of 120 nsec four-ported memory.

The SKY320 performs arithmetic at up to 5 million operation/sec, using overlapped additions and multiplications, according to the vendor.

The coprocessor reportedly can be accessed from the Personal Computer, the TMS320 and two auxiliary 16-bit I/O ports operating independently of the Personal Computer's 8-bit bus.

The SKY320 is priced at $2,995.

Sky Computers, Foot of John St., Lowell, Mass. 01852.

SIGMA INFORMATION SYSTEMS, INC.
PC-128

Sigma Information Systems, Inc. has introduced its PC-128 motherboard, a product said to be fully hardware- and software-compatible with the IBM Personal Computer XT.

The PC-128 reportedly offers 128K bytes of internal memory and a 16-bit Intel Corp. 8088 CPU that can address up to 864K bytes of system memory. Its eight I/O interface slots are said to be IBM-compatible and able to support IBM disk controllers, multifunction boards and modems.

The PC-128 also is said to include eight extended read-only memory (ROM) sockets for use with either eight 8K-byte or eight 16K-byte erasable programmable ROM chips. It also reportedly includes a speaker port.

PC-128 is priced at $582.

Sigma Information Systems, 3401 E. LaPalma Ave., Anaheim, Calif. 92806.

REMOTE SYSTEMS, INC.
Secureware III

Remote Systems, Inc. has introduced Secureware III, a security system for the IBM Personal Computer and Personal Computer XT.

Secureware III is mounted into a card slot in the computer and is addressed by the processor as an I/O device.

It reportedly reduces the potential for software diskette piracy and can be programmed to work with hard-disk-based systems.

In a network, Secureware III is said to offer data file security and a reliable method of user validation for access to a host computer.

Secureware III is priced at $195, the vendor said.

Remote Systems, 38 Cessna Court, Gaithersburg, Md. 20879.

See BOARD page 132

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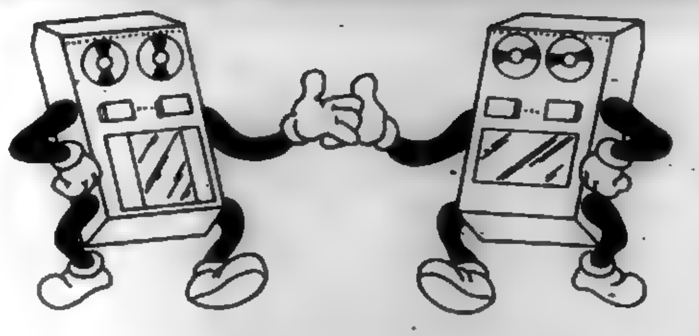

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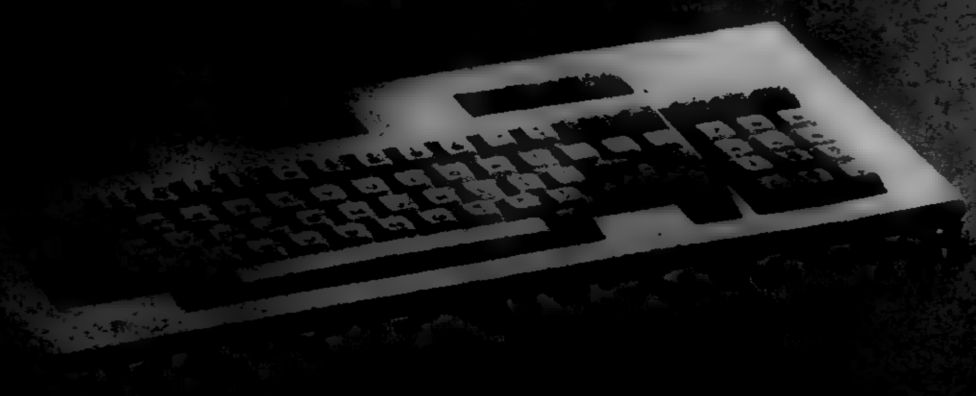

BOARD

from page 130

AST RESEARCH, INC.
Advantage

AST Research, Inc. has introduced Advantage, a multifunction memory expansion board designed for the IBM Personal Computer AT.

Advantage allows a user to work with up to 3M bytes of random-access memory and takes advantage of the AT's high-performance bus, AST Research said. The board reportedly works with either 64K-bit or 256K-bit chips. Advantage is said to offer an IBM-compatible parallel printer port, two serial ports and a game port.

Advantage costs $495.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

WAVE MATE, INC.
Bullet-286

Wave Mate, Inc. has introduced its Bullet-286 motherboard for the IBM Personal Computer XT. The product is said to incorporate the Intel Corp. 80286 microprocessor while maintaining IBM compatibility.

The Bullet-286 reportedly has the same dimensions and physical connections as the Personal Computer XT motherboard and provides up to 640K bytes of on-board memory with zero wait states. According to Wave Mate, the product uses virtual machine emulation to resolve the Intel Corp. 90286/Intel 8088 compatibility problems.

Virtual machine concepts are said to permit Personal Computer XT application and system programs to be treated as black box object-code modules, which require no modification to achieve Intel 8086 functionality.

The Bullet-286 is available in 256K-byte, 512K-byte and 1M-bytes models, priced from $1,995 to $3,395.

Wave Mate, 14009 S. Crenshaw, Hawthorne, Calif. 90250.

QUADRAM CORP.
Pallette Master

Quadram Corp. has unveiled Palette Master, a high-resolution graphics adapter for IBM's Personal Computer.

Pallette Master reportedly can display 256 from 256,000 possible colors on the screen, Quadram said. The product is said to feature 64K bytes of memory and 320- by 200-pixel resolution.

Pallette Master reportedly allows a user to store, transmit, recall and manipulate photographic-quality images. The product is compatible with software written for the IBM Personal Computer color graphics adapter.

Pallette Master costs $695.

Quadram, 4355 International Blvd., Norcross, Ga. 30093.

INTELLUTION, INC.
Eprom for IBM Personal Computer

Intellution, Inc. has announced a graphics character erasable programmable read-only memory (Eprom) product for the IBM Personal Computer.

The product plugs into an IBM Personal Computer color graphics board and provides 86 graphics symbols including valve bodies, valve actuators, motors, pumps, corners, transmitters, ladder diagram symbols, bar graphs and process vessels, according to the vendor.

The product costs $70, the vendor said.

Intellution, Suite F, 35 Perwal St., Westwood, Mass. 02090.

SEATTLE TELECOM & DATA, INC.
Model PC-286

Seattle Telecom & Data, Inc. has introduced an add-in processor board for IBM Personal Computers that reportedly can increase the processing speed of the Personal Computer and Personal Computer XT by 10 times.

The PC-286 reportedly takes over the Personal Computer bus completely, generating all Intel 8088 timing internally and running software without the need for special software disks, input and output port address switches or jumpers.

The PC-286 can run at 4, 6 or 8 MHz, permitting it to be tailored to scientific and engineering applications, the vendor said. Additionally, the PC-286 CPU, its on-board expansion connector and IBM Personal Computer bus all are said to have independent access to the board's main memory.

The PC-286, with 256K bytes of random-access memory, is priced at $2,395.

Seattle Telecom & Data, 3637 151st Place N.E., Redmond, Wash. 98052.

DIGIGRAPHIC SYSTEMS CORP.
Com-8 board

Digigraphic Systems Corp. has introduced its Com-8 multichannel communications board for the IBM Personal Computer AT and other IBM Personal Computers.

The Com-8 board fits into an expansion slot on the Personal Computer's chassis and adds eight individually addressable serial ports. It also allows Com-8 boards to be chained together to enable a system to support as many terminals as permitted by the computer's memory.

The Com-8 board is $629.

Digigraphic Systems, 10873 Yellow Circle, Minnetonka, Minn. 55343.

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
Coax Exchange graphics option

Intelligent Technologies International Corp. has added a graphics option to Coax Exchange, a communications board for the IBM Personal Computer line.

With the option, a Personal Computer reportedly can emulate an IBM 3279 Model S3G color graphics terminal. The microcomputer can then emulate all 3279 text and graphics display modes, with color quality, screen painting, image aspect ratio and 720- by 396-pixel resolution,

Continued on page 134

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York.

However, Weiss agreed with James Renalds, analyst with Dataquest, Inc. in San Jose, Calif., that the introductions do not address some major incompatibility issues among low-end IBM software.

Among other items in the flood of Oct. 25 announcements, the main enhancements to the Personal Computer/370 series included the new Personal Computer AT/370, 3278 (rather than 3277) terminal emulation as standard and a new release of the VM/PC system software.

Experts noted that the new AT/370 is a logical step up from the Personal Computer XT/370, with greater processing speed and memory capabilities. But several analysts described the target market for both machines as very small.

New control programs for the 3270 Personal Computer, which also made their debut Oct. 25, included application program interface services that reportedly will enhance communications between Personal Computer and host sessions. The services also will "automate, customize and simplify many functions that were previously available only through operator procedures," according to IBM.

Simplifying the user interface would help to overcome one major handicap for the 3270 Personal Computer, whose sales "are off to a slow start," Weiss said. His firm's surveys found two remaining marketing obstacles: pricing and the requirement for a 3274 controller with four ports.

When users compared the 3270 Personal Computer with a standard Personal Computer with 3270 emulation options, "in more cases than not they felt they were not getting that much more with the 3270 [Personal Computer]," Weiss said. The demand for multiple host sessions was the critical criterion justifying the additional cost of the 3270 Personal Computer, he said.

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an organizational, not an individual, problem.

Automation's threat

In many ways the manager's complaint is similar to those heard on the production line when factory automation comes through the door.

Automation is threatening because it changes the work environment.

Very frequently the changes that are implied by office automation for managers and professionals raise the issue of perceived status.

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CONTROL DATA

Addressing society's major unmet needs as profitable business opportunities.

Continued from page 133

according to the vendor. A single keystroke is said to allow a user to toggle between microcomputer and mainframe sessions.

The graphics option costs $1,395, and the Coax Exchange sells for $1,195.

Intelligent Technologies International, 151 University Ave., Palo Alto, Calif. 94301.

EMULEX CORP.

PC/Memory Plus Clock; PC/Short Memory

Emulex Corp. has introduced its PC/Memory Plus Clock board and its PC/Short Memory board for the IBM Personal Computer line.

The PC/Memory Plus Clock is said to be a full-size, multifunction circuit board capable of supporting up to 576K bytes of socketed random-access memory in a single Personal Computer slot. It automatically stamps users' files with the time and date and features an on-board five-year battery, Emulex said.

The PC/Short Memory Board is available in five increments of 64K bytes each and fits into the short memory slot of the Personal Computer XT or Portable Personal Computer.

The PC/Memory Plus Clock is priced at $345 in its basic 64K-byte version. Prices range up to $1,145 for the 576K-byte version. The PC/Short Memory board is priced from $259 for the 64K-byte version to $759 for the 384K-byte board.

Emulex, P.O. 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

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three different documents or use the windows to display information from a variety of spreadsheet programs.

■ Calculator. Users can perform calculations within documents while editing, using Wordstar 2000's math option.

The 2000 software line also includes proportional spacing; printer support for more than 100 printer models; a typewriter mode for addressing envelopes and filling out forms directly from the computer keyboard; spelling correction, which corrects misspellings and typographical errors and provides phonetic correction; sorting; and automatic paragraph reformatting, the firm said.

Wordstar 2000 Plus contains all the features of Wordstar 2000 as well as telecommunications capabilities, a mailing list data base and an indexing system, Micropro said.

The 2000 line will be shipped in late November and will be available for the IBM Personal Computer, Personal Computer XT, Personal Computer AT and fully compatible systems under IBM's PC-DOS 2.0, 2.1 and 3.0. The programs require 256K bytes of random-access memory (320K bytes for PC-DOS 3.0 and the AT). The company recommends the use of a hard disk drive.

The Wordstar line includes a copy protection scheme that allows users to make three copies of the program. According to Micropro, the copy protection will be transparent to users with hard disk drives, while users with floppy-disk-based systems will be required to load in a program disk each time they use Wordstar 2000.

Wordstar 2000 costs $495 and Wordstar 2000 Plus is priced at $595. Upgrades are available for current users at a cost of $250 for Wordstar 2000 or $350 for Wordstar 2000 Plus.

Micropro President H. Glen Haney emphasized the fact that the company will continue to support and enhance the original Wordstar as part of a two-pronged attack on the word processing market. "We want to crowd out all the competition at the low end and block out the competition at the top," he said.

In general, analysts agreed that Micropro has addressed many of the shortcomings of the original Wordstar and added features that will be welcomed by users.

Robert Lefkowitz, a software analyst with Infocorp, a Cupertino, Calif.-based market research firm, said that in designing Wordstar 2000, Micropro "has been as successful as anyone can be at solving two problems that work against each other: providing full functionality as well as ease of use."

Bonnie Digrius, a software analyst with Cupertino, Calif.-based Creative Strategies International, Inc., said the new packages are priced too high.

Digrius also questioned Micropro's claim that the new software line will appeal to a wide variety of users — from the executive who has limited word processing needs to the professional whose needs are extensive.

For more information, Micropro International is at 33 San Pablo Ave., San Rafael, Calif. 94903.

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tasking operation under future operating system offerings.

GEM will require 256K bytes of random-access memory, two floppy disk drives, a bit-mapped display, a mouse and MS-DOS 2.0 or later. Existing MS-DOS applications will run under GEM without any changes in performance, Digital Research said.

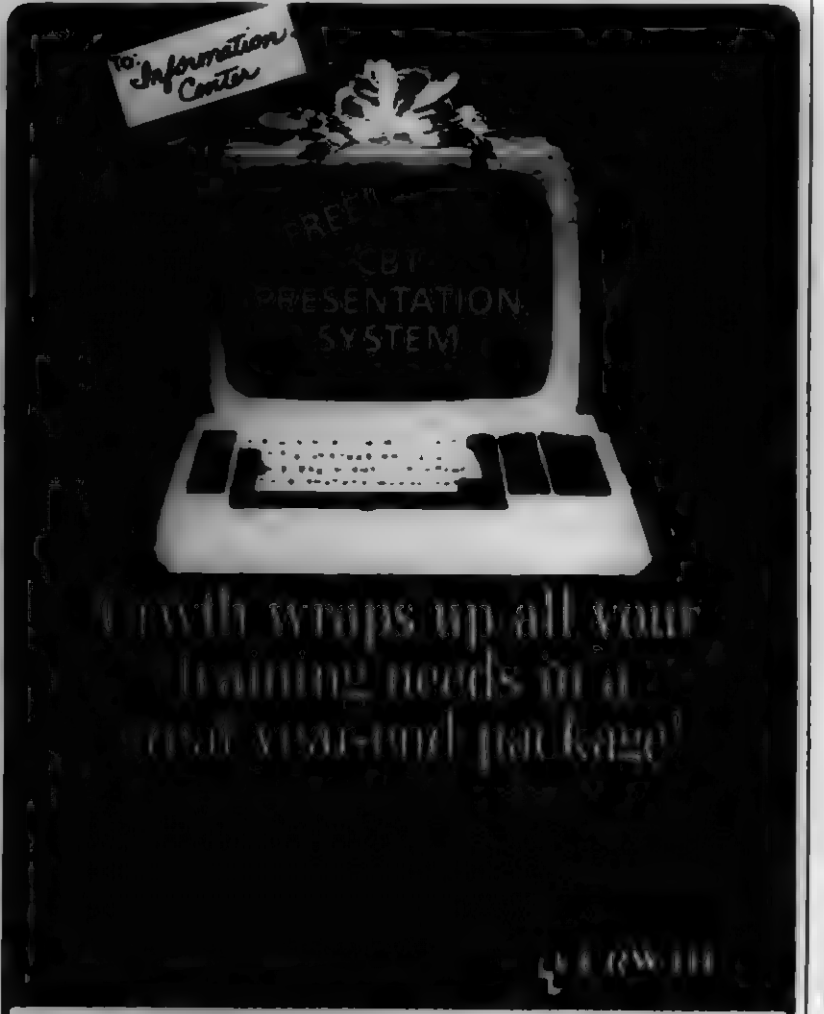
A GEM programmer's toolkit for the IBM Personal Computer will be sold to software developers in the first quarter of 1985, priced in the $500 range, Digital Research said.

The supplier suggested that Macintosh software developers will use GEM as an easy way to port packages from the MS-DOS environment.

DRI also introduced the first GEM software application, GEM Desktop, said to eliminate the need for MS-DOS commands. The screen shows a graphics representation of a desktop with icons and windows, and all commands can be achieved by pointing and selecting with a mouse, DRI said. Up to six desk accessories (such as a calculator) fit within Desktop. An OEM package, GEM Desktop is scheduled for first-quarter 1985 shipment.

The company also is slated to announce several GEM presentation graphics products. Among these, the GEM Draw and GEM Wordchart application software packages will be priced in the $300 range and will be shipped in the first quarter of 1985, Digital Research said.

Digital Research is located at 60 Garden Court, Monterey, Calif. 93942.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COMPUTER INDUSTRY

Prime chief sees 'sharp focus' as key

By Peter Bartolik
CW Staff

NATICK, Mass. — Three years ago next month, Prime Computer, Inc. named as its president a former IBM vice-president, Joe M. Henson. This filled a five-month void created by the sudden departure of former President Kenneth G. Fisher, who had groomed the 32-bit superminicomputer vendor from practically start-up level to annual revenues in excess of $300 million.

The trade of a charismatic, hard-charging Fisher for someone mentored in the conservative style of Big Blue was expected to result in cultural changes at a relatively small company that had soared on annual sales increases of 75%.

Changes there were. Newly appointed President Henson wanted a more mature organization geared toward long-term growth and prosperity. Following the typical pattern of IBM personnel tapped to head other companies, he brought in a cadre of fellow IBM employees to bring the organization into line. He increased research and development spending, which, combined with shortfalls in revenue, produced a profit decline from $44.9 million in 1982 to $32.5 million in 1983. Topping things off, Fisher announced the formation of Encore Computer Corp. in mid-1983 and tapped three Prime vice-presidents and three mid-level managers, which compounded a vast exodus among management ranks.

The departure of people who had grown with the company, the imposition of a broad-based strategy on a relatively small, specialized company and the erroneous revenue forecasts for the first two quarters of last year all combined to generate an impression in some quarters that Prime had run out of steam after milking its initial 32-bit technology to the limit.

But over the past year, in an understated manner, Prime introduced a series of new machines, extending its line upward to claim a share of the price/performance peak in the supermini industry prior to the announcement of Digital Equipment Corp.'s VAX 8600, code-named Venus, filling out the middle of the line with new boxes and bringing out a generally well-received low-end machine and microprocessor-based workstations. Despite its claim to one of the youngest product lines in the industry, the company has until now not funded an aggressive marketing program, preferring instead to bring its profits back into line.

Gale Aguilar, vice-president of corporate business development and strategy, was brought in from IBM and, like Henson, served more than two decades with the No. 1 computer company. Aguilar said in a recent interview that Prime had to undergo change because other vendors had climbed into the 32-bit market, and Prime needed "to turn this event into a process.

"I don't know that that had anything to do with people," he added. "I'm not sure that [Henson], being here earlier, wouldn't have gone through it, or Fisher, staying longer, . . . wouldn't have gone through the

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■ Franklin Computer Corp. said it will liquidate its assets to settle with creditors under a Chapter 11 bankruptcy reorganization/136

■ Digital Equipment Corp. President Kenneth Olsen told an annual meeting audience that the No. 2 computer maker has put the problems of last year behind it/139

■ An Wang, founder, board chairman and chief executive officer of Wang Laboratories, Inc., was awarded the American Electronics Association's highest honor at a ceremony last month/140

ANALYSIS

Foundering U.S. PCMs leaving field to IBM, Japanese

By Peter Bartolik
and David Olmos
CW Staff

Yet again, the point is being driven home with brutal finality — climbing into a bed warmed by IBM can be a fatal strategy. The almost sudden collapse of the domestic plug-compatible disk drive industry leaves the huge IBM mainframe community with, effectively, little alternative among vendors.

With Storage Technology Corp. (STC) filing for protection under Chapter 11 of the U.S. Federal Bankruptcy Act just one month after Control Data Corp. announced it was departing the plug-compatible market,-IBM mainframe users are left with the unpalatable alternative of shopping for memory peripherals from either IBM or Japanese competitors.

Yes, Memorex Corp., the Burroughs Corp. subsidiary, has proclaimed it is in the business to stay. But Memorex has experienced the same technological problems that forced CDC out, and the expected introduction of new IBM disk drives next year will add further pressure to Memorex's viability.

Carol Lerner, an analyst with International Data Corp. of Framingham, Mass., was brutally frank about the remaining domestic vendor. "Memorex is just about out of it," she said. "That leaves IBM and the Japanese."

Jonathan Fram, an analyst with Paine Webber, Inc., was not prepared to write the obituary on Memorex. But, he said, "[Memorex] will be a continual drag on [the profits of] Burroughs."

According to Fram, "The Japanese have a willingness to take the long-term view. They are buying up market share at the expense of margins." Hitachi Ltd. and Fujitsu Ltd. stretched to the limit the older ferrite core technology, according to Fram. While the Japanese companies were continuing to increase market share with the older machines, CDC, STC and Memorex all effectively killed sales of older equipment with what turned out to be premature announcements of thin-film head drives.

Now, according to Fram, "Hitachi and

See STC page 147

DG breaks through billion-dollar barrier

WESTBORO, Mass. — Data General Corp. topped the $1 billion annual revenue barrier for the first time in its history, the company said recently.

DG's revenues for fiscal 1984 were $1.1 billion, a 40% increase over $828 million the previous year. Operating income for the year was $102.6 million, or 8.8% of revenues, compared with $36.5 million, or 4.4% of revenues, a year earlier.

Profit for the fourth quarter ended Sept. 29 more than doubled to $29.5 million, or $1.12 a share, compared with $10.7 million, or 43 cents a share, for the corresponding period one year earlier.

The company's profit for the latest quarter was aided by a one-time tax benefit of $12.6 million, or 47 cents a share, resulting from a change in the tax law governing overseas trading.

"This year's performance is largely the result of the most ambitious product development effort in the company's history," said Edson D. De Castro, DG president.

Visicorp to merge with Paladin Software

By Kathleen Burton
CW West Coast Bureau

SAN JOSE, Calif. — Visicorp, the Silicon Valley firm that soared to success on sales of the popular Visicalc financial spreadsheet program, announced recently it will merge with Paladin Software Corp., a one-year-old Santa Clara, Calif., software firm.

The two privately held companies will consummate the agreement with the exchange of an undisclosed amount of stock, said Lydia Barnes, a product line manager at Paladin. Paladin, which was founded in October 1983 under the name Optisoft, is presently developing a business software product, Barnes said.

Visicorp's fortunes dipped last year when the company became involved in internal financial problems and a series of lawsuits with Software Arts, Inc. of Boston, which originally developed Visicalc. Sales of Visicorp's major software programs, Visicalc and Visi On, sagged during that time, and Visicorp eventually relinquished Visicalc copyright, trademark and license to Software Arts in an out-of-court settlement.

Over the past several months, Visicorp has been searching for new products and a new management team to replace several key executives who left the company, said Daniel Fylstra, Visicorp's chairman and chief executive officer. The Paladin merger and the separate sale of a Visicorp subsidiary, Communications Solutions, Inc. of San Jose, Calif., to Control Data Corp. of Minneapolis, will infuse Visicorp with a new management team, new business software products and much-needed cash, he said.

According to the agreement, Paladin's president, Roy Folk, formerly a product manager at Visicorp, will head the new company, which will continue to use the Paladin name. Fylstra will relinquish his duties, but will remain on the board of directors, and Richard Melmon, who became a Visicorp director last spring, will be named chairman of the new firm. Fylstra, who took over Visicorp's operations in July when then-president Terry Opdendyk resigned, would not reveal his plans.

Following the merger, the new company will continue using the name Visi for products that are already on the market, Fylstra said.

JOE M. HENSON

Joe M. Henson spent 28 years with IBM, where he rose to the position of vice-president, industry marketing, in the Data Processing Division. On Dec. 1, 1981, he was named president and chief executive officer of Prime Computer, Inc., which had been leaderless since former president Kenneth G. Fisher suddenly resigned earlier in the year. In an interview with** Computerworld **Senior Editor/Industry Peter Bartolik, Henson spoke of his and the company's transition since 1981 and changes in the industry.

"In IBM, you have a company that has a lot of history and a lot of time in developing its infrastructure, its planning capability, its coordination and integration capability. On the other hand, it is a much larger company, it is slower to make decisions, [it has] many many more levels of management. So there are pluses, and there are minuses. . . . As a matter of fact, I think I'd say the absence of cultural shock was surprising; it was one of the things I was prepared for — that after 28 years at IBM, [it would] be a great big cultural thing, but it wasn't."

"As you would expect under the circumstances, with the prior president having abruptly departed the company and then there being a period of six months when there was no president, there were a lot of transitional, emotional issues. The organization was certainly not stable. . . . So we went through a transitional period where it was necessary for some people to be replaced; some of the individuals who had joined that small start-up company in association with the prior president — as a matter of fact had been recruited from a long-time association with him — weren't interested in working in this company under a new set of management. Some of them made a lot of money and maybe weren't quite as eager to work now; they wanted to enjoy the rewards of their previous efforts. So we had to go through all of that. That was a difficult period, but I think we're through all that."

"So it's one thing to have a corporate strategy, a defined market and product direction you're pursuing, but we have to get the word out to all of the constituencies so that it's manifest and the implementation of it is clear. . . . We have not, until more recent times, invested the money to do that. Well, why haven't we? It's a logical question. Well, why didn't we spend the money? . . . By the time I get here, everybody has a 32-bit minicomputer. So what happens? The gross margins start eroding; we're in the worst economic recession in 40 years; we've got to ramp up the investment in R&D, so we take it from 7.5% to 10.1%; we've got to make that investment of tens of millions of dollars in customer service; we have to expand the sales force; and now, we want to invest money in advertising and sales promotion when we haven't invested in the past. Well, where's all of that going to come from? [How are you going to] maintain your profitability? . . . So where's it going to come from? What we've had to do is reset that economic model. We couldn't do it all at once without impacting the bottom line."

"Sure, I'm threatened by IBM and its size and its muscle. But the [fact remains that] we do have the enormity of the market going for us and the tremendous growth in the departmental level systems — the fastest growing segment of the marketplace, growing much, much faster than the large mainframe marketplace. We're fortunate, on the one hand, to be focused on the very segment of the market that is the fastest growing, that represents a tremendous opportunity for us; it represents a tremendous opportunity for a lot of other people, too, and they can see that."

Prime distinguished by lack of stand-alone micro product

One clear factor distinguishing Prime Computer, Inc. from its traditional competitors in the supermini-computer industry is the lack of a stand-alone microcomputer product, either developed internally or purchased from another company.

According to the company's president, Joe M. Henson, the company realized some factors that perhaps some of its competitors are just now coming to grips with. "I believe if you don't own the technology, and you don't own the sales and service outlets, you really don't control your own destiny," Henson said. "When I looked at the economies of scale, it was obvious to me that [the computer] business was going to be dominated by IBM and the other very, very large-volume players that are already there."

Henson also said, "I don't think a company the size of Prime is going to dominate the personal computer marketplace; that is folly. But we can certainly provide our customers with a capability to integrate workstations more tightly into a Prime network than personal computers acquired from others."

That is not to say the company didn't consider developing such a machine.

Gale Aguilar, vice-president of corporate business development and strategy, said, "We looked at bringing out a so-called [personal computer] some time ago and even put some effort into doing that." He explained that the company wanted to avoid the retail aspects of the micro arena, and concentrate on professional workstations.

"We still fully intend to have microprocessor-based workstations in our product line and, in fact, we do have one of the [Convergent Technologies, Inc.] versions in our office offering right now," Aguilar said.

The company also purchased the rights to the IBM-compatible DOT portable computer produced by Computer Devices, Inc., which has been operating under protection of Chapter 11 of the Federal Bankruptcy Act since last October.

John Maske, vice-president of manufacturing and service, said the company will introduce workstations under a variety of manufacturing scenarios. But, he added, "We're not out of manufacturing entirely; we are going to have something about a year and a half from now that might not be workstation size, but closely related to it, that we will develop and manufacture internally."

PRIME

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same thing. It is very hard to separate, in a company growing as fast as we've grown, where these events get triggered by changes in the company and the environment and where they get triggered by changes in people. Or maybe they go together; maybe when your environment changes, the better person to manage changes [with it]."

What is clear is that in the three years since Fisher departed the company, many have revised their perception of what kind of shape he left it in. Fisher was not available for comment, but analysts and current Prime executives now say that the company was overdue for internal change when he left.

Aguilar

"The issue at Prime was that too many people perceived the company incorrectly when Fisher left," according to Jay Stevens of Dean Witter Reynolds, Inc. "Under Fisher, [Prime] did not spend enough on R&D. The product line was mature."

Stephen K. Smith, of Paine Webber, Inc. observed, "One thing Henson has done in the first year or two [is] focus on a number of internal problems. . . . There were far too many levels of management; there were problems with equipment reliability. He's put them right, but it's taken a while."

Henson, while stressing that Prime had been extraordinarily successful, recently conceded, "I found a great number of problems that surprised me. And perhaps they shouldn't have, perhaps I should have more accurately anticipated those [problems]."

He cited among the problems the absence of a defined corporate strategy; a weakness in internal operational planning; an undertrained, undermanned and inadequate customer service program; and "at least two levels of organization too many" in the sales organization.

Perhaps most crucial was the level of spending on R&D. When Fisher left, according to company statistics, R&D spending was only 7.5% of revenues; Henson raised that to 8.5% in 1982 and 10.1% in 1983. The company is now committed to the 10% level for the long term.

According to Gerald Kokos, senior manager of investor relations and treasurer of Prime, the shortfall anticipated in revenues in the first and second quarters of 1983 was as much a surprise to the company as to Wall Street analysts. Kokos noted that 1982, a recessionary year for companies like DEC and Data General Corp., was a very strong year for Prime, particularly in the fourth quarter.

The company ramped up R&D spending and sales and support expenses based largely on 1982 results, Kokos added, so "we grew at a healthy 16% rate, but we had an expense base that was built up for 25% growth."

Henson added, "What we had to do was reset the economic model; we couldn't do it all at once without impacting the bottom line." He took pride in the fact that net operating margins were still relatively high during 1983 in comparison to competitors. Much of the 1983 problems resulted from new models introduced by competitors and greater price pressure from that competition. Henson said the company misjudged the pace of the economic recovery and wishes it could have more accurately prepared for the earnings dip. "But I wouldn't have changed the investment process; I think it was crucial," he declared.

Those investments began to pay off last year and this year, with the introduction of the high-end 9950, which, prior to announcement of DEC's latest high-end machine, Prime claimed was the top price/performance machine when evaluated in transactions processed in the multiuser, multifunction environment to which it caters. Since DEC's announcement, Prime spokesmen said the new VAX was not unexpected and does not deter Prime's own development plans. Dean Whitter's Stevens said, "I think next year Prime will bring out a comparable machine to the Venus introduced by DEC."

Prime also took comfort from the fact that DEC's latest VAX model uses emitter-coupled logic (ECL) semiconductors, as opposed to Shottky transistor-transistor logic gate arrays. Prime led the way in this area with an ECL-based 9950 and midrange 9750. The company also touts its Primos operating system that runs on all equipment from the high to low end.

One area the company has stayed out of is the microcomputer arena (see story page 136). Henson and the other officers said they made a conscious decision to stay away from the commodity micro market. But the company was also relatively late bringing out workstation products to work with its superminis. John Maske, vice-president of manufacturing and service, said the company recognizes it is late in that area, "but we don't think the parade has passed us by." Prime has been selling a Convergent Technologies, Inc. workstation under the Prime label and is committed to more.

Although the company in its first decade made its success based on pushing good machines out the door, the focus under Henson is now to identify key market areas where the company can establish itself as a total solutions system provider. A decision made prior to Henson's arrival was to focus on the office automation area, but the company stubbed its toe when software it purchased proved to have problems that effectively killed that strategy.

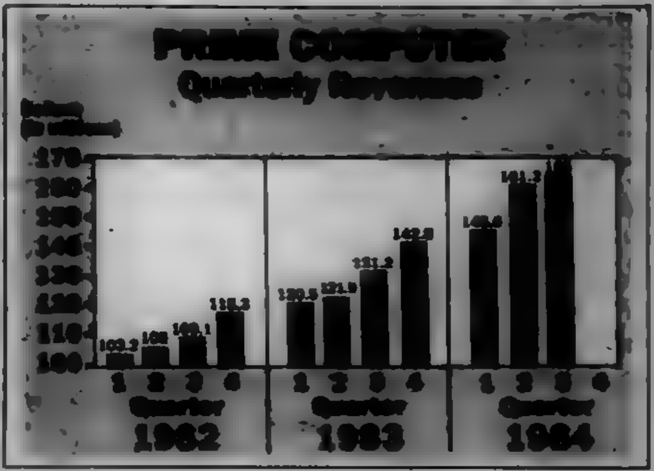
Now, the goal in the office automation arena is to provide a general-purpose system with word processing and electronic mail capabilities, along with the communications capabilities provided by Prime's Ringnet and Primenet networks. "Our view is that word processing and office automation are generic capabilities of any general purpose computer," Henson said.

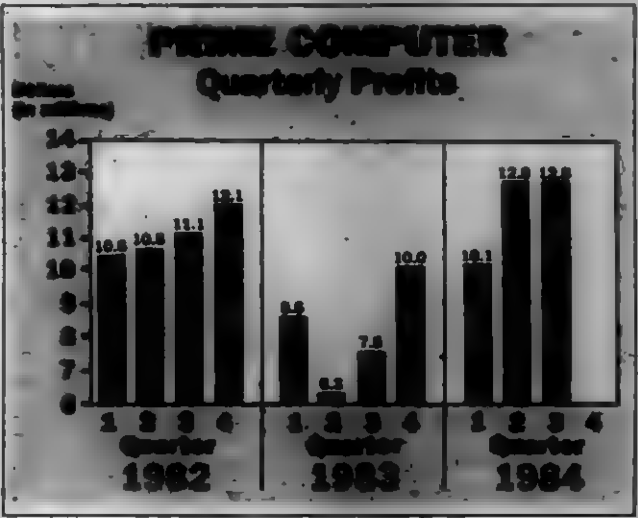
Where OA has been discounted as an overall strategy, the company's goals in the area of computer-aided design and manufacturing (CAD/CAM) are stronger than ever. According to Paine Webber's Smith, "With CAD/CAM, [Prime's] done a good job, but it's a very competitive business, and it has to pay close attention."

The other part of Henson's "sharply focused strategy" is to target the distributed data processing market aggressively. Henson said the company protects users' investment in software by maintaining one operating system for the entire product line. But the company is also intent on abiding by industry standards and is working to make Primos coresident with AT&T's Unix, should that evolve into the standard that has been predicted.

Despite the problems of 1983, Prime expects a record earnings year for 1984. Henson said he believes Prime is well positioned for the future.

"We've been embracing new technologies more aggressively. We took a long look and prioritized our development activities to focus more toward high-gross-margin, high-end products than we did toward the low end."





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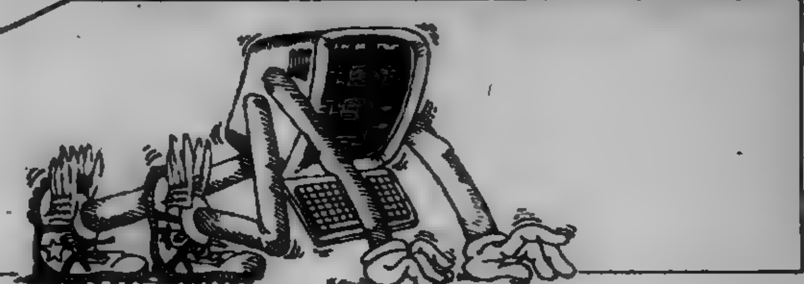

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Franklin to free assets in effort to settle with creditors

Legal battles with Apple placed New Jersey-based manufacturer in financial straits

PENNSAUKEN, N.J. — Franklin Computer Corp., the personal computer manufacturer that filed Chapter 11 bankruptcy proceedings in June [CW, July 2], recently said it will liquidate its assets to settle with creditors.

In a reorganization plan filed with U.S. Bankruptcy Court in Philadelphia, Franklin outlined its plans to liquidate its assets, a court spokeswoman said last week. For the past several years, Franklin has been troubled by legal battles with Apple Computer, Inc. involving software copyright infringements. In January, Franklin agreed to pay Apple $2.5 million and promised to cease marketing some of its products.

But the suit put heavy financial strains on the company. In bankruptcy papers filed last summer, Franklin listed assets of $83.9 million and liabilities of $22.8 million. Three of the company's five largest, unsecured creditors are computer companies, including Texas Instruments, Inc., Key Tronic Corp. and Apple. Franklin also owes $4.9 million to its largest secured creditor, National Westminster Bank USA.

This summer the company laid off 160 of 275 employees. Two months ago, the company shifted to a four-day work week.

Marvin Krasny, counsel for the bankrupt company, told *Computerworld* that Franklin will take between six months and a year to liquidate and give the proceeds to its creditors. After that time, he said, it is expected the company will be out of business.

Limited manufacturing will continue in order to convert some of the firm's existing parts into finished inventory, he noted.

Assets and inventory have been written down since the company filed for protection, and current assets are listed at about $15 million, Krasny said.

A question remains as to whether some of the company's intangible assets will be leased or sold.

The reason for the six- to 12-month liquidation period is because the company is "trying to get top dollar," for the assets, Krasny said. "We are not going to sell them off under a hammer at an auction," he said.

Morton David, Franklin chairman and chief executive officer, also announced that former Vice-President Michael Strange was appointed president of the company, succeeding Joel Shusterman, a Franklin founder who returned to the company after the May resignation of R. Barry Borden.

Sperry forms AI center, inks joint pacts

By Charles Babcock
CW New York Bureau

NEW YORK — Sperry Corp. has consolidated its artificial intelligence and expert systems activity into a Knowledge Systems Center in Minneapolis and has signed letters of intent with two other companies for joint AI efforts.

Both moves are needed for Sperry "to move artificial intelligence technology out of the laboratories and into commercially viable applications," Sperry's Executive Vice-President Joseph J. Kroger said at the company's advanced technology symposium recently held in New York.

New York-based Sperry plans to team up with Texas Instruments, Inc. of Dallas to produce specialized processors for Lisp, AT&T's Unix and new man-machine interfaces. It will also offer TI's Explorer and other artificial-intelligence-based products, Kroger said.

Explorer, announced earlier this year, is an AI development environment supplied with separate communicating processor boards designed to support the Unix operating system and symbolic processing.

Sperry also plans to distribute jointly the Knowledge Engineering Environment software system produced by Intellicorp of Menlo Park, Calif., and use the system itself in developing expert-systems-based products, Kroger added.

Varied operational problems

Sperry programs will address operational problems in manufacturing, financial services and energy industries as well as federal and local government applications, he said.

The $20 million Knowledge Systems Center will combine Sperry's four electronics-based business units: Information Systems Group in Blue Bell, Pa.; Defense Products Group in Eagan, Minn.; Systems Management Group in Great Neck, N.Y.; and Aerospace and Marine Group in Phoenix.

The center will be under the direction of Larry L. Walker, former director of interconnect and marketing strategies.

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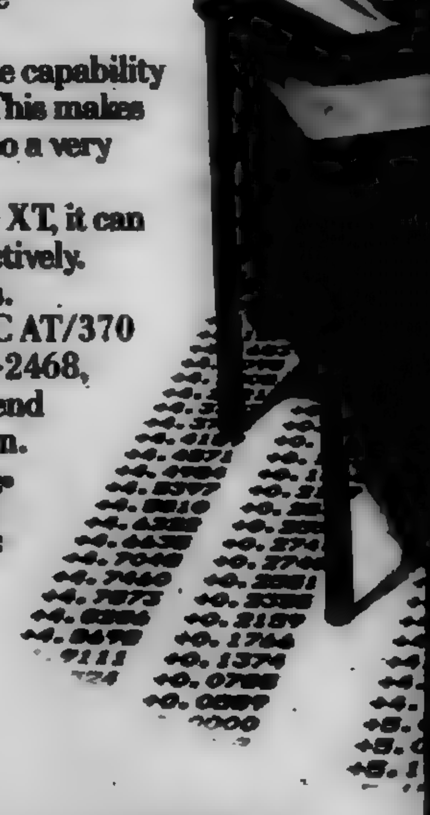

The Smart Desk from IBM

VAX 8600 predicted to fuel DEC's revenue rebound

By David Olsen
CW Staff

BOSTON — One day after the long-awaited announcement of Digital Equipment Corp's. high-end superminicomputer, the VAX 8600, DEC President Kenneth H. Olsen asserted that his company has put its problems behind it and is gathering momentum.

"A year ago, we had trouble explaining what we were going to do," Olsen told shareholders, analysts and other attendees at DEC's Nov. 1 annual meeting here. He was referring to last year's meeting during which the company announced a staggering 73% drop in first-quarter earnings to baffled shareholders.

"We have forgotten about that," Olsen said of the first quarter of 1983. "The basic problems we generated for that first quarter are not with us [any longer]."

In contrast to a year ago, Olsen could enjoy some good news. The VAX 8600 announcement, he said, received an "enthusiastic reception" from analysts and the press. He could also bask in the company's recent financial results, which showed first-quarter profits and revenue up sharply from a year earlier.

Olsen noted, however, that the Maynard, Mass., company's first-quarter profits were boosted by a nonrecurring tax benefit from a tax law change governing overseas trading. "We will not see this again next year," he said, but added that the company's performance "will always be measured against" the previous year's results, including the tax credit.

Commenting on whether the powerful 8600 is an effort to go after a piece of IBM's market, Olsen said the answer is "Obviously, no. IBM is eight times bigger than we are. It is mathematically impossible for us to take over IBM," Olsen said. The company's objective, he said, is to prevent IBM from making inroads into DEC's customer base. "IBM has no reason to worry about us. We have a lot of reason to worry about them."

However, Olsen's statements regarding IBM seemed at odds with remarks he made a day earlier at the 8600 unveiling. Asked then if the No. 2 computer maker was planning to compete directly with IBM's product line, Olsen replied, "What do you think we have been doing for the past two years?"

Discussing the company's strategy, Olsen said DEC is committed to the concept of clustering VAXs to a common data base as a way of achieving a single, high-performance system. "We believe that clustering gives all the benefits of multiprocessing and more," he said.

Retail market bomb

Olsen conceded that the company's personal computers "bombed in the retail market." He attributed that lack of success to retail customers not knowing for what purposes they wanted to use personal computers. He claimed DEC's personal computers have sold well to "our kind of customers."

Olsen asserted that DEC's personal computer line is not dead yet. "We're just starting," he said. "The personal computer is a key part of our strategy."

Olsen defended the company's marketing of its personal computers by downplaying the importance of advertising. "Marketing . . . always means, first of all, defining the product, defining customers' needs and then matching them," he said. If a product meets those criteria, he added, "with or without Charlie Chaplin or space things, it will sell."

"We didn't get to $5.6 billion [in annual revenue] without a little scheming about how we sell," Olsen said. "And if you can sell without looking too obvious, it's better."

Olsen was also asked when he expects the company's operating profit margins to return to their historic double-digit levels. In the fiscal year ended June 30, DEC's operating margin was 6%.

"Our historic attitude has been never to make promises," Olsen said. He said he hopes DEC's new products will help restore the company's past profit levels, but he noted that a "pending economic slowdown" in the U.S. does not bode well for a speedy change in the situation.

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DEC officer leaves position

MAYNARD, Mass. — Alfred M. Bertocchi, chief financial officer of Digital Equipment Corp. since 1971, has stepped down from that position, according to an announcement made by company President Kenneth Olsen Nov. 1.

Olsen said Bertocchi had asked to reduce his responsibilities at the company. However, Bertocchi will continue to work for DEC on a consulting basis.

While Bertocchi served in his position, DEC's annual revenues grew from $140 million to $5.6 billion. "[Bertocchi] is one who always had very good sound judgment and wisdom on financial matters," Olsen said.

AEA lauds Wang; cites arts, educational contributions

By David Gimes
CW Staff

BOSTON — An Wang, who 34 years ago founded a small electronics company that he proceeded to build into a world leader in office automation, was awarded the American Electronics Association's (AEA) 1984 Medal of Achievement last month.

Wang

Wang, chairman of the board and chief executive officer of Wang Laboratories, Inc. in Lowell, Mass., accepted the award at the AEA's annual meeting here.

"I accept this honor on behalf of my colleagues at Wang Laboratories who have helped me in my work. This award is, indeed, a tribute to their faith in progress through technology," Wang said in accepting the award.

The medal is the AEA's highest award, presented annually for significant contributions to the advancement of electronics. The medal recognizes overall accomplishment rather than specific inventions or contributions. Other considerations include service to the community, humanitarian organizations and educational institutions.

Last year's recipient of the medal was John G. Linvill of Stanford University, Stanford, Calif.

Dean O. Morton, AEA chairman and chief operating officer of Hewlett-Packard Co., said Wang was being recognized not only for his technical achievements, but also for "his contributions of both time and financial aid to educational institutions, the community and the arts. Dr. Wang has taken his responsibilities beyond the successful management of his company and into the community."

Wang stressed the need for the U.S. to foster a forward-looking, aggressive educational policy in order to maintain its technological supremacy. "As the leaders of an industry whose continued success depends upon education, we have a vital stake in ensuring that our educational institutions keep pace with high technology's ever-increasing need for highly educated individuals," he said.

At the same time, Wang noted, "We should remember that our fervor for the new technology must be tempered with an abiding respect for our humanistic values and traditions. Accordingly, we must remember the importance of our great cultural institutions and their profound contributions to the quality of life within our communities."

He urged the roomful of top computer industry executives to support cultural activities because "without our commitment, they cannot sustain the artistic and cultural endeavors which bring grace and dignity to our lives."

A graduate of Chiao Tung University in Shanghai and Harvard University in Cambridge, Mass., Wang began his computer manufacturing company in Boston's South End in 1951. In the early 1950s, he invented the magnetic core memory, which for more than two decades was a basic component of the computer.

Wang Laboratories introduced a desktop computer called Loci in 1964. A forerunner of the company's electronic desk calculator, it had a keyboard resembling that of an adding machine, but offered the user the unique feature of generating logarithms with a single keystroke.

In fiscal 1984, Wang Laboratories reported net income of $210 million on revenues of $2.1 billion.

Intel licenses Fujitsu to produce, market 16-bit microprocessors

SANTA CLARA, Calif., — Intel Corp. last week announced it will grant Fujitsu Ltd. a license to manufacture and market Intel's 80186 and 80286 16-bit microprocessors and the 8051 microcontroller.

According to Intel, the agreement includes the 80188, an 8-bit bus version of the 80186, and the 82284 clock generator and 82288 bus controller support devices for the 80286.

The agreement expands the 1981 technology exchange pact between the two companies, in which Fujitsu was granted a second source license for Intel's 8086 and 8088 microprocessors, the 8089 coprocessor and support devices. The current agreement reportedly provides for the transfer of mask-set information from Intel to Fujitsu. Fujitsu said it plans to have its sample available in mid-1985, with Intel's 8051 available as early as January.

Michael Gumport, an analyst with Paine Webber, Inc., said the Intel move is in keeping with Intel's plans to provide second sourcing in Europe, Japan and the U.S.

Matami Yasufuku, Fujitsu executive director, said the agreement enables Fujitsu to give full support to expansion from a 4-bit to an 8- or 16-bit microprocessor.

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Signetics cuts defense firm shipments

By Kathleen Burton
CW West Coast Bureau

SUNNYVALE, Calif. — Semiconductor manufacturer Signetics Corp. stopped shipping electronic chips to 25 of its defense contractors early last month, after a voluntary internal audit in mid-September revealed possible testing irregularities in 1,200 types of chips destined for military users.

Signetics, one of the largest military chip suppliers, which sells about $70 million in chips annually to military contractors, said it voluntarily notified defense contractors of the potential irregularities and said the discrepancies may involve chips shipped since 1981.

Signetics spokesman Ronald Deutsch said the company did not test its semiconductors according to the electrical specifications originally drawn up by its defense contractors. He noted that in most cases, the contractors had verbally approved waivers in the electrical testing requirements for the chips, but had failed to confirm the changes in writing. Signetics' internal audit was prompted by an incident last September at Texas Instruments, Inc., when IBM discovered that TI had not fully tested its military chips, he said.

According to a semiconductor industry analyst who asked not to be identified, the incidents at TI and Signetics underscore a long-standing practice among Department of Defense (DOD) contractors to use internal testing requirements for chips rather than DOD-approved standards. He said contractors generally create their own testing requirements, called source control drawings, for chips that do not already have formal military testing standards because it sometimes takes as much as a year for DOD engineers to devise formal testing protocols for new chips.

A spokesman for IBM, a major Signetics customer and defense contractor, said it has stopped shipping military equipment using Signetics chips until the irregularities are more clearly identified.

Prime acquires Japan-based distributor

NATICK, Mass. — Prime Computer, Inc. last month announced it has acquired its exclusive Japanese distributor to sell and service Prime systems in Japan.

The company purchased Prime Computer Japan, Inc. from Marc Analysis Research Corp. of Palo Alto, Calif., in a cash transaction. A spokeswoman for the company [redacted]

Prime said the new wholly owned subsidiary, to be headquartered in Tokyo, will focus on marketing its computer-aided design and manufacturing systems and its Prime Information relational data base management programs, both of which have been modified for the Japanese language.

The company also announced the creation of its sixth overseas regional office, the North Pacific Zone Office, in Tokyo. The office will oversee Prime's Japanese subsidiary and its distributorships in Taiwan and South [redacted]

[redacted] aging director of the subsidiary and general manager of the regional office. Stratton formerly was national marketing manager for Prime Computer of Australia Ltd.

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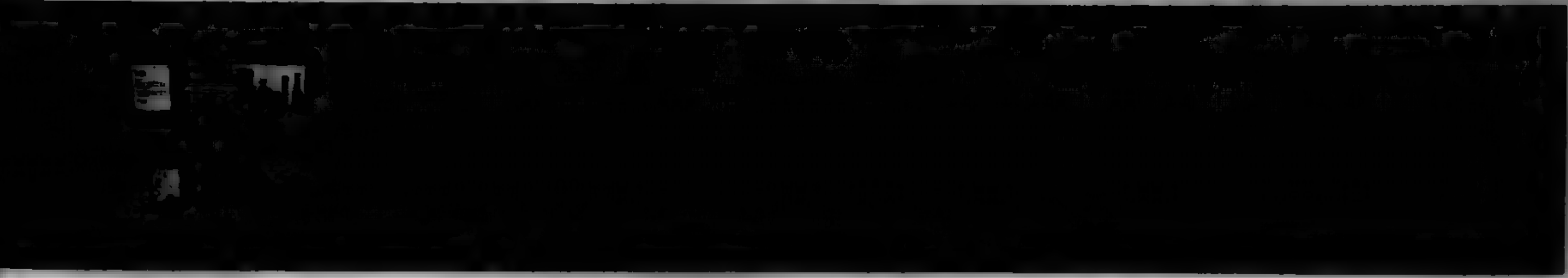

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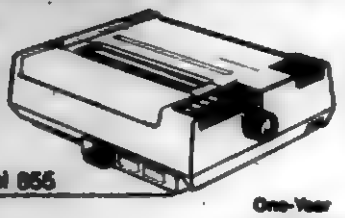

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Computer Task Group, Inc. reported revenues for the third quarter ended Sept. 30 of $21.8 million, compared with $13.5 million in the comparable period one year ago. Profits were $538,000, or 26 cents per share, compared with $406,000, or 21 cents per share, in the same period one year earlier.

■

Cipher Data Products, Inc. reported profits for the first quarter ended Sept. 30 of $3.7 million, or 28 cents per share, compared with $2.2 million, or 17 cents per share, in the corresponding quarter last year. Revenues were $38.8 million, compared with $24.1 million in the same period a year ago.

■

Integrated Device Technology, Inc. announced that profits for the second quarter ended Sept. 30 rose to $1.7 million, or 12 cents per share, compared with a loss of $556,000, or 6 cents per share, in the comparable period one year ago. Revenues were $9.6 million, compared with $2.6 million in the same quarter a year ago.

■

GTE Corp. reported profits for the third quarter of $277 million, or $1.36 per share, compared with $236 million, or $1.22 per share, in the same period one year ago. Revenues were $3.6 billion, compared with $3.3 billion a year ago.

■

Applied Data Research, Inc. reported revenues for the three months ended Sept. 30 of $33.6 million, compared with $24.8 million in the same quarter one year earlier. Profits were $2.5 million, or 47 cents per share, compared with $3.1 million, or 58 cents per share, in the comparable period last year.

■

Nashua Corp. announced profits for the third quarter ended Sept. 28 of $3.9 million, or 82 cents per share, compared with $2.5 million, or 53 cents per share, for the same period a year ago. Revenues were $144.8 million, compared with $137 million, for the year-earlier period.

■

Printronix, Inc. reported profits for the second quarter of $2.8 million, or 61 cents per share, compared with $1.6 million, or 35 cents per share, in the same quarter last year. Revenues were $37.4 million, compared with $26.9 million for the comparable quarter one year earlier.

■

Computer & Communications Technology Corp. announced revenues for the third quarter ended Sept. 29 of $31.6 million, compared with $22.8 million last year. Profits were $3.2 million, or 41 cents per share, compared with $1.5 million, or 20 cents per share, in the same period last year.

■

Communications Satellite Corp. announced profits for the third quarter ended Sept. 30 of $12.8 million, or 71 cents per share, compared with $12.7 million, or 71 cents per share, reported for the same period one year earlier. Revenues were $109.9 million, a decrease of $4.4 million from the third quarter of 1983.

■

Mentor Graphics Corp. reported revenues of $24.2 million for the third quarter ended Sept. 30, compared with $7.9 million for the same period a year ago. Profits were $2.3 million, or 17 cents per share, compared with $419,000, or 5 cents per share, for the same quarter last year.

See DIMES page 146

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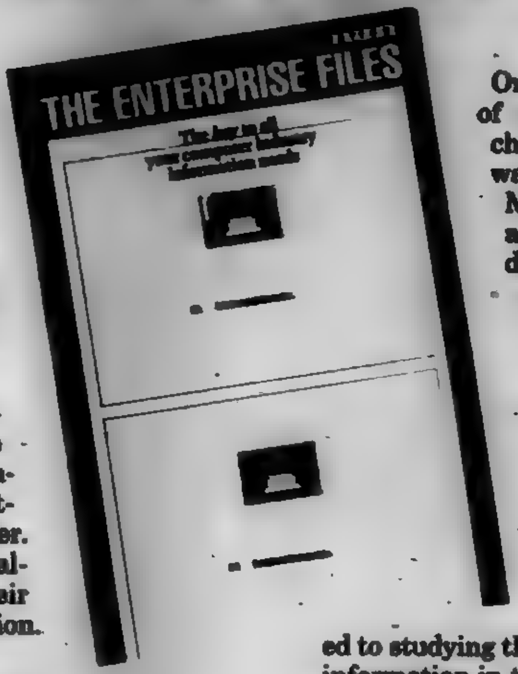

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IDC

INTERNATIONAL DATA CORPORATION

DIMES

from page 144

Perfect Data Corp. announced revenues for the quarter ended Sept. 30 were $1.7 million, compared with $1.2 million in the same period a year earlier.

■

Altos Computer Systems, Inc. reported profits for the first quarter ended Sept. 29 of $3.7 million, or 25 cents per share, compared with $1.1 million, or 8 cents per share for the same quarter a year ago. Revenues were $33.3 million, compared with $18.1 million in the corresponding quarter last year.

■

Micro D, Inc. announced that it will take a one-time $2.5 million charge against earnings in the fourth quarter ending Oct. 31, representing a write-down of inventory and accounts receivable.

■

The write-down will result in an estimated pretax loss in the fourth quarter of approximately $1.6 million. This represents an estimated after-tax loss of approximately $850,000, or 13 cents per share.

■

Computer Automation, Inc. reported a net loss of $589,000, or 29 cents per share, compared with a net loss of $2.8 million, or $1.40 per share, in the same quarter one year earlier. Revenues were $14.2 million, compared with $12.1 million in the same period last year.

■

Miniscribe Corp. reported a third-quarter net loss of $2,5 million, or 13 cents per share, compared with 1.4 million, or 5 cents per share, in the same period one year ago. Revenues were $26.1 million, compared with $21.7 million in the same quarter last year.

■

Corporate Data Sciences, Inc. announced a net loss for the quarter ended Aug. 31 of $251,203, or 5 cents per share, compared with $79,616, or 6 cents per share, in the same period one year earlier.

■

Zenith Electronics Corp. reported profits for the third quarter ended Sept. 29 of $21.9 million, or 99 cents per share. Profits include a domestic international sales corporation tax adjustment for $10.4 million, or 47 cents per share. Third-quarter revenues were $436 million, compared with $341 million for the same period last year.

■

U.S. Design Corp. reported revenues for the three months ended Sept. 30 of $1.3 million vs. $1 million in the same period one year ago. The company's net loss in the first quarter was $469,006, compared with a net loss of $473,000 incurred in the same quarter one year earlier.

■

Hogan Systems, Inc. reported revenues for the second fiscal quarter of $11.3 million, compared with $8.5 million for the same period one year ago. Profits were $1 million, or 7 cents per share, compared with $1.8 million, or 14 cents per share, in the comparable quarter one year earlier.

■

Integrated Software Systems Corp. announced revenues for the third quarter ended Sept. 30 of $8.8 million, an increase of 40% from last year's revenues of $6.3 million. Profits were $1.1 million, or 22 cents per share, compared with $955,000, or 18 cents per share, in the same quarter one year ago.

■

Iomega Corp. reported revenues for the third quarter ended Sept. 30 of $1.56 million, compared with $3.2 million in the same period one year ago. Profits were $1.7 million, or 13 cents per share, compared with a loss of $2.4 million, or 21 cents per share, in the corresponding period one year earlier.

■

Lee Data Corp. announced revenues for its second quarter ended Sept. 30 of $22.2 million, compared with $22.6 million in the same quarter one year ago. Profits were $1.6 million, or 12 cents per share, compared with $4.2 million, or 30 cents per share, in the second quarter of the previous year.

■

Dataproducts Corp. reported revenues of $114.1 million for the second quarter ended Sept. 29, compared with $91.4 million in the same period one year earlier. Profits were $5.4 million, or 26 cents per share, compared with $5.1 million, or 25 cents per share, for the same quarter one year ago.

■

Intergraph Corp. reported revenues for the third quarter ended Sept. 30 of $105.4 million, compared with $67.2 million in the same period one year earlier. Profits were $17.3 million, or 67 cents per share, compared with $7.7 million, or 30 cents per share, for the comparable period one year ago.

■

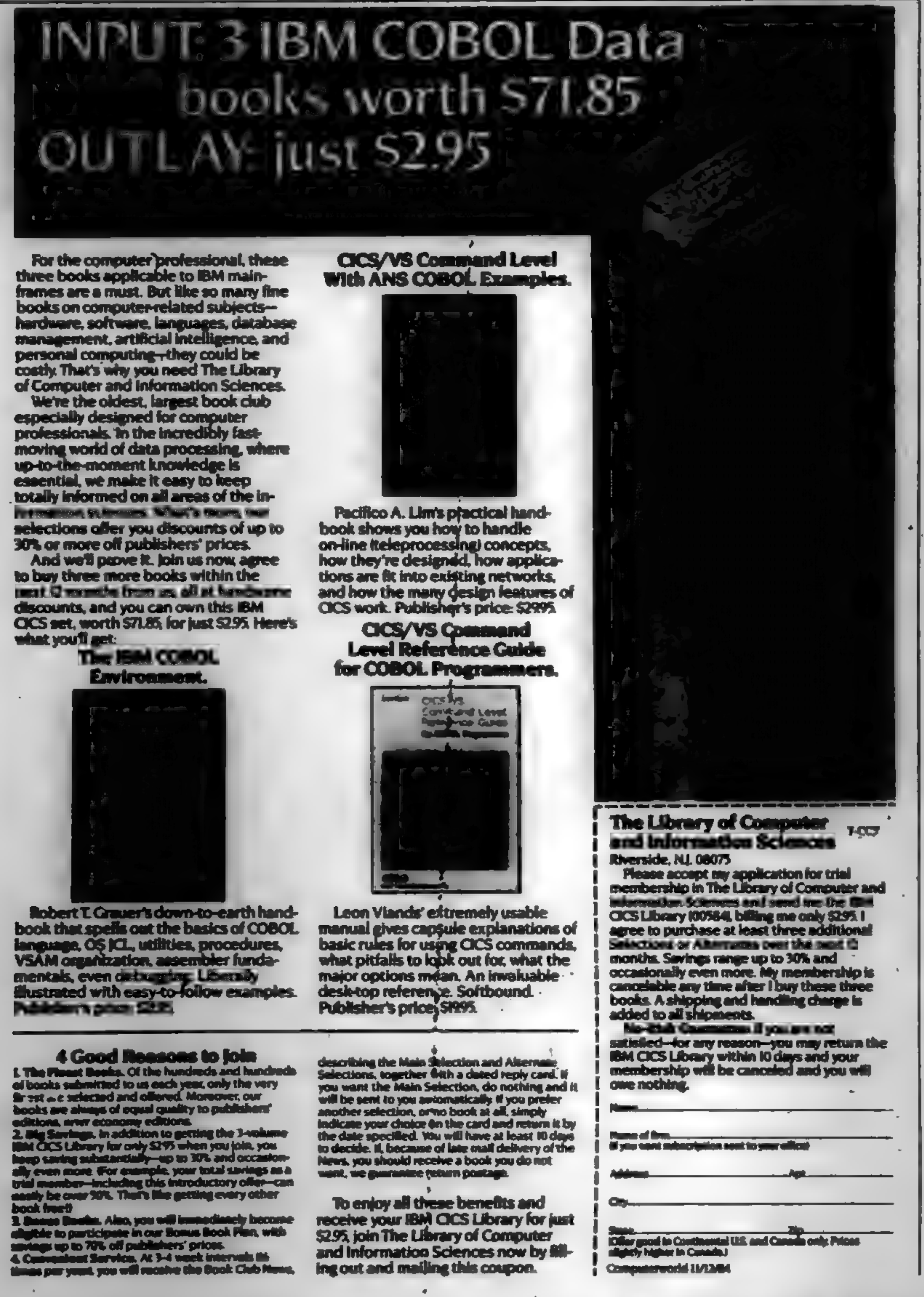
Mentor Graphics Corp. announced revenues for the third quarter ended Sept. 30 of $24.2 million, compared with $7.9 million in the same period a year ago. Profits were $2.3 million, or 17 cents per share, compared with $419,000, or 5 cents per share, for the same quarter one year earlier.

■

Evans & Sutherland Computer Corp. reported revenues for the third quarter of $17.6 million, compared with $16.7 million in the same quarter last year. Profits were $1.7 million, or 19 cents per share, compared with $2.9 million, or 33 cents per share, in the comparable period one year earlier.

■

Seagate Technology reported revenues of $50.6 million for its first fiscal quarter ended Sept. 30, compared with $50.6 million for the comparable year-ago quarter. Profits were $577,000, or 1 cent per share, com-



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pared with $4.4 million, or 10 cents per share, for the year-earlier period.

■

Computer Associates International, Inc. announced revenues for the second quarter ended Sept. 30 of $31 million, a 70% increase compared with $18.2 million for the year-earlier period. Profits were $2.2 million, or 21 cents per share, compared with $1.5 million, or 15 cents per share, for the same period a year ago.

■

AGS Computers, Inc. announced revenues for the third quarter ended Sept. 30 of $56.1 million, compared with $38.7 million in the comparable period a year earlier. Profits were $1.7 million, or 34 cents per share, compared with $1.5 million, or 34 cents per share, in the same quarter last year.

■

Ramtek Corp. reported revenues for the first quarter ended Sept. 30 were $10.7 million, compared with $9.4 million for the corresponding period last year. Profits were $92,000, or 3 cents per share, compared with a loss of $715,000, or 21 cents per share, in the same quarter one year ago.

■

Daisy Systems Corp. announced that revenues for the fourth quarter ended Sept. 30 were $21.8 million, compared with $7.3 million in the corresponding period one year earlier. Profits were $3.3 million, or 22 cents per share, compared with $1.7 million, or 11 cents per share, in the same period one year ago.

■

Quantum Corp. reported revenues for the second quarter ended Sept. 29 were $30 million, compared with $15.1 million for the same quarter a year earlier. Profits were $4.6 million, or 49 cents per share, compared with $2.4 million, or 26 cents per share, in the corresponding period a year ago.

■

Compugraphic Corp. reported revenues for the third quarter ended Sept. 29 of $101.3 million, compared with $81 million in the comparable quarter one year earlier. Profits were $6.5 million, or 79 cents per share, compared with $4.7 million, or 57 cents per share, in the previous year's quarter.

■

Informatics General Corp. announced revenues for the third quarter of $53.8 million, compared with $45.7 million in the same period one year earlier. Profits were $1 million, or 19 cents per share, compared with $2.3 million, or 42 cents per share, for the corresponding quarter a year ago.

■

Compaq Computer Corp. reported revenues for the third quarter ended Sept. 30 were $87.5 million, compared with $36 million in the same quarter one year earlier. Profits were $1.8 million, or 7 cents per share, compared with $882,000, or 3 cents per share, in the corresponding period one year ago.

■

Seeq Technology, Inc. announced profits for the fourth quarter ended Sept. 30 were $1.4 million, or 11 cents per share, compared with a net loss of $4.5 million, or $2.08 per share, in the like period last year. Revenues were $15.1 million, compared with $ 3.6 million in the same quarter one year earlier.

■

STC

from page 135

Fujitsu are really starting to come on stream," and are ready to jump in with the newer technology. The Japanese companies, he predicted, will each ship more disk drives next year than the entire domestic plug-compatible manufacturers were "hoping to ship this year."

Sharply limited focus

Most analysts believe STC might still salvage something, but that something will be a sharply reduced and limited focus, as opposed to the optimistic goals of simultaneously competing with high-end disk drives, developing optical storage and putting out a Cmos-based mainframe.

"I would not expect STC to fail," said James Porter, president of Disk/Trend, Inc., a Los Altos, Calif., market research firm. "I would expect it to have to shrink back somewhat to conserve cash and maybe to defer some of its newer programs."

Porter said STC is still delivering 3380 equipment drives and large quantities of tape drives, "so they have an excellent ongoing business."

He said STC's biggest in-house development program is the optical disk drive. Deliveries of that product reportedly are not scheduled until first quarter 1985. The other new program is STC's version of a tape drive to use IBM's 18-track tape drive program. If financing for these development programs is cut back as part of the reorganization, the company's long-term future may be grim indeed.

Most analysts seem to be waiting to see whether some other company — the Japanese and other U.S. computer companies are most often mentioned — will seek to acquire parts or the whole of STC. Fram, however, took a dim view of this alternative, wondering who would want to get into a business that looks so frail. Thomas Crotty of the Gartner Group, however, noted that STC has an established sales and support base, along with clean, modern manufacturing facilities.

The question the user community must face is whether any domestic company can survive IBM's massive power. STC, Memorex and CDC had yet to achieve full speed in manufacturing and distribution of IBM's 3380; yet IBM is widely believed to be preparing the announcement of two enhanced models. By the time any company could counter that, Big Blue would probably be ready with yet another step forward.

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WYOMING

Higher Education Computer Network

The Wyoming Higher Education Computer Network (WHECN) is operated by the University of Wyoming to serve the administrative and instructional computing needs at the seven community colleges located throughout the State of Wyoming. Each college has substantial administrative and academic computers in addition to a connection to the CDC CYBER 835 and 760 computing facility at the University in Laramie. In support of this activity, the following position is available for immediate hire:

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- Administrative User Services

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Each college has a Microdata Reality or Sequel computer system running the PICK operating system. Applications include payroll, accounts receivable, accounts payable, general ledger, registration and inventory. Some travel to each college will be necessary.

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This position will require some travel within the state. Starting salary will range from $21,336 to $26,712 depending on qualifications and experience.

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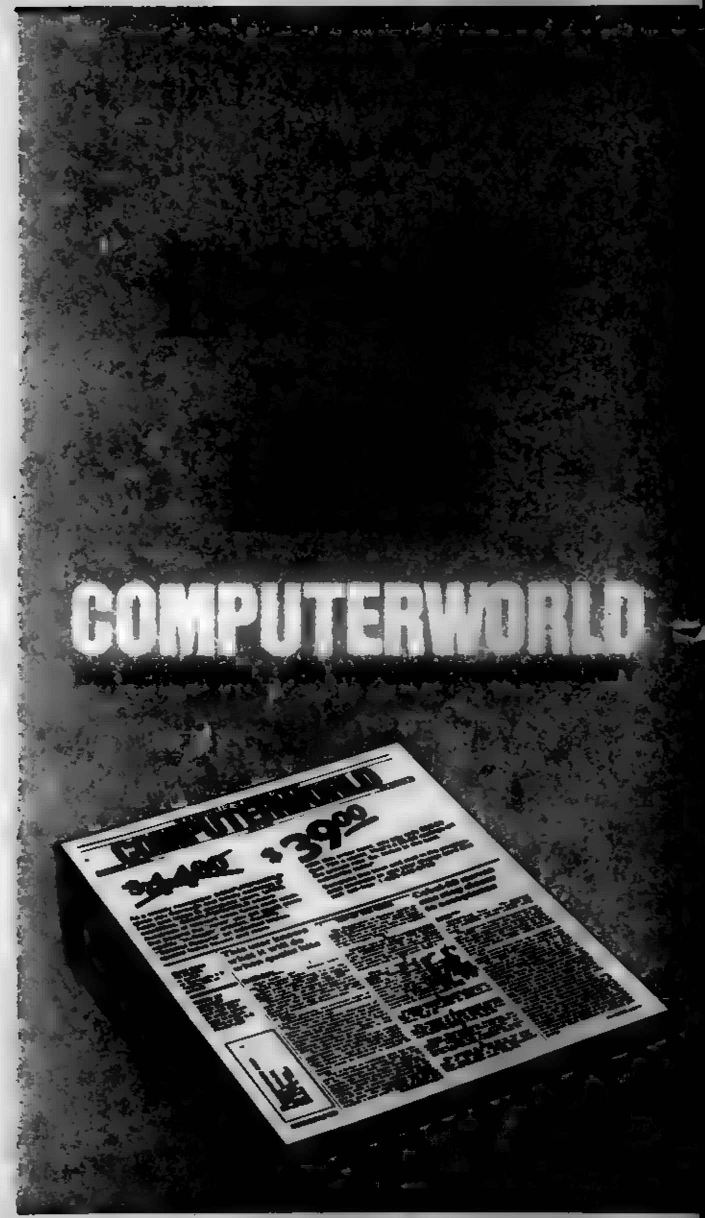
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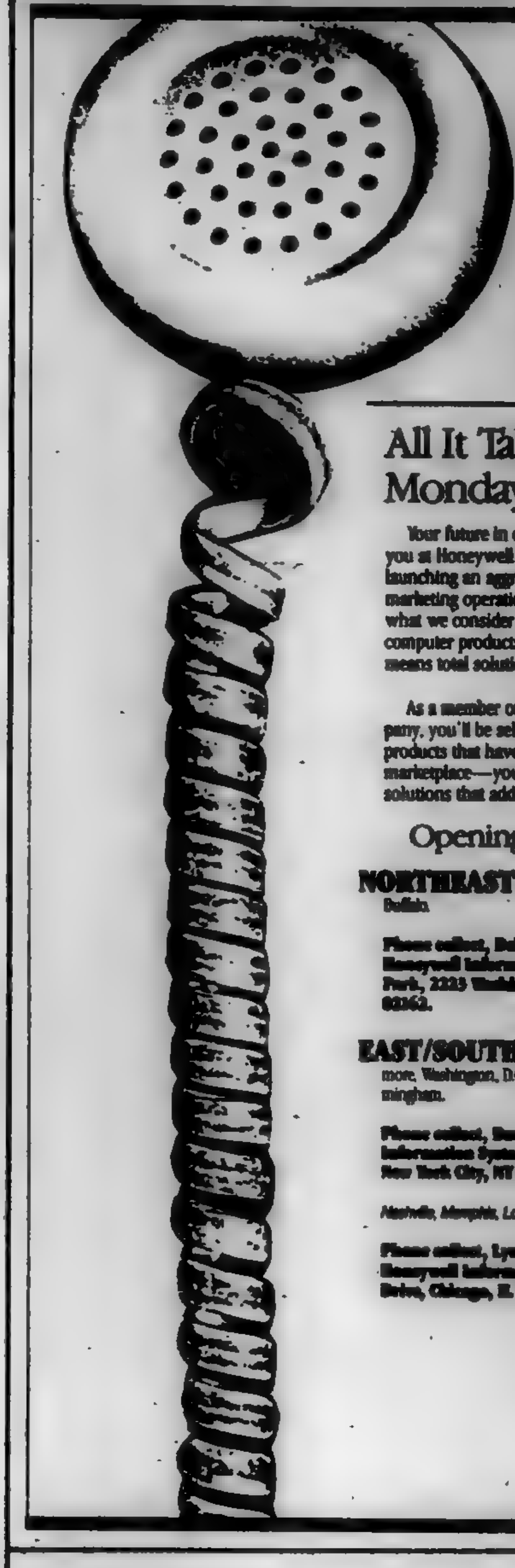

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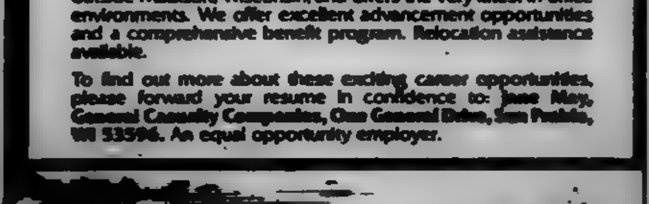

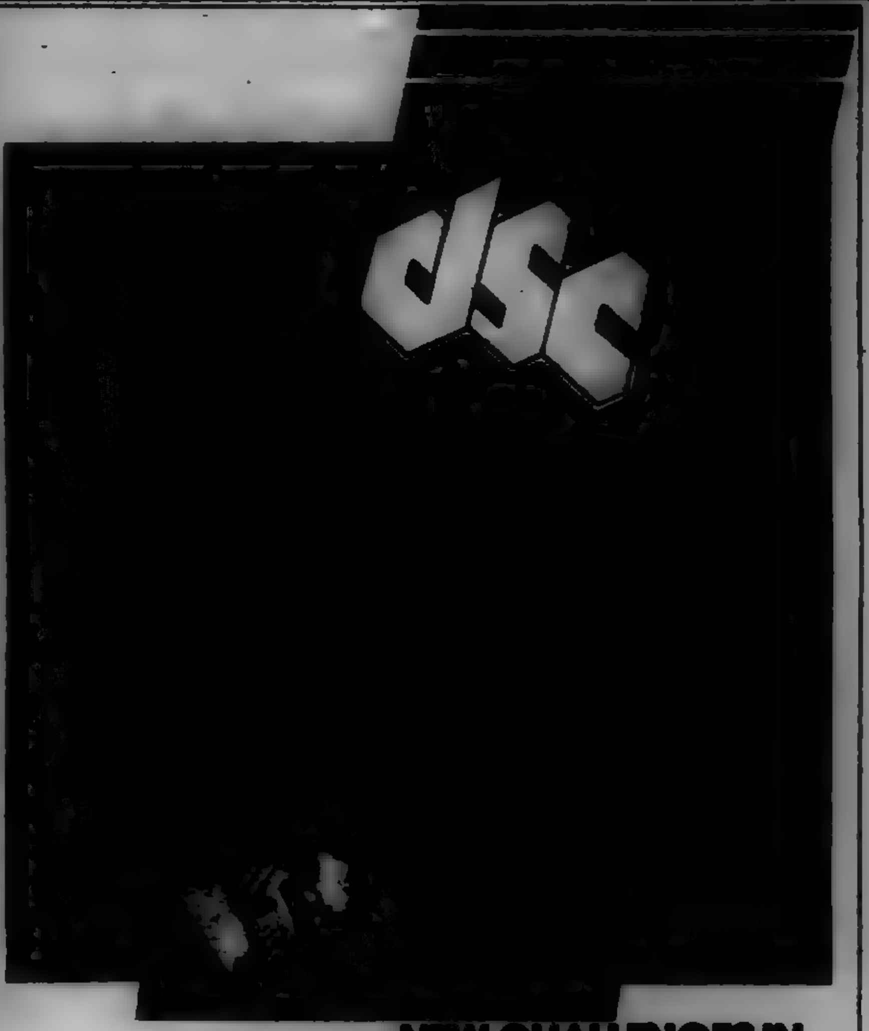

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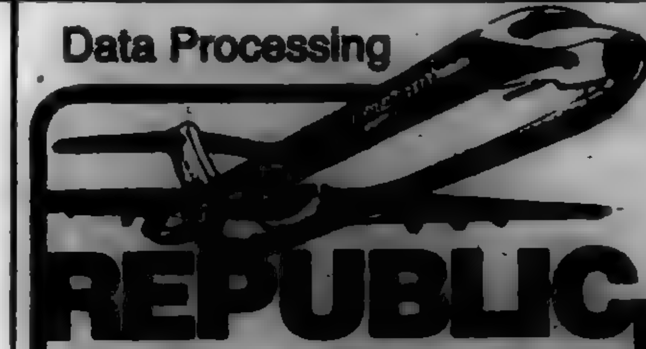

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Computing Centre

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MANAGER OF SYSTEMS DEVELOPMENT - Manage development and implementation of planned application systems; exercise centralized control over developmental activities. Requires extensive experience in systems development, with four years in a supervisory capacity.

MANAGER OF DATA RESOURCES - Manage the company's migration from a conventional data processing to a data-base environment. Requires practical experience in developing and successfully implementing shared data-bases, with four years in a supervisory capacity.

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MIT

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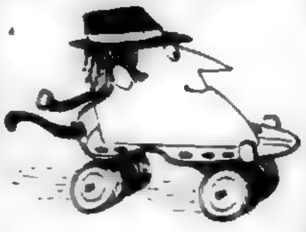

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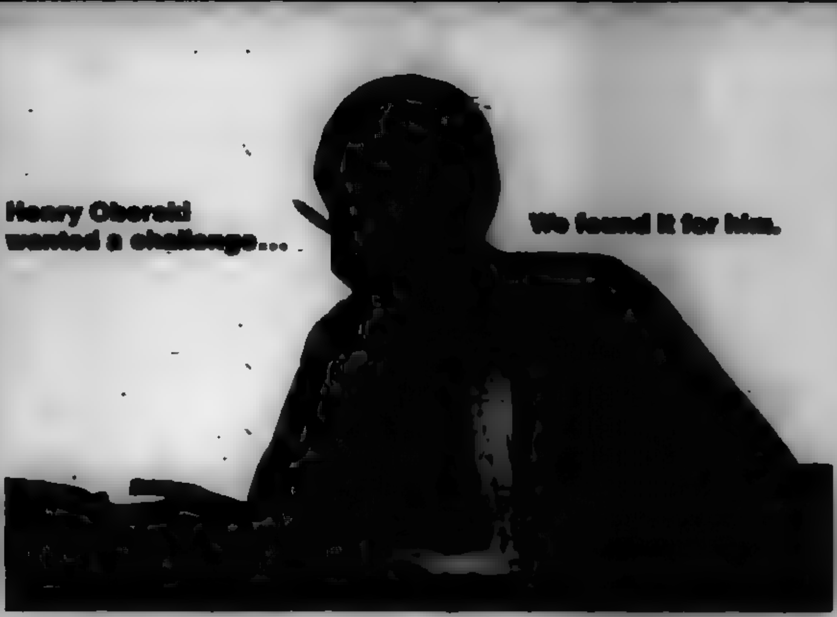
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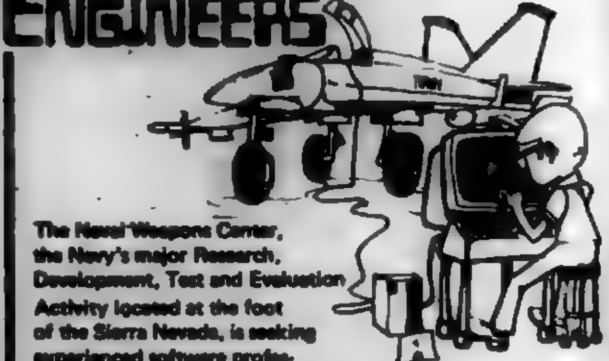

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Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

General Request for Proposal No. 981 due 3:30 p.m., Tuesday, December 11, 1984, for the general acquisition of consulting services to address upcoming project needs in the areas of feasibility study, systems analysis and design, and systems development and implementation. This is a general RFP to be used to select consulting services for the State of Mississippi during 1985.

General Request for Proposal No. 982 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of IBM [illegible] compatible terminals and printers. This is a general RFP to be used to select terminals and printers for the State of Mississippi during 1985.

General Request for Proposal No. 983 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of data entry services for State Agencies and Institutions. This is a general RFP to be used to select data entry services for the State of Mississippi during 1985.

General Request for Proposal No. 984 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of IBM 3270 compatible CRT's, printers, and controllers. This is a general RFP to be used to select terminals for the State of Mississippi through 1985.

General Request for Proposal No. 985 due 3:30 p.m., Tuesday, December 11, 1984 for the acquisition of microcomputers, peripherals and software. This is a general RFP to be used for acquiring micros for teaching, data acquisition and a variety of other purposes for the State of Mississippi during 1985.

General Request for Proposal No. 986 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of small, microcomputer-based CAD systems, graphics terminals, plotters and related peripherals. This is a general RFP to be used to select graphics equipment for the State of Mississippi through 1985.

General Request for Proposal No. 987 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of ASR and KSR hardcopy terminals. This is a general RFP to be used to select terminals for the State of Mississippi during 1985.

General Request for Proposal No. 988 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of receive-only printers to attach to TTY compatible CRT's. This is a general RFP to be used to select printers for the State of Mississippi during 1985.

General Request for Proposal No. 989 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of TTY compatible CRT's. This is a general RFP to be used to select CRT's for the State of Mississippi during 1985.

General Request for Proposal No. 990 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of acoustic couplers. This is a general RFP to be used to select couplers for the State of Mississippi during 1985.

General Request for Proposal No. 991 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of low to medium speed synchronous and asynchronous modems ranging in speed up to 3600 baud. This is a general RFP to be used to select modems for the State of Mississippi through 1985.

General Request for Proposal No. 992 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of medium, high, and wideband modems ranging in speed from 4800 through 56K baud. This is a general RFP to be used to select modems for the State of Mississippi during 1985.

General Request for Proposal No. 993 due 3:30 p.m., Tuesday, December 11, 1984, for the acquisition of short haul modems, line drivers and modem eliminators. This is a general RFP to be used to select special purpose modems for the State of Mississippi during 1985.

Request for Proposal No. [illegible] due 3:30 p.m., Wednesday, November 28, 1984, for the acquisition of a minicomputer to be used for data acquisition and general data processing for the Physical Acoustic Research Laboratory at the UNIVERSITY OF MISSISSIPPI.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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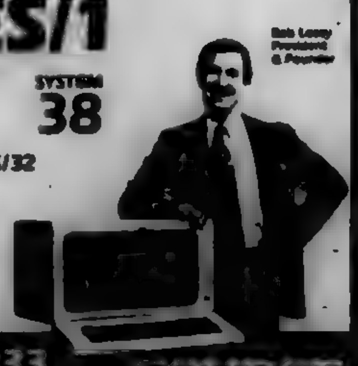

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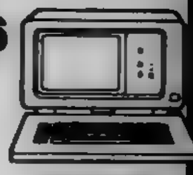

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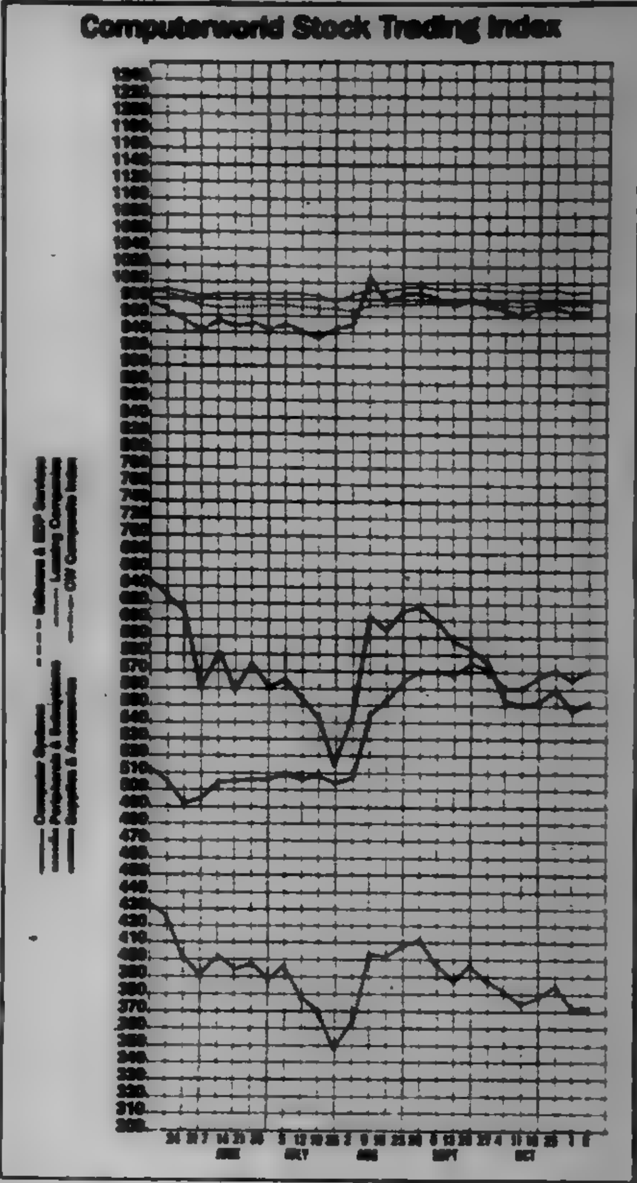

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 7, 1984

All statistics compiled
computed and formatted
by
TRADE QUOTES INC
Cambridge Mass 02139

COMPUTER SYSTEMS

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 7 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	6- 24	7 7/8	+ 1/4	+3.2
O	ALTOS COMPUTER SYST	6- 18	9 3/8	+ 1/8	+1.3
A	AMDAHL CORP	10- 30	12 3/4	- 3/8	-3.3
O	APPLE COMPUTER INC	18- 63	25 3/4	+ 7/8	+3.5
N	AT&T	15- 21	18 3/4	+ 1/4	+1.3
N	BURROUGHS CORP	44- 59	56 1/8	0	0.0
O	COMPAQ COMPUTER CP	6- 19	9 3/8	- 1/4	-4.4
O	COMPUTER AUTOMATION	3- 17	3 1/8	- 1/8	-4.4
A	COMPUTER CONSOLES	3- 26	8 3/4	- 3/8	-4.4
N	CONTROL DATA CORP	25- 62	30 1/8	+4 1/4	+16.5
O	CONVERGENT TECHNOL	7- 46	6 3/8	- 1/8	-1.9
N	CRAY RESEARCH INC	30- 80	52 3/4	+ 3/4	+1.4
O	DAISY SYSTEMS CORP	14- 30	20 1/8	+ 1/4	+0.9
N	DATA GENERAL CORP	37- 90	65	+3 3/8	+5.4
N	DATAPOINT CORP	14- 36	17 7/8	- 7/8	-4.7
N	DIGITAL EQUIPMENT	84-125	101 3/4	+ 7/8	+0.9
A	EECO INC	12- 16	13 3/8	+ 1/4	+1.9
A	ELECTRONIC ASSOC.	3- 15	3 3/8	- 5/8	-15.6
A	FLOATING POINT SYST	13- 46	18 1/8	+ 7/8	+5.0
N	FOXBORO	28- 47	32 3/8	+1 1/4	+4.0
O	GENERAL AUTOMATION	6- 16	6 1/4	+ 5/8	+11.1
N	GOULD INC	21- 44	25 3/4	- 3/4	-2.8
N	HARRIS CORP	29- 49	35	+ 1/4	+0.8
N	HEWLETT-PACKARD CO	32- 48	37 1/4	+1	+2.7
N	HONEYWELL INC	46- 69	58 7/8	+ 3/8	+0.6
N	IBM	103-134	123 3/4	+1 1/8	+0.9
O	IPL SYSTEMS INC	3- 14	3	0	0.0
N	ITT CORP	21- 47	28 1/8	+ 1/4	+0.9
N	M/A-COM INC	13- 38	18 1/8	+ 1/2	+2.8
O	MANAGEMENT ASSIST	3- 29	25 7/8	- 1/8	-0.4
O	MATSUSHITA ELEC(ADR)	[illegible]	85 1/2	- 1/8	-0.7
N	MODULAR COMPUTER SYS	6- 18	7 1/4	- 1/8	-1.6
N	MOHAWK DATA SCI	3- 17	3 5/8	- 3/8	-5.0
N	MOTOROLA INC	29- 49	34 5/8	- 1/8	-0.3
N	NAT'L SEMICONDUCTOR	11- 28	12 1/4	+ 3/8	+3.0
N	NBI INC	17- 38	16 7/8	- 1/4	-1.4
N	NCR	25- 34	28 3/8	+ 1/2	+1.3
N	PERKIN-ELMER	18- 37	25 1/4	+3	+12.9
N	PRIME COMPUTER INC	13- 26	16 3/4	0	0.0
N	SPERRY CORP	38- 50	39	+1 3/8	+3.5
O	STRATUS COMPUTER INC	9- 17	16	+ 1/2	+3.2
O	TANDEM COMPUTERS INC	15- 46	19	+ 3/4	+4.1
N	TANDY CORP	24- 62	34 5/8	+1 1/8	+3.7
O	TELEVIDEO SYSTEMS	3- 16	2 1/4	- 1/8	-7.1
O	TELXON CORP	6- 17	16 3/4	0	0.0
N	TEXAS INSTRUMENTS	101-160	126 3/8	-1 1/8	-0.9
A	ULTIMATE CORP	13- 24	16	- 3/4	-4.4
O	VECTOR GRAPHICS INC	0- 9	3/4	0	0.0
A	WANG LABS "B"	24- 42	28	+2	+7.6
A	WANG LABS "C"	24- 42	27 7/8	+1 3/8	+5.1
N	XEROX CORP	35- 52	37	+1 1/2	+4.2

LEASING COMPANIES

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 7 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	16- 22	21	- 1/2	-2.3
A	CIS CORP	6- 10	6 3/4	- 3/4	-10.0
N	COMDISCO INC	10- 42	12	- 1/4	-2.0
O	CONTINENTAL INFO SYS	3- 16	7 3/8	+ 3/8	+5.3
N	DPF INC	10- 16	15 3/4	- 3/8	-2.3
O	FINALCO GROUP INC	4- 12	6 1/8	+ 1/4	+4.1
A	PHOENIX AMERICAN INC	3- 17	3 1/4	- 5/8	-16.1
O	SELECTERM INC	11- 21	10 1/2	0	0.0
N	U.S. LEASING	29- 44	38 3/4	+ 1/8	+0.3

COMPONENTS

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 7 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	20- 41	28	-1	-3.5
O	ADV'D SEMICONDUCTOR	16- 28	15 1/4	- 1/4	-1.5
N	ANALOG DEVICES INC	20- 32	24	+1	+4.2
O	ANALOGIC CORP	10- 20	13 3/8	+1 1/8	+9.1
N	APPLIED MAGNETICS CP	8- 27	9 1/4	+ 1/8	+1.3
O	[illegible] CORP	6- 12	6 5/8	- 1/8	-1.8
O	MICRO MASK INC	10- 19	10 3/8	0	0.0
N	TERADYNE	22- 38	28 7/8	+ 1/4	+0.9

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SOFTWARE & EDP SERVICES

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 7 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 6	2 1/2	0	0.0
N	ADVANCED SYSTEMS INC	10- 22	14 1/2	- 1/8	-0.8
O	AGS COMPUTERS INC	12- 28	12 1/2	- 1/4	-1.9
O	AMERICAN SOFTWARE	13- 31	17	-1 1/4	-6.8
N	ANACOMP INC	2- 10	2 3/4	- 1/8	-4.3
O	ANALYSTS INTL CORP	8- 17	9 1/4	- 1/8	-1.3
N	APPLIED DATA RES	10- 37	26 3/8	+ 3/8	+1.4
O	ASHTON TATE	6- 15	6 1/2	- 1/2	-7.1
O	ASK COMPUTER SYSTEMS	13- 21	16 1/8	+1	+6.6
O	ASTROSYSTEMS INC	1- 7	1 5/8	-1/16	-3.8
N	AUTOMATIC DATA PROC	30- 44	37 3/4	+ 3/8	+1.0
O	COMPUTER ASSOC INT'L	15- 30	17 3/4	+ 1/2	+2.9
O	COMPUTER HORIZONS	5- 28	6 3/8	+ 5/8	+10.9
O	COMPUTER NETWORK	5- 11	8 1/2	+1 1/4	+17.2
N	COMPUTER SCIENCES	14- 29	18 1/2	+ 7/8	+5.0
O	COMPUTER TASK GROUP	10- 18	10 1/4	+ 1/8	+1.2
O	COMPUTER USAGE	6- 10	6	0	0.0
O	COMPUTONE SYSTEMS	4- 20	7 1/2	+ 7/8	+13.2
O	COMSERV CORP	1- 16	2 3/4	+ 1/4	+10.0
O	COMSHARE	7- 14	7 3/8	0	0.0
N	CULLINET SOFTWARE	24- 50	42 3/8	- 3/4	-1.7
O	CYCARE SYSTEMS INC	14- 28	17 3/8	- 3/4	-4.1
O	[illegible] SYSTEMS INC	10- 27	10	- 1/4	-2.4
N	GENERAL ELECTRIC CO	48- 58	57 5/8	+ 1/4	+0.4
N	GTE CORP	36- 46	42 3/8	+ 7/8	+2.1
N	INFORMATICS GENERAL	11- 22	14 1/2	+ 3/4	+5.5
O	INFORMATION SCIENCE	5- 17	5 1/4	0	0.0
O	INFOTRON SYSTEMS CP	14- 40	16	+ 1/4	+1.6
O	KEANE ASSOCIATES	6- 15	12	0	0.0
A	LOGICON	18- 32	28 1/4	+1 1/2	+5.6
O	LOTUS DEVELOPMENT CP	13- 40	20	+1 3/4	+9.6
O	MCI COMMUNICATIONS	6- 20	8 3/4	0	0.0
O	MGMT SCI AMER INC	9- 30	15 3/8	+ 7/8	+6.0
O	MATHEMATICAL APP GRP	6- 10	8 1/2	0	0.0
O	MICOM SYSTEMS INC	11- 30	18 3/4	0	0.0
O	MICROPRO INT'L CP	3- 16	3	- 3/8	-11.1
O	[illegible] CP	6- 20	14 3/4	- 1/8	-0.8
O	NATIONAL DATA CORP	9- 25	9 5/8	- 1/2	-5.4
O	ON-LINE SOFTWARE INT	6- 20	9 1/2	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	11 7/8	+ 3/4	+6.7
O	PLANNING RESEARCH	10- 21	11 3/8	+ 3/8	+3.4
O	POLICY MGMT SYSTS CP	20- 38	25 1/2	+1 1/8	+4.6
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O	REYNOLDS & REYNOLDS	20- 33	32 3/4	+ 3/4	+2.3
O	SEI CORP	11- 30	13 3/8	+ 1/2	+3.7
O	SHARED MEDICAL SYST	23- 40	26 3/4	- 1/2	-1.8
O	SCIENTIFIC COMPUTERS	4- 14	6 1/8	+ 1/8	+2.0
O	SOFTWARE AG	9- 15	14 3/8	+1 3/4	+10.3
N	[illegible] CORP	10- 18	13 3/8	+ 1/8	+0.9
N	UCCEL	7- 17	12	- 1/8	-1.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 7 1984	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	2- 7	2 7/8	0	0.0
A	ANDERSON JACOBSON	6- 26	4 3/4	- 1/2	-9.5
O	AUTO-TROL TECHNOLOGY	14- 29	9 3/4	- 1/4	-2.5
O	AVANT-GARDE COMPUTING	13- 29	20	+ 1/4	+1.2
O	BANCTEC INC	5- 22	6 3/4	-1	-12.9
A	BEEHIVE INT'L	1- 13	3/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	20 1/8	- 3/8	-1.8
O	CAMBEX CORP	1- 3	2 1/4	0	0.0
N	CENTRONICS DATA CORP	6- 20	10 1/2	- 3/4	-6.6
A	CETEC CORP	7- 12	8 1/4	+ 1/8	+1.5
A	COMPUTRONICS	4- 10	4 1/4	+ 1/8	+3.0
N	COMPUGRAPHIC CORP	20- 40	20 1/2	- 1/8	-0.6
O	COMPUTER TRANSCEIVER	1- 10	3/8	- 1/8	-14.3
N	COMPUTERVISION CORP	29- 58	41	-1 1/8	-2.6
A	CONRAC CORP	11- 24	13 7/8	0	0.0
A	DATAPRODUCTS CORP	15- 32	16 1/2	+1 3/8	+9.2
A	DATARAM CORP	6- 12	6 1/2	+ 1/4	+4.0
O	DATA SWITCH CORP	6- 41	7	+ 1/4	+3.7
O	DATUM INC	9- 17	9 1/4	0	0.0
O	DECISION DATA COMPUT	9- 14	12 1/4	- 3/8	-2.9
O	DOCUTEL-OLIVETTI	3- 20	6 3/8	+ 1/4	+4.7
N	ELECTRONIC M & M	6- 11	6 1/4	- 1/2	-7.4
O	EMDATA, INC	7- 16	9 1/4	- 3/4	-7.5
O	EVANS & SUTHERLAND	13- 50	18 1/2	-1 1/2	-10.7
O	[illegible] TECHNOLOGIES	9- 14	12 3/8	+ 1/4	+1.9
N	GEN'L DATA COMM IND	14- 28	17 7/8	+ 1/8	+0.7
N	HAZELTINE CORP	16- 28	20 7/8	- 7/8	-4.0
O	ICOT CORP	3- 8	3 3/8	+ 1/8	+3.8
O	INFORMATION [illegible], INC	10- 19	11 1/2	- 1/4	-2.1
O	INTECOM INC	7- 28	9 5/8	-1 1/4	-11.4
O	INTEL CORP	27- 48	30	+1 1/8	+3.9
A	LUNDY ELECTRONICS	7- 19	8 5/8	- 3/8	-4.1
O	[illegible] CORP	6- 13	12 3/8	+ 1/2	+4.0
A	MSI DATA CORP	3- 23	9 7/8	+ 3/8	+3.9
N	NASHUA CORP	19- 28	25 3/8	+ 1/8	+0.4
O	NETWORK SYSTEMS CORP	16- 34	30	+1 1/2	+5.2
N	NO AMERICAN PHILIPS	30- 46	37 1/2	- 5/8	-1.6
N	NORTHERN TELECOM LTD	30- 46	39 3/4	- 5/8	-1.6
O	OMEX	1- 6	1/8	0	0.0
N	PARADYNE CORP	11- 28	14 5/8	+ 3/4	+5.4
A	PENRIL CORP	3- 14	11 1/2	0	0.0
N	PLESSEY CO (ADR)	20- 41	27 3/4	+1 1/4	+4.7
O	PRINTRONIX INC	16- 30	19 1/4	-2 1/4	-10.4
O	[illegible] CORP	6- 23	6 1/4	+ 1/8	+2.1
N	RECOGNITION EQUIP	10- 17	13 3/8	+ 3/8	+2.8
N	[illegible] CORP	[illegible]	60 3/8	+ 7/8	+1.5
N	SANDERS ASSOCIATES	[illegible]	[illegible]	- 3/4	-1.9
O	SCAN DATA	1- 8	3/8	0	0.0
O	SCAN-TRON CORP	3- 19	11 3/4	+ 1/2	+4.4
N	SCIENTIFIC ATLANTA	9- 25	9	+ 1/8	+1.4
O	SEAGATE TECHNOLOGY	9- 22	9 1/8	- 1/8	-1.4
N	STORAGE TECHNOLOGY	3- 29	4 1/8	+1 1/2	+57.1
O	SYKES DATATRONICS	3- 13	1 1/2	- 1/8	-7.6
O	SYSTEMS & COMP TECH	20- 50	26 1/4	- 1/2	-1.8
A	T BAR INC	7- 17	9 3/4	+ 1/8	+1.3
A	TAB PRODUCTS CO	12- 26	16 1/2	- 3/8	-2.2
O	TANDON CORP	3- 35	8	+ 1/8	+1.5
A	TEC INC	6- 13	8 3/8	+ 1/8	+1.5
N	TEKTRONIX INC	50- 67	60 3/4	+2 1/2	+4.3
N	TELEX	10- 25	20 1/4	-1 1/8	-5.2
O	[illegible] SYSTEMS CP	3- 17	5 1/2	+ 1/8	+11.1
N	TIMEPLEX INC	10- 30	17 3/4	- 1/4	-1.3
O	VISUAL TECHNOLOGY	3- 26	2 3/4	- 1/8	-4.3

SUPPLIES & ACCESSORIES

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 7 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	17- 23	20 3/4	- 3/8	-1.8
N	BARRY WRIGHT	20- 28	23 1/8	- 3/4	-3.1
O	DUPLEX PRODUCTS INC	20- 27	25 1/2	+ 1/4	+1.0
N	ENNIS BUS. FORMS	14- 30	23 7/8	0	0.0
N	3M COMPANY	70- 90	80 3/8	+1 3/8	+1.6
N	MOORE CORP LTD	30- 44	42 3/4	+2	+4.7
N	STANDARD REGISTER	27- 45	41 1/8	+ 1/4	+0.6
N	WALLACE COMP SERVICE	25- 30	30	+ 3/8	+1.2

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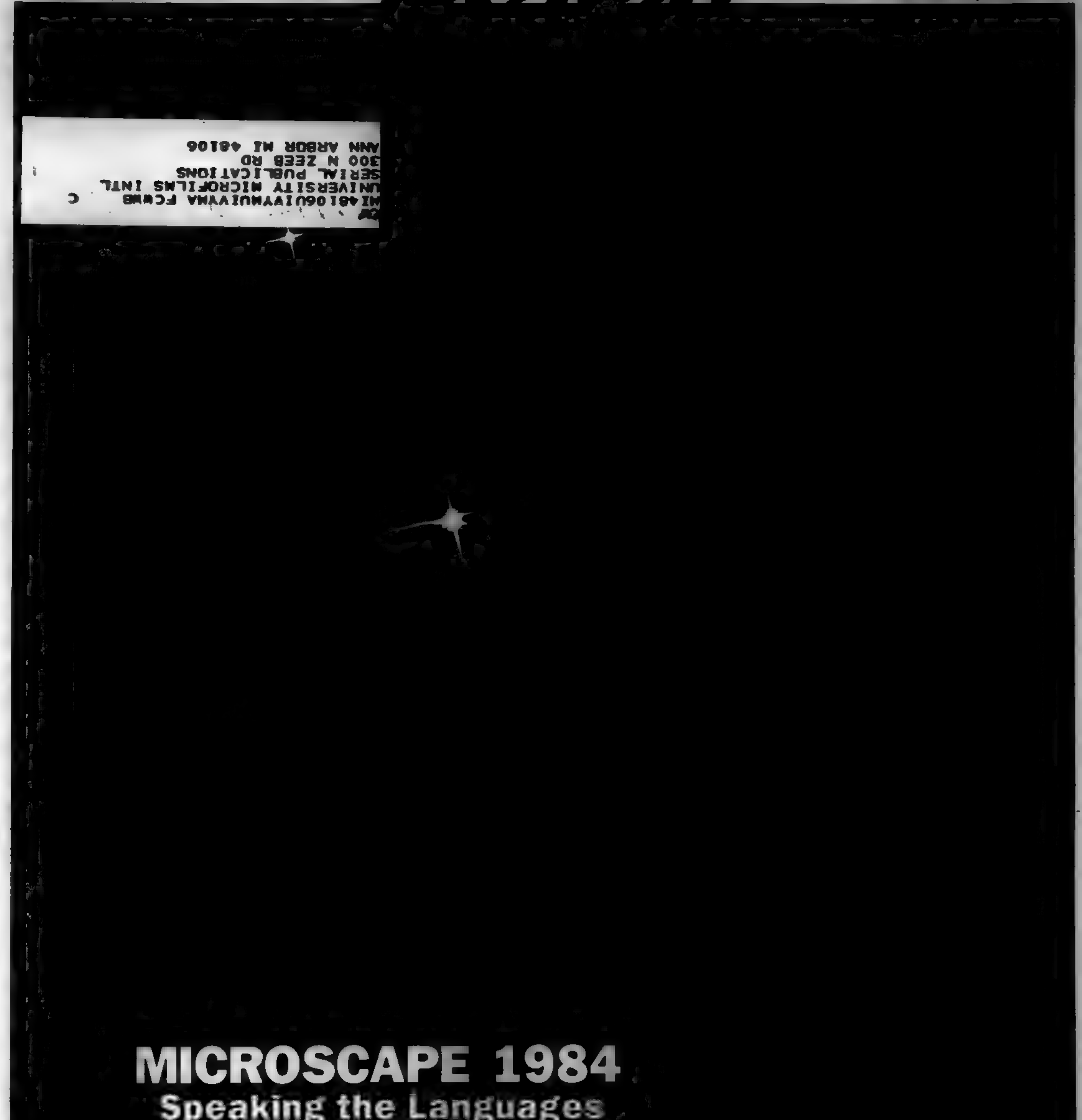

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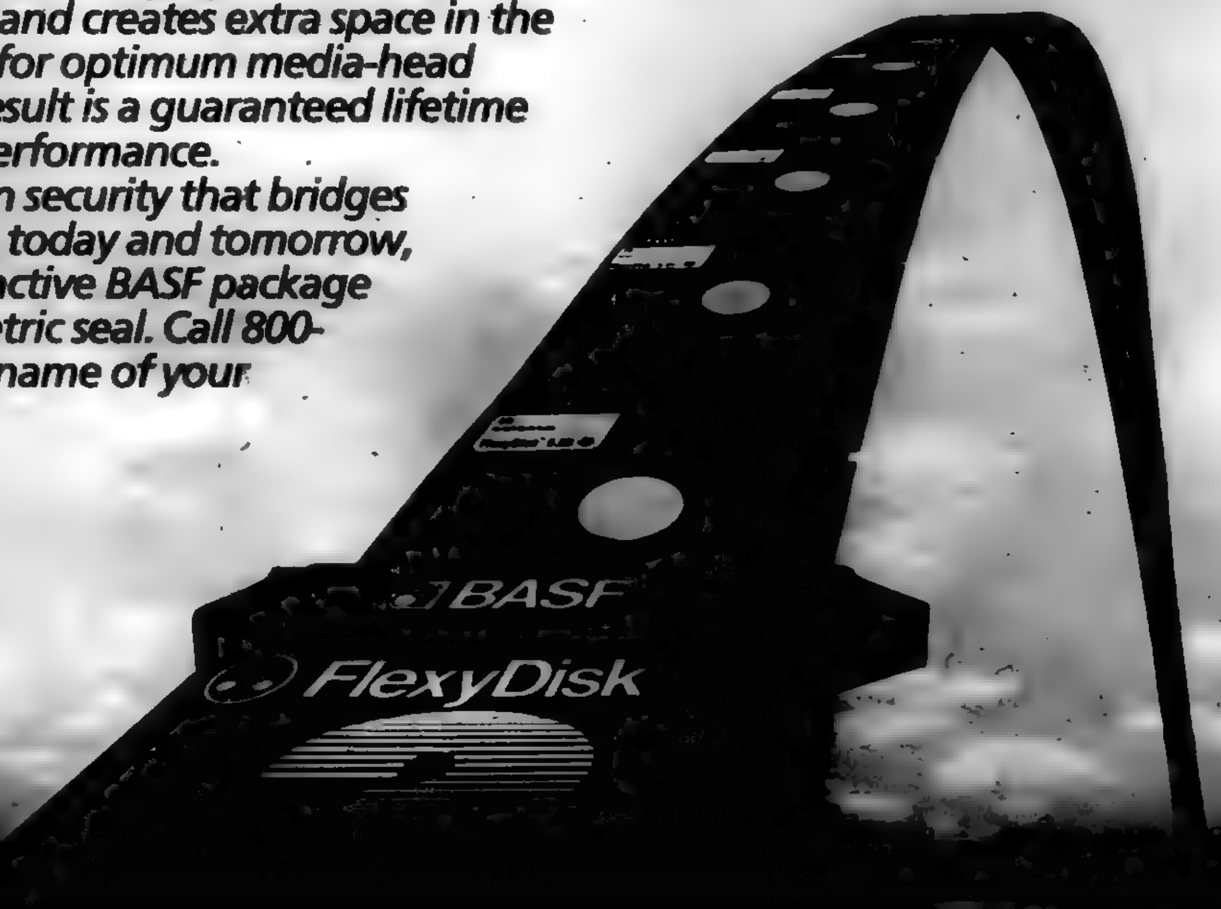

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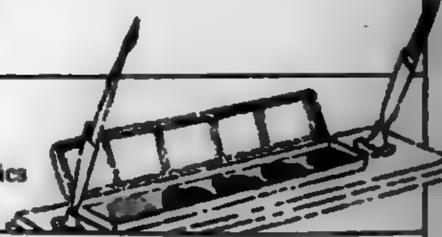

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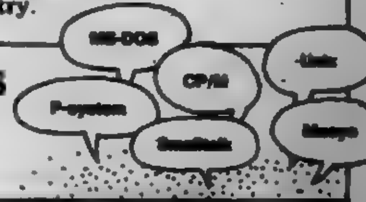

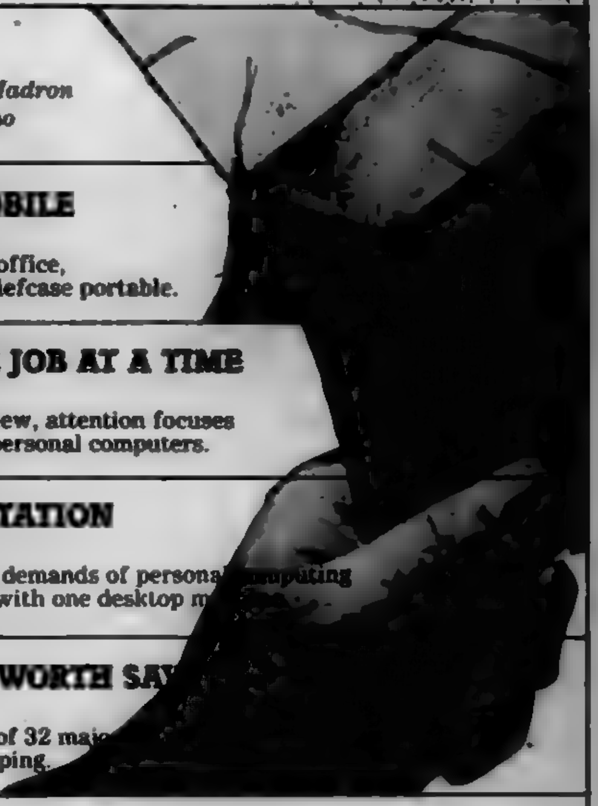

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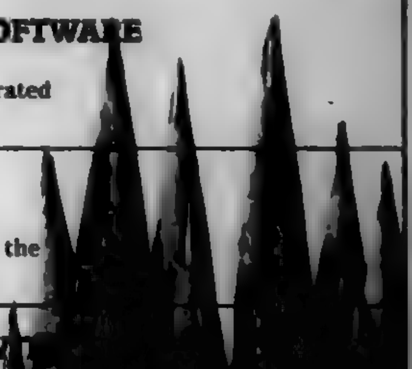

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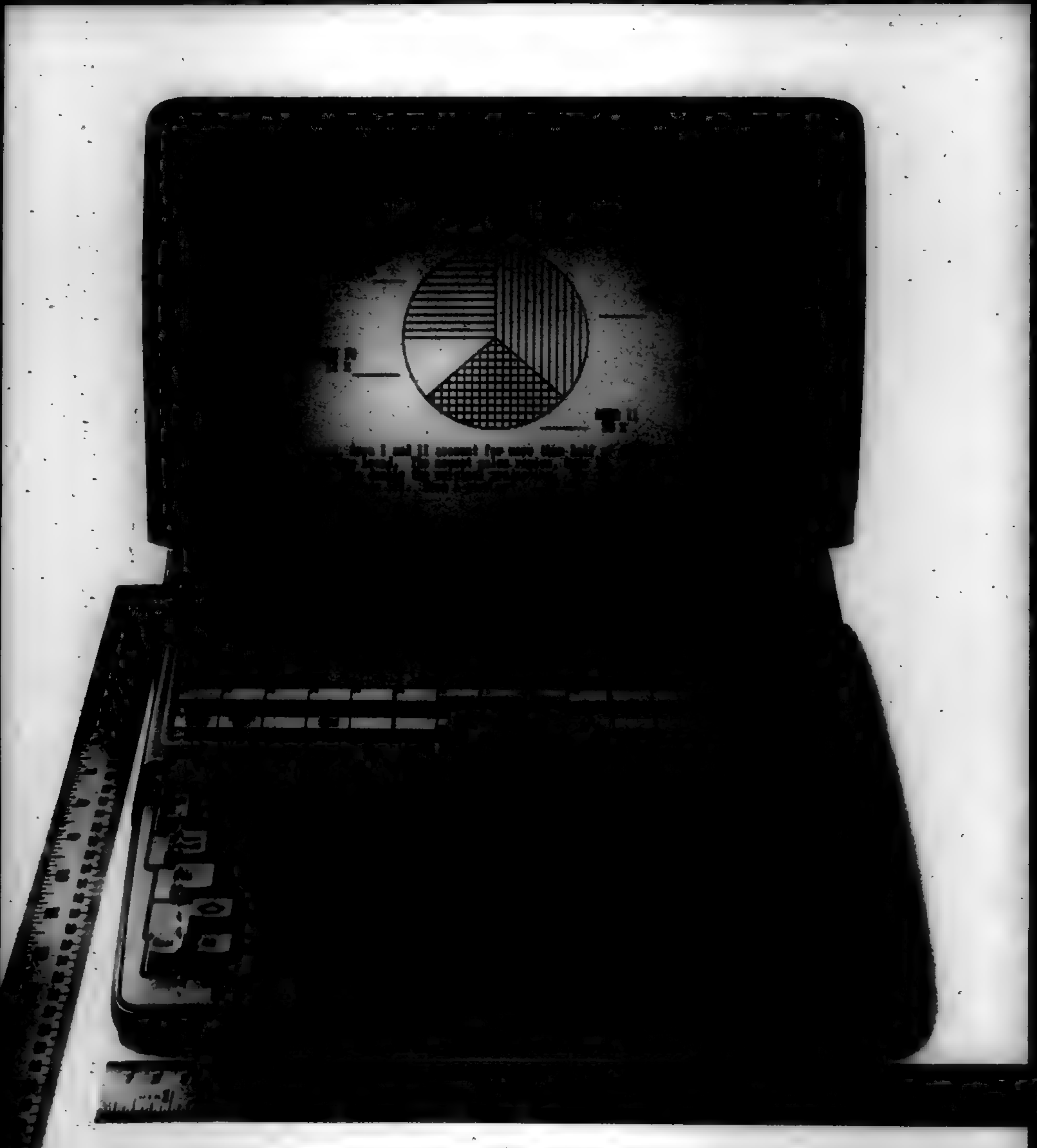

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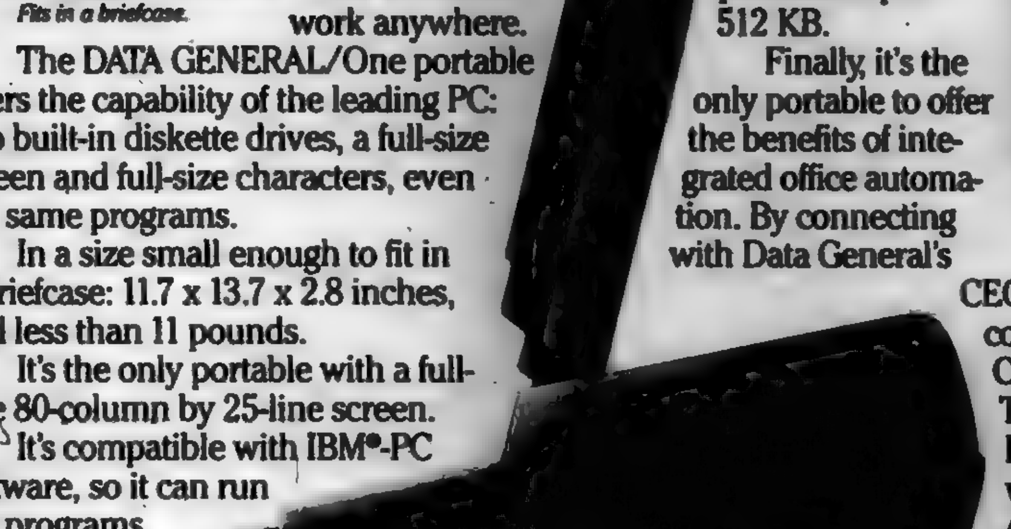

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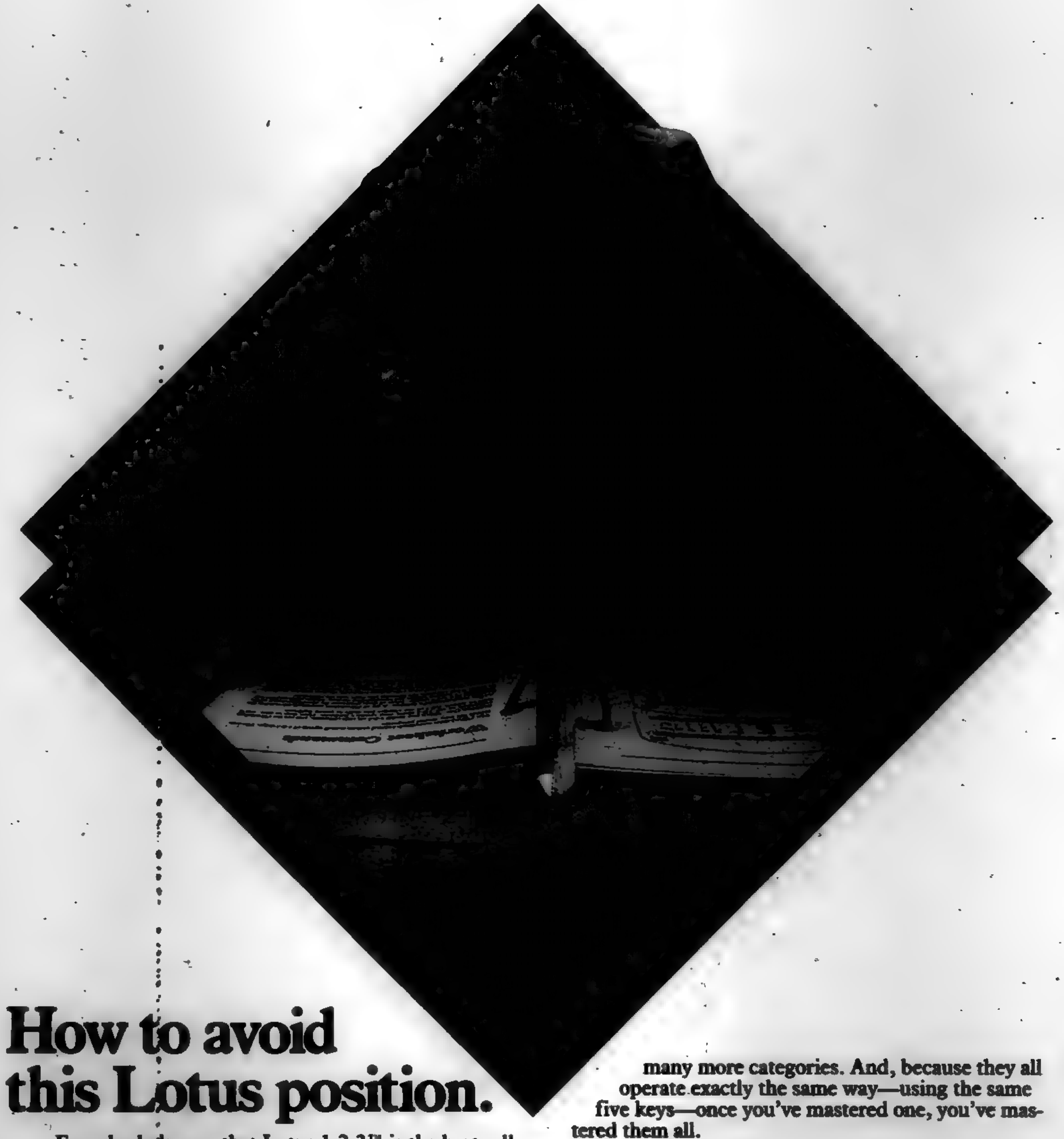

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THE EXECUTIVE DECISION MAKER

By Louis Boyle

A new breed of user is emerging in the microcomputer world: the senior executive who finds the micro a strategic tool that gives him powerful leverage in manipulating information. Not only are micros used on behalf of these executives, but more and more top managers are putting micros to work themselves.

Especially at the senior levels, managers often search for information while drowning in data. A good microcomputer-based decision support system, whether simple or sophisticated, helps them sort the wheat from the chaff.

The most common decision support software is spreadsheet packages. More often than not, data is re-entered into the micro from its original source as opposed to being downloaded — although the more sophisticated uses involve completely automated extraction from a mainframe data base, some reformatting and summarizing, then downloading to the micro. In either case, only rarely does the executive become involved in making the data accessible; he has neither the time nor inclination.

The Microcomputer Consulting Group at Arthur Andersen & Co. recently commissioned a survey to discover how executives felt about personal computing. The survey covered 151 large organizations (annual sales averaging $133 million) and 157 small ones (sales from $1 million to $10 million). It zeroed in on executives who played a broad policy role within their organizations.

Although the geographical coverage of the survey was limited to the Southwest, further research across the rest of the U.S. and Canada confirms the general trends reported.

The overall results are unequivocal: The micro has gained widespread acceptance by decision makers in all the major business sectors: manufacturing, wholesale trade, retail, insurance, health and social services, transportation, government, construction, finance, utilities and communications.

Micros are very conspicuous, used in 57% of companies overall and 73% of the large companies. Significantly, roughly one in three executives has a micro on his desk; 23% have one at home as well.

An overwhelming 93% stated their micro's performance is meeting or exceeding expectations.

Again, the major application (in 59% of the large companies surveyed) is decision support: providing an information and analysis infrastructure that supports much more informed decisions. This area covers budgeting, finances, what-if analyses of all types and general accounting (especially in smaller organizations).

The other main uses are word processing (45%) and operations control (inventory, distribution, production, labor, 27%).

The primary area of concern was to get a system that responded specifically to the user's anticipated needs; additional concerns relate to education to ensure proper acceptance and usage of the micros. Compatibility with existing systems (hardware connectability, ability to move data between the micro and the mainframe, interfacing to internal and external data bases) is also a significant issue.

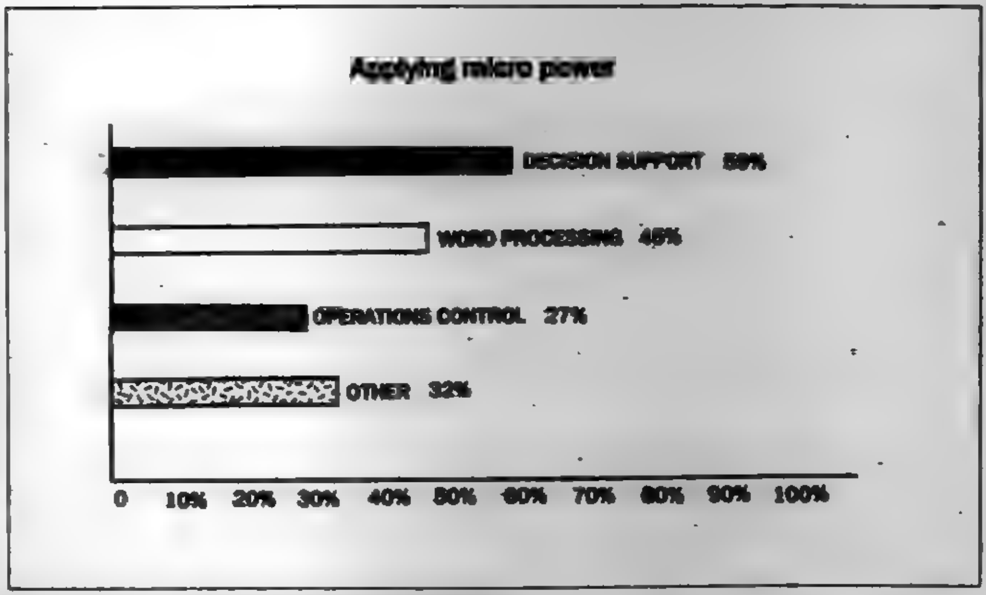
The decision-making process depends more and more upon an integrated view of the business and how it affects, and is affected by, the outside world.

In action

At Arthur Andersen, the majority of the staff uses micros every day. There is one micro for approximately every 10 professionals. Plans call for one on every desk. One of the senior executives using a microcomputer is Vic Millar, who holds worldwide responsibility for planning, defining and integrating Arthur Andersen's three practice area divisions: accounting and audit, management information consulting and tax.

Millar uses the micro to reference individual office and division operating statistics. This system is basically a menu-driven key factor reporting system that presents data in both tabular and graphics format. The system replaces a voluminous series of cumbersome report books and provides a much wider scope of information and deeper levels of detail.

The bottom-level detail data is generated by transaction systems running on the firm's mainframe computers. Information Builders, Inc.'s Focus package is used to extract and summarize the data; then it is downloaded to an IBM Personal Computer with an attached 20M-byte hard disk drive, where Information Builders' PC-Focus is used to build the operational data base.



Percentage of companies using each application.

The micro data base is then transferred to a similar Personal Computer (without the link of hard-copy output devices) in Millar's office.

The data available to him is a series of key operating factors at the division within an office level, as well as consolidations of this data at the office, area, country and region level and across division levels. Actual and budget information on partner profitability, chargeable hours per employee and so on is kept on a monthly, year-to-date, prior year and summary-annual data basis.

Millar uses this data to gain a better understanding of the quantitative side of the practice in his contacts with the offices around the world. He is thus much better equipped to discuss trends and performance (both absolute and relative to peers) at all management levels.

Homework

The chief financial officer of a large transportation company, who has very heavy demands on his time during the day, is becoming accustomed to using a micro by working on one at home.

A basic course, covering Microsoft Corp.'s MS-DOS and Lotus Development Corp.'s 1-2-3, gave him the background he needed to start understanding the ins and outs of the machine. He spent long hours on nights and weekends gaining a basic understanding of the machine's capabilities. He produced graphics, bar charts and spreadsheet analyses for personal budget, financial and tax planning applications, then went on to word processing and simple business applications, such as key operating statistics, sales analysis and so on.

Within a few months, he could set up more sophisticated business applications, using data on his corporation's mainframes that would be downloaded to the micro.

- At the U.S. Navy Headquarters Command Pacific Air Fleet, Zenith Data Systems Corp. micros connected via a Sytek, Inc. broadband local-area network serve as electronic mail terminals among the officers of the command. The entire network is secured for confidential message traffic.
- Daniel Sasson is the Montreal branch manager of Crowntek, one of the largest computer service bureaus in Canada, which recently moved into a line of micro services to provide integrated solutions to its clients. Sasson uses a portable Grid Systems Corp. micro for marketing analyses and follow-up, for tracking prospective customers and for writing internal memos. He is now using the micro's data base, spreadsheet, graphics, word processing and mainframe communications capabilities, as well as a number of application interfaces (data base to word processing, data base to spreadsheet tables and graphics, mainframe downloading to the data base).

Sasson has set up some applications himself: his branch operating budget, status reports (including graphs) to his management, revenue status/tracking by client and salesman, forecasting via historical trend analysis, weekly sales reports by salesman and monthly performance studies of mainframe usage.

Louis Boyle is the director of management information services at Future Electronics, a manufacturing firm in Montreal. He was recently a senior manager in the Montreal office of Arthur Andersen & Co.

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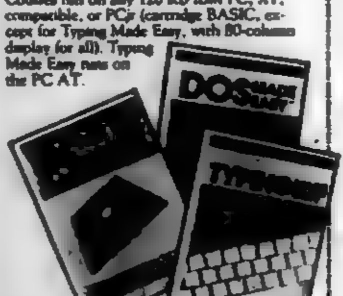

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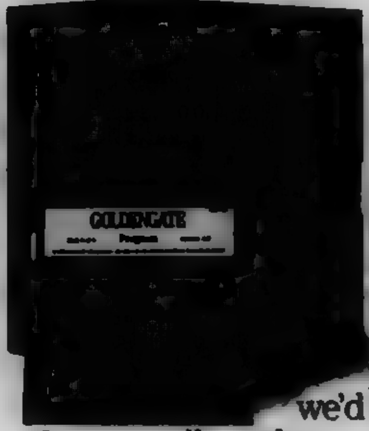
The pc software to use if you have IDMS/R.



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To find out more about GOLDENGATE, IDB and other components of our complete approach to information management, attend a Cullinet Seminar. To make arrangements, phone, toll-free, 1-800-551-4555.

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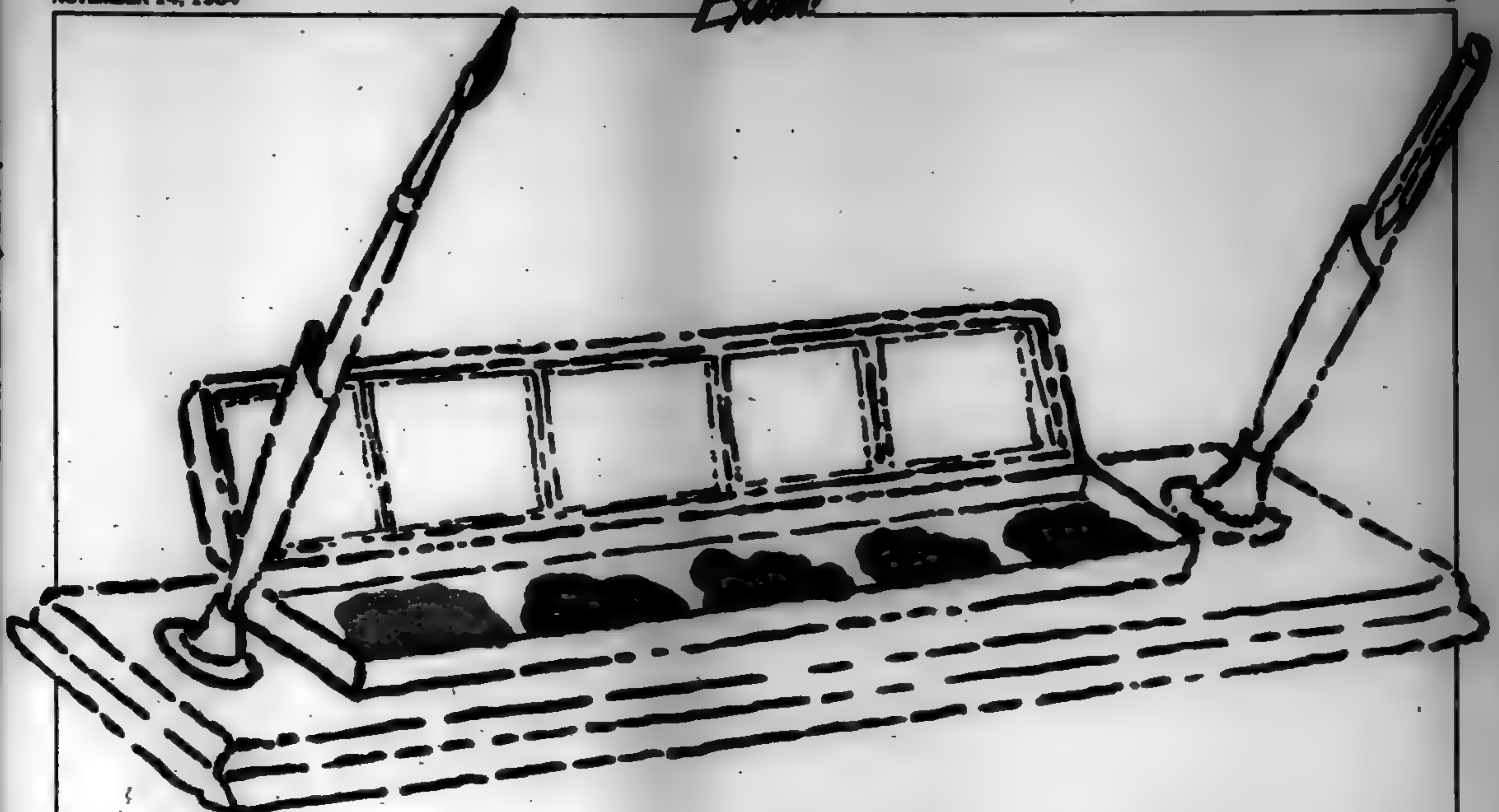


THE EXECUTIVE PALETTE

By Alan Paller

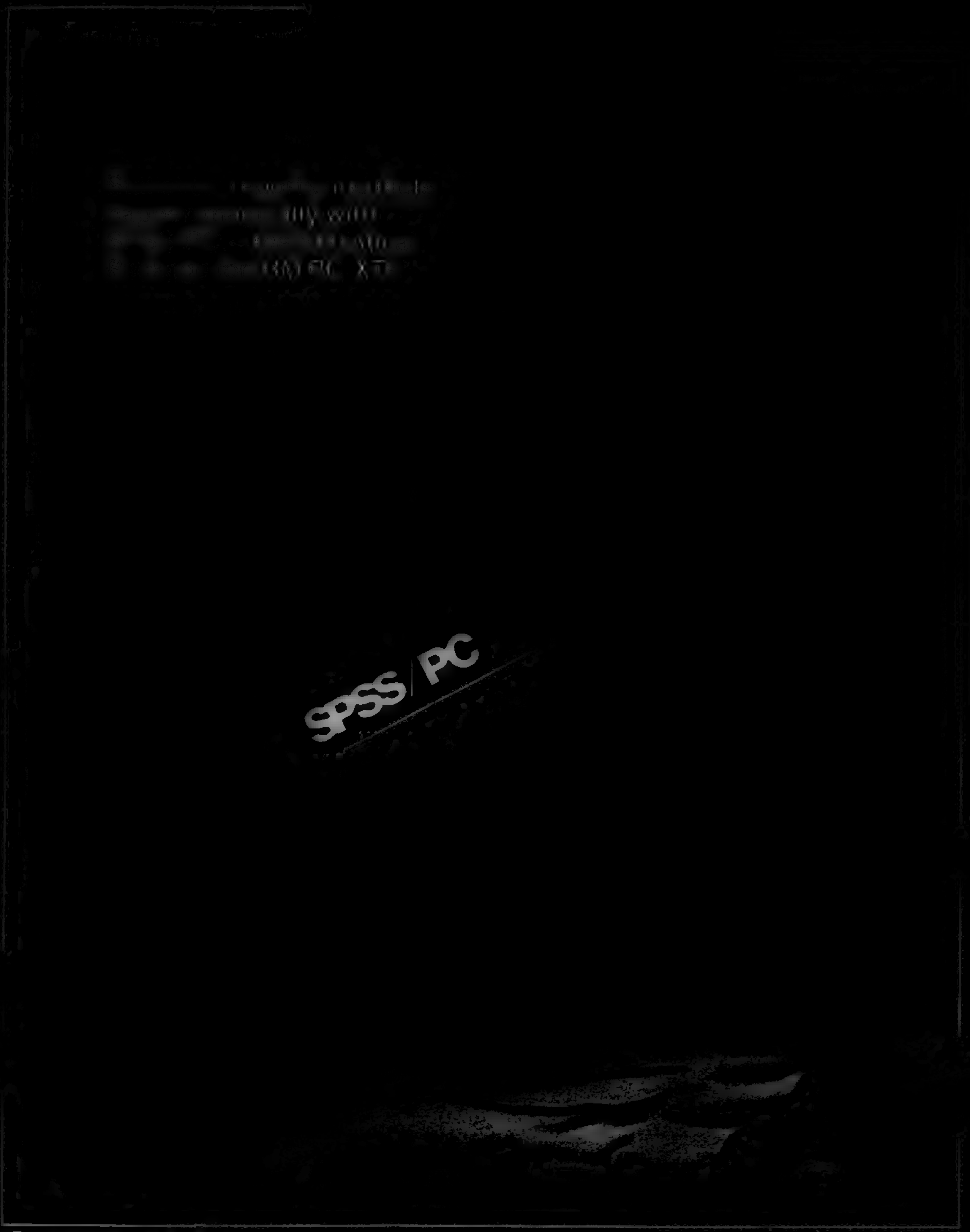
Is business graphics just the executive's Atari? For some middle- and senior-level executives, yes: Graphics happened to come with the computer package and occasionally generates a pretty chart.

But with the spread of micros and computer literacy, business graphics is moving rapidly out of the toy store and into the executive suite.

The use of computer graphics to manipulate business data into more readily understandable forms for decision making and to produce high-quality presentations is only now gaining the widespread acceptance it deserves. It is clearly one of the most dynamic sectors of the computer graphics industry.

When computer graphics appeared on the scene in the late '60s, it was used primarily to analyze data and convert it into charts for easier communication. Because the resolution was low and the graphics were of poor quality, primary applications were internal. Company analysts cared little whether the charts they studied were pretty, as long as they helped them understand the data they needed to study. Similarly, management didn't look for brilliant color in charts. Managers looked for indicators of developing problems, missed opportunities or clearer, more useful information formats.

Then in the late '70s, the new generation of hardware could produce graphics of superior quality in a broad selection of colors. At the same time, advances were made in graphics software. All these breakthroughs sparked a revolution and brought about a dramatic increase in the



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acceptance of business graphics. Suddenly, computer graphics began appearing in slide presentations for both internal and external audiences. Producers responding to this interest stepped up their research and development efforts and new product introductions, all aimed at providing new, improved and less expensive hardware and software.

Presentation graphics for board meetings, sales promotions, management briefings, reports to stockholders and a variety of other uses accounts for about 45% of the business graphics market. But as effective as this use of business graphics may be, the real payoff for corporations is the ability to access large amounts of data for decision making.

The desktop graphics terminal or personal computer is the key to the success of management graphics.

Presenting this data in a visual format makes it easier to understand and actually helps executives "see" the meaning of the data and respond with better decisions. This use of computer graphics, known as management graphics, is growing even faster than presentation graphics.

Use of computer graphics in business saves both time and money. At Pepsico, Inc., for example, senior finance officers formerly spent five days each month poring over huge printouts. When the company began using computer graphics for financial analysis, that data was presented in 650 slides per reporting period, and management time spent on analysis dropped to one day per month. In addition, the graphics presentation of data enables managers to identify more easily areas of potential cost savings.

The desktop graphics terminal or personal computer is the key to the success of management graphics. Increasing numbers of managers are discovering that a personal computer can be as useful an executive tool as a telephone or a calculator. Personal computers are turning up in large corporations on the desks of senior managers, plant managers, financial controllers, sales managers, quality control managers, customer service directors — the people who make decisions that affect growth and productivity.

Developments in computer graphics hardware and software in the last 18 months have enabled corporations to take a giant step forward in the use of business graphics in decision making. The introduction of the IBM 3270 Personal Computer in 1983 and of the 3270 Personal Computer/G in

Painting a picture of company sales.

PLANNING GRAPHICS?

So dynamic is the growth of business applications of computer graphics that the National Computer Graphics Association (NCGA) will sponsor two conferences in 1985 emphasizing business graphics — one in Los Angeles June 25-27, and one in Boston Aug. 13-15. Educational sessions will cover the many facets of business graphics, including management and presentation graphics. Introductory sessions will help companies that are moving into the use of computer graphics. The exhibits planned for each event will enable participants to get hands-on experience with the best equipment available.

The NCGA is located at 8401 Arlington Blvd., Fairfax, Va. 22031.

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Simplicity to please any user is delivered with the diskette. An easily customized LOGON script is provided for PC users. FTP follows this script to automatically dial and log on to the host system. All the user does is type PCFTP in response to the DOS prompt. Following autodial and autologon, the following menu appears:

The user types in three fields of information and presses F1. The file is then transmitted.

Either before or after transmission, users can ask for help, display directories, toggle between the host system editor and the FTP menu, display and alter file attribute settings selected by FTP, list a PC file, or exit to DOS.

Function key driven
Press a key, ship a file. Or get help. Or display directories. Or select any FTP function with a single stroke. Classic simplicity.

Fast.
Transmission speeds can be from 110 to 9600 baud, limited only by the hardware. 1K byte packets are used rather than individual records or lines. Blanks are compressed to further speed the process.

Flexibility at no extra cost.
FTP automatically decides on text or binary transfer and the attributes to use for the transmitted file. Decisions are based on the file names typed by the user. Pressing F6 displays the following screen

(A similar screen is used for CMS filetypes):

To override FTP's decision, just move the cursor to the desired file type.

It really does work!
If you allow users to dial your host, FTP will work for you. We'll even send you a diskette to prove it (You'll dial the OBS mainframe). Drop us a line or send us a business card. Or give us a call if you're in a hurry.

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the spring of 1984 heralded the age of business graphics as a management tool. The systems can deliver information directly to the executive's screen, quickly and in a graphics format that makes the data easy to understand.

The concurrent development of higher quality, lower cost output devices has increased the potential even more. Laser printers that hit the market this past summer can produce high-quality charts and graphics. Film recorders can convert data into presentation-quality slides. The cost of this hardware has plummeted from $40,000 to $10,000 and may be $5,000 by year end. In many cases, these devices can be connected to the mainframe so that every terminal within the corporation has access to high-quality slides and crisp black-and-white prints.

> Chevrolet's graphics system saves a full week in the research and development cycle. Charts are ready for review one day after tests are run.

Easy accessibility to high-quality, low-cost graphics is changing the way companies do business. For example, when Monsanto Co. attached a film recorder to its corporate mainframe, managers quickly learned the value of computer graphics in information sharing. In the first two weeks, requests for graphics in 35mm format went from none to 25. In the second two weeks, they increased to 75, and at the end of three months, slide requests averaged 750 per week. All this happened before the company made any formal announcement of the equipment's availability to staff.

Use of computer graphics can dramatically reduce the time elapsed between gathering data and receiving analysis of that data. At Chevrolet Motor Division of General Motors Corp., for example, track tests of new car models are run every Tuesday. The tests generate thousands of pieces of data.

Before Chevrolet had a graphics system to chart this data, graphics technicians converted the data to charts by hand. The test results were ready for review on Wednesday of the following week. Since the graphics system has been installed, the charts are ready for review the day after the tests are run — saving a full week in the research and development cycle.

Better decisions

Computer graphics systems not only save time in arriving at decisions, but they can also help executives make better decisions. Dow Chemical Co. buys petroleum on the spot market. The decision whether to accept an offer is highly complex and requires consensus of three corporate officials in Houston, New Orleans and Midland, Mich. With computer graphics, Dow can send the analytical data in chart format to screens at all three sites so that the decision makers can view it simultaneously. In the 60 minutes they have to make their final decision, they can quickly study the data and arrive at a consensus by phone. Tens of millions of dollars depend on their making good decisions. The graphics system allows instant access to the best data available upon which to base those decisions.

But the revolution in the use of business graphics as a management tool is just beginning. Because the IBM 3270 and the 3270-PC/G are terminals as well as personal computers, they can give an executive direct access to data on the corporate mainframe. While systems of the past enabled executives to keep track of corporate activity in specific areas, the new hardware and software offer the potential to create much larger visual data bases.

Some of today's business graphics software provides on-line visual access to that data. Rather than having to rely on analysts to create visual systems, executives can call up the data they need to make a decision, project growth, analyze the market and evaluate sales — all at the touch of a button.

Growth in development of business graphics systems should top 40% per year through this decade, with mainframe and microcomputer software the fastest growing segments. Better software and lower cost hardware will put computer graphics within the reach of greater numbers of executives, even those in relatively small businesses.

Business graphics is a dynamic market. Advances by manufacturers of hardware and software warrant attention. But the real action is taking place in the executive suite, where business graphics is helping executives make better decisions to the profit of their companies. Their innovative applications are a driving force in the development of this vital industry.

Alan Paller is president of AUI Data Graphics, a subsidiary of Integrated Systems Corp. in Arlington, Va. A board member of the National Computer Graphics Association, he will chair its conference on business graphics next year.

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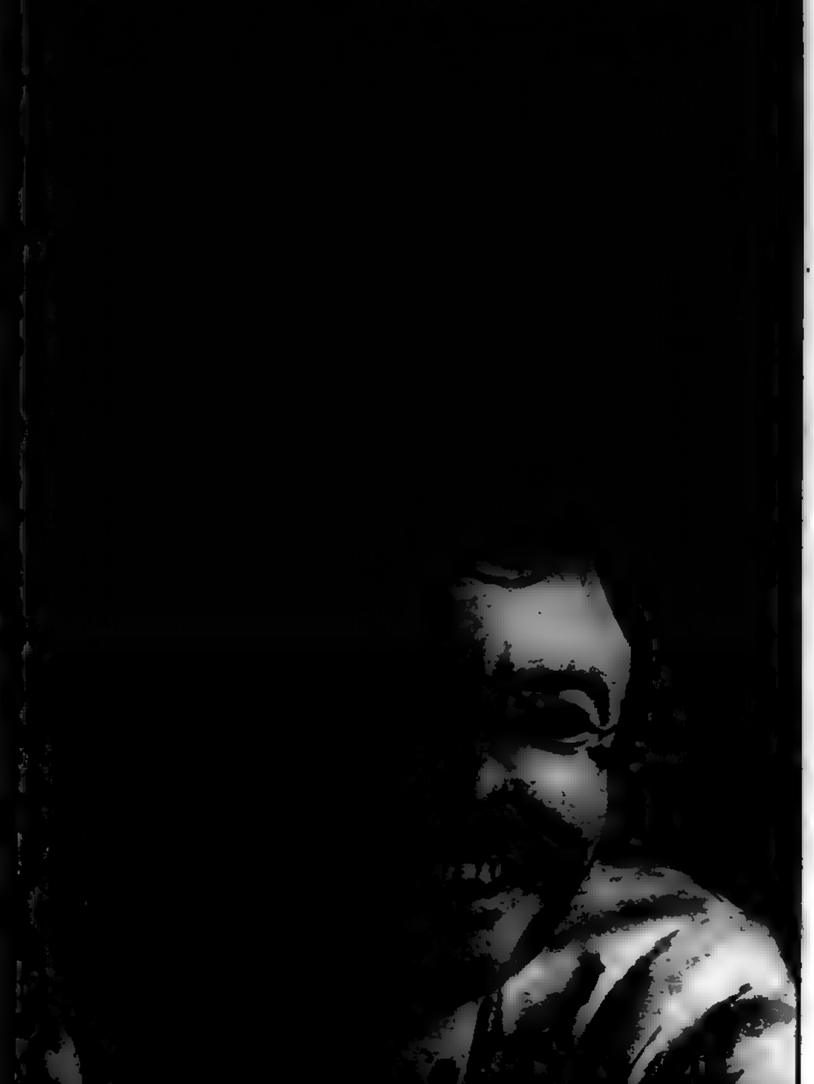
4 UNDER

Promoting programmers as record companies promote their performers is an interesting idea. How do you equate the two?



MICHAEL MEYER

[illegible]dele Goldberg has worked for the past 11 years at the Xerox Palo Alto Research Center, where she helped develop Smalltalk.

What are some of the issues that drive your work as a researcher?

Goldberg: The world is always changing and will continue to change. In order to keep up with and understand these changes, we must have tools that can help us get the information we need. Having access to information is the key to individual power; no matter how complicated the world.

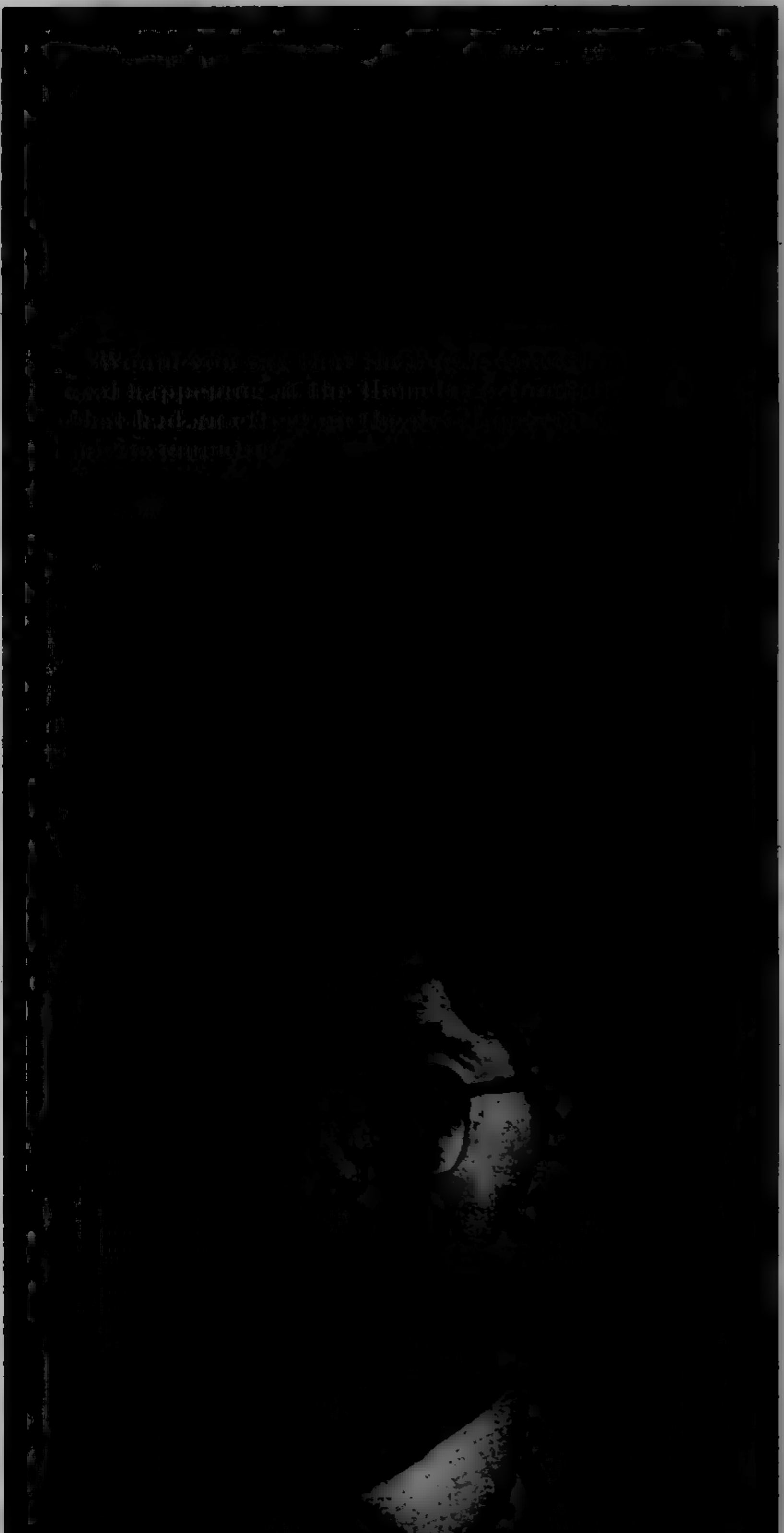
(Continued on Page 18)

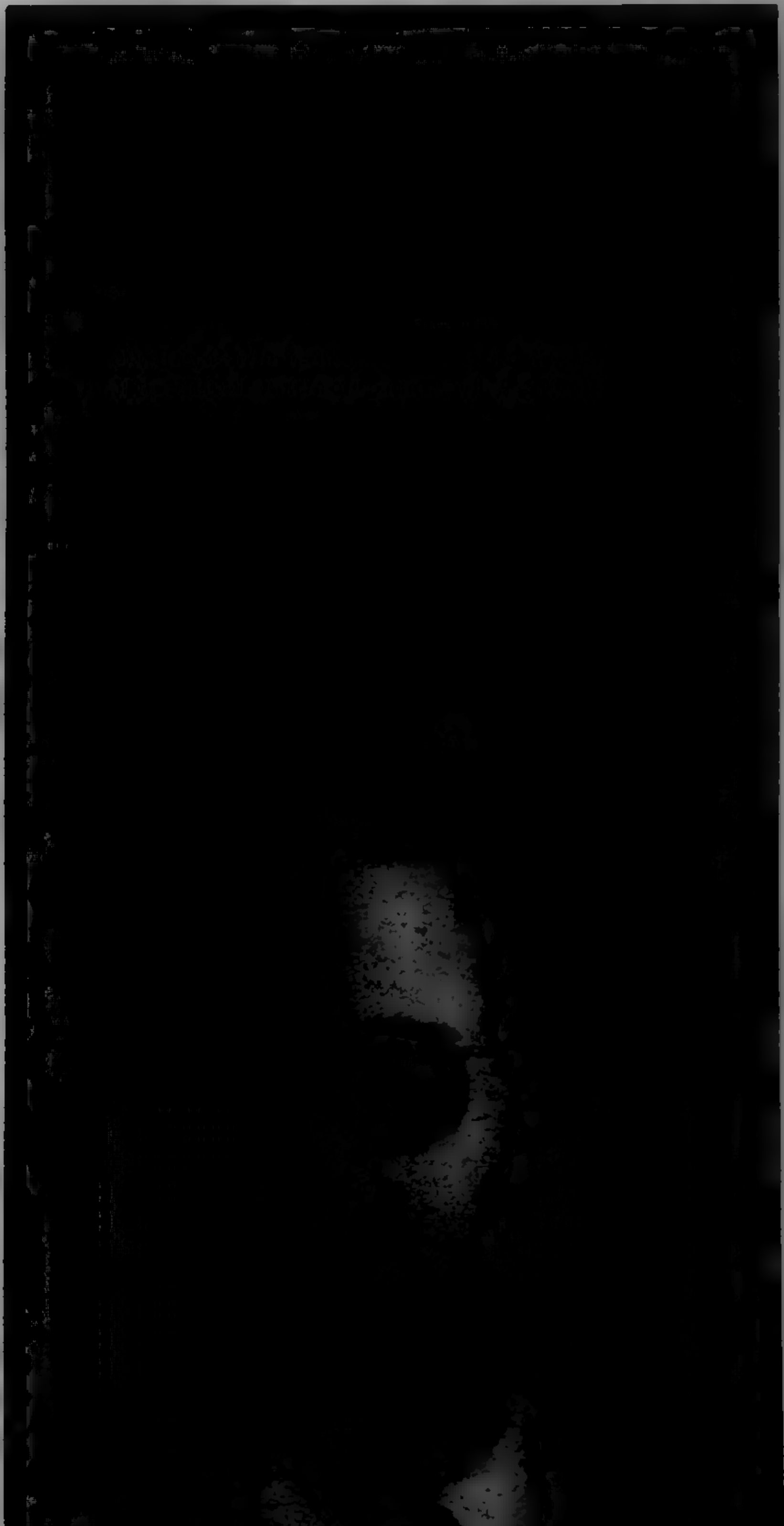
40

They helped launch the industry — four people under 40 years old who profoundly affected how microcomputers are used and marketed.

Priscilla Burgess, a Stanford, Calif., writer, interviewed the four about the rapid growth of the industry, their particular contributions to it and the direction of microcomputer technology.

Each one represents a different facet of the industry: Trip Hawkins was responsible for marketing Apple Computer, Inc.'s Apple II and, in doing so, defined how micros are sold and serviced. Adele Goldberg was part of the team that created Smalltalk, which inspired Apple's Macintosh and influenced the use of icons and windows today. Steve Leininger developed Tandy Corp.'s TRS-80 Model I, one of the first micros on the market. Dan Bricklin created Visi Calc, giving business people a reason to use micros — and incidentally, launched the market for "Visi Clones."





HAWKINS

(Continued from Page 14)

them themselves. We try to give programmers the credit for their products that they deserve.

The philosophy I base this on is that the computer is a new medium of communication, much like film, television, audio or book publishing. It happens to be a pretty impressive medium, and it's a creative medium. The best work is done by people with real creative talent who are able to exploit the power of the computer. These creative people feel the same way about their work as artists in other media do.

So you are not developing software yourself, but finding people who already have products that you think are marketable?

Hawkins: Actually, we have a very flexible approach to where the next great product will come from. Sometimes we come up with an idea and produce it, and other times we will market software that has already been developed.

One of the things we have learned is that software is not really a publishing business. In the book industry, there is very little value added in the creative process. When the writer has finished writing, the publishing company simply makes sure there are no typographical errors, prints up thousands of copies and it's done.

When you are dealing with software, it is much more difficult getting to where you want to go. You may have a terrific idea, but producing the software requires a lot of knowledge about design, computers and the user interface.

How did you happen to be at Apple at such a crucial time?

Hawkins: While I was getting my MBA at Stanford, I did market research on the computer industry in Silicon Valley. When my last study was published, I had correctly forecast that Radio Shack would be the industry leader in 1978. The people at Apple were upset and called me to complain. In the course of the conversation, I mentioned I was looking for a job. Apple was a very high-quality operation with very bright people, and I felt that they were the kind of people I wanted to work with.

Where was Apple in terms of its development?

Hawkins: It was just before they started to sell disk drives, which changed it from being limited to a hobby business to a business with a lot of other possibilities.

What do you feel your contribution to Apple's marketing effort was?

Hawkins: The first thing I was assigned to do was to find out what people were doing with Apples. After a lot of research, we came to the opinion that we could sell the Apple II to the business world if we developed a more powerful machine. So, in 1978, Steve Jobs and I wrote the first proposal for Lisa, as an inexpensive, office desktop product.

Most people thought that small businesses would buy them for accounting applications, but I argued that there were a lot more desktops out there than there were small businesses. And accounting is a complex application that is not that well understood by the businessmen themselves.

What kind of use did you envision?

Hawkins: Word processing was the primary element. I identified the second application as a formatter calculator for financial planning and tables. I was essentially describing [Software Arts, Inc.'s] Visi Calc.

In our original proposal for the Lisa, we wanted it to come out at a retail price of $2,000. Of course, by the time the engineers got through with it, it cost a lot more than that. But now with the Macintosh, the price is closer to what we wanted it to be.

For the next year, I drew up the business plan to get the Apple II into the business market. That involved developing a plan of attack and signing up software products for the Apple II. That is when I started my career as a software talent scout. We got a retail store inventory package, an accounting system, Apple Writer, and I provided support and the operating system for the first version of Visi Calc. In the summer of 1979, we launched the first field training program to promote the software.

What are some of your other contributions?

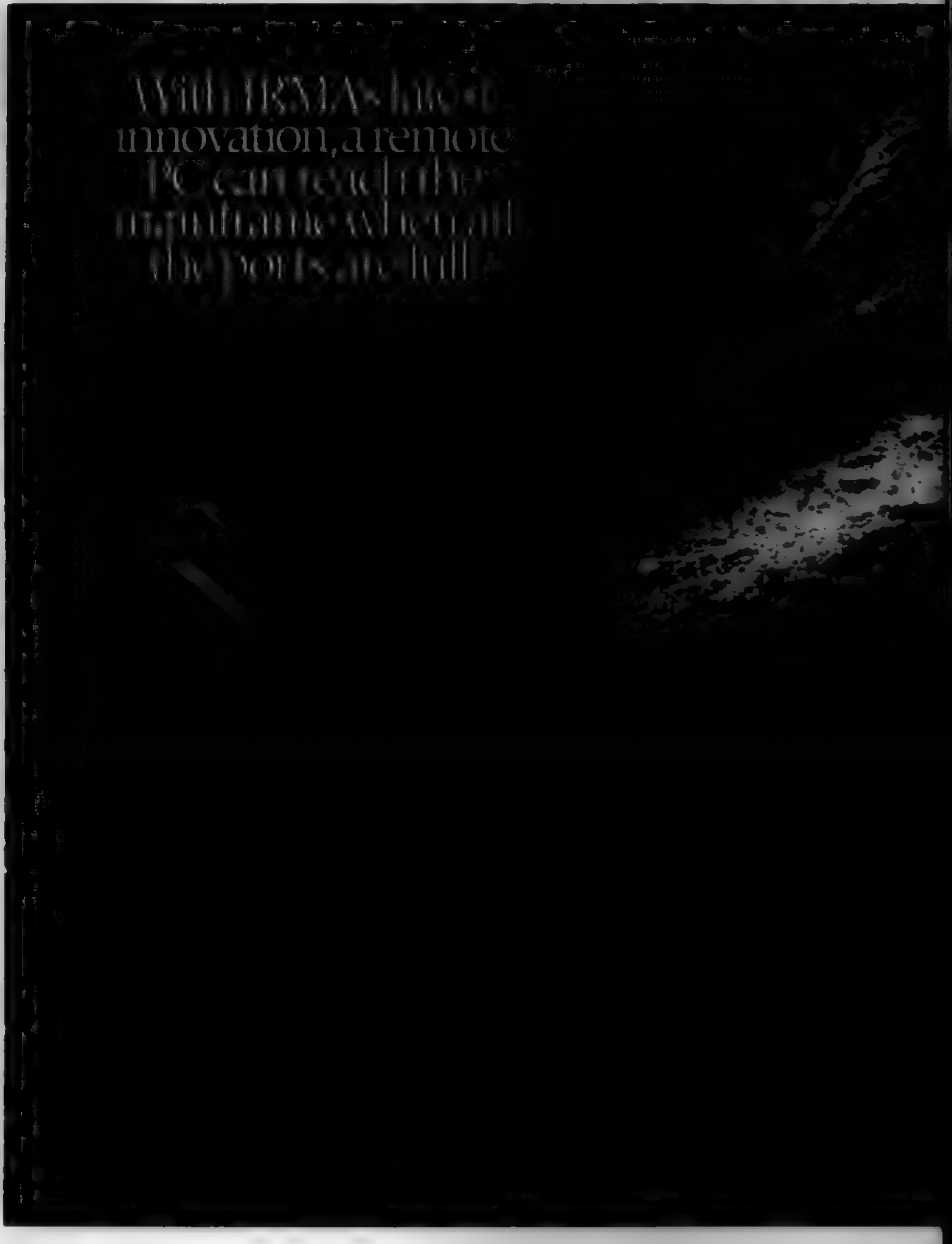
Hawkins: The idea of a walk-in retail computer service, so that people could bring their computers in to be fixed rather than sending a repairman out to the customer's location. This approach was imitated by the entire industry.

Another thing we pioneered was the idea of having an 800 telephone number for toll-free support for software products. That was my idea, and it worked really well. Seminar selling was another idea that brought down the cost of selling the computers to people in the business world.

Then I became the product manager for Lisa. At that point, it was a disaster. It looked nothing like what it is today.

Was that the result of your initial proposal?

Hawkins: No. While I was off working on the Apple II, engineering went off and completely redesigned it. I identified some of the problems and some better directions at the time when Steve had visited Xerox [Palo Alto Research Center] and seen Smalltalk. He took six of us back up, after which we incorporated a lot of the ideas into the Lisa.


With IRMA's latest innovation, a remote PC can reach the mainframe when all the ports are full.

Unfortunately, the Lisa ended up coming out very late and was very expensive.

Hawkins: But they sold about $100 million in the first year, so everything is relative. From an engineering standpoint, it was two years late, because it was started well before the IBM Personal Computer, and Lisa was scheduled to come out before it. By the time the Personal Computer came out, it was much too late to change anything. If I had still been there, I would never have let them go out the door with the price they did. The high price, the IBM Personal Computer and the fact that Lotus [Development Corp.'s] 1-2-3 was just around the corner really hurt the Lisa.

For which computers is your company designing software?

Hawkins: Our strength is really in the home machines like the Commodore [Business Machines, Inc.] 64, the Apple II family, the Atari family, the Macintosh and the IBM Personal Computer. We are going to become the No. 1 supplier for the new Commodore machine — Commodore has acquired a company called Amiga. We are very excited about that machine. It's exactly the kind of computer I started Electronic Arts to make software for.

What are your general impressions of the market today? What do you think about the turmoil?

Hawkins: On the business side, the market has gone through a very simple stepping-stone process. It started with the Apple II and Visi Calc. Then the IBM Personal Computer and Lotus 1-2-3 came out and provided better tools. The Personal Computer has taken over the dominant role in the corporate market.

The retailers have always had a hot item to sell over the past four or five years and haven't really stretched out in new areas. They haven't learned to sell to new markets effectively, so this year that market has slowed down a bit. There haven't been as many people out to buy spreadsheets, and a lot of retailers have been losing money.

On the consumer side, video games took off without anyone understanding why. It was a fad. The machines had no growth path; and the games were not that interesting. At the same time that was happening, the really inexpensive computers came out promoted by ads that tried to make parents feel guilty. Pretty soon they realized that the computers didn't do anything. So now you have disillusioned retailers who have been burned on video game inventories and then on cheap computers.

There has been a shake-up in the software business as well. There had been a very carefree attitude on the part of the manufacturers, so much of the software was filled with problems. The consumer is demanding a better quality product, and a lot of the companies that produced shoddy goods are going away.

I think that this year the home computer industry is going to be no bigger than it was last year. At Christmas, there will probably be $60 million spent by the home computer companies to talk about good products.

A lot of consumers are going to discover what home computing really can be for the first time.

The computer is the medium of doing, which sets it apart from other media such as TV.

What do you think home computing can be besides word processing?

Hawkins: There are two categories. The first is looking at the computer as an appliance. An appliance is something like a dishwasher; you push a few buttons and you get a result. And if the price of the result is low enough and it saves you time and money, you buy it.

The computer has a revolutionary aspect in that every time I put a new disk in, I can turn it into another appliance.

A program to balance your checkbook or look up recipes really doesn't save you time and money, but other products do. Word processing is a good example.

How do you see the industry developing?

Hawkins: Telecommunications is going to be very important. I think there is going to be a real interest in using the computer as a way to link up with other people.

The computer is a new medium, and it is the medium of doing, which sets it apart from other media like TV. The aspect of interaction is important because it is compelling and involving, and it can offer dynamic feedback instantaneously. For example, the best selling product on the market right now is [Sublogic's] Flight Simulator. It is really exciting to fly an airplane, and to be able to do that on your home computer is fantastic.

Do you feel that the philosophy of your company has had an impact on the industry?

Hawkins: I think it has had an impact, but the impact hasn't been fully felt because there are still a lot of people who have not seen our products.

As long as I can show our products and they say, "I had no idea you could do this with a computer," I know that I'm still a missionary.

It's a sinking feeling indeed.

On the one hand, you have a remote PC which makes a lot of business sense to connect to your big IBM mainframe.

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GOLDBERG

(Continued from Page 14)

becomes, you can feel you are in charge because you are capable of finding out what is going on.

However, if you create something for yourself that helps you understand your world and it is shared in the business or government marketplace, it will be used in different ways. So you have to make sure that you present it in a way that encourages people to use it the way you hoped they would.

You have to believe that when you come up with something that really helps people, they will use it in a positive way. If you don't believe that, then you can't do research.

In the early days of the microcomputer, people seemed to delight in the thing itself. Now these same people tend to be looking at how micros fit into society.

Goldberg: The focus of personal computing as an individual working with the technology had good qualities to it, but it misled us down a pathway of worrying about the device. Alan Kay said once that as long as the computer dominates your attention, then you don't have something that supports interpersonal communication.

It's people who are interesting: what they know, their comments and opinions.

We do have telephones.

Goldberg: That's right, except that suppose there's one person who knows something you want to know and there are 1,000 other people besides you who want to know that, too. How reasonable is it to occupy that person's time with 1,000 phone calls when the question is always the same?

We are very interested in the nature of the shared information space — I won't call it a data base, because data is the wrong word — that allows a dialogue to be stored and then accessed and used by others. The purpose of a microcomputer is not so individuals can be alone, but so that individuals can have a broader world in which to interact with other people.

It sounds great, but that is not what is happening now.

Goldberg: No, we're not doing it right now, and there is a reason for it. It has to do with what the marketplace can sell. What is being sold? Office tools that will make individuals in offices more productive. Because we are using an electronic device, we think that people should be able to do more faster. There is the illusion that the machine is doing most of the work, while the human is simply monitoring it.

This whole question of productivity is really misguided, because we don't know what we are measuring. We don't understand human expectations and human constraints.

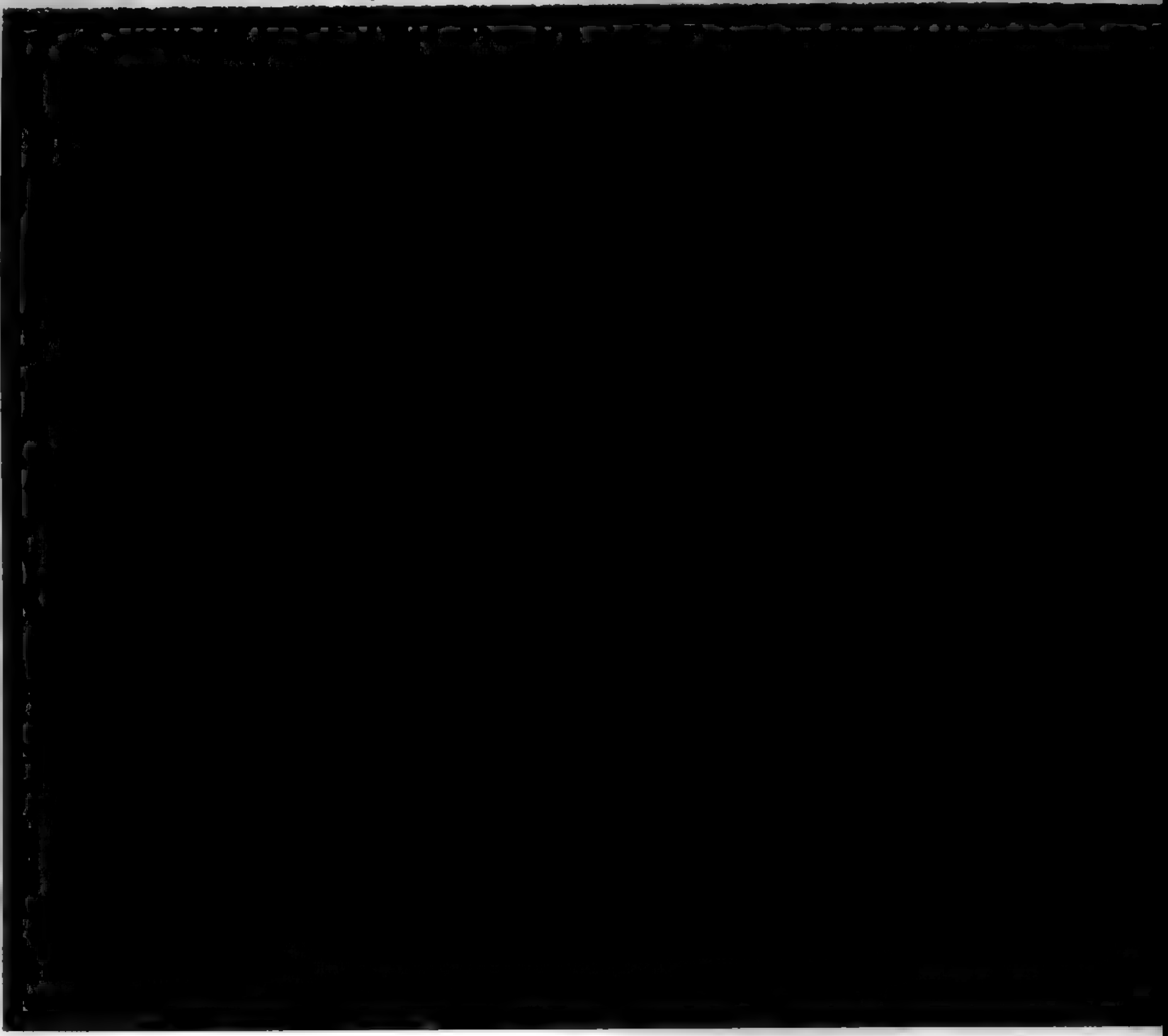
How do you feel about the success of the Macintosh?

Goldberg: A lot of people have asked if I feel badly that Xerox wasn't the one to produce the Macintosh. The answer is yes, of course. All of the elements of the Macintosh were derived directly from research done here. But of course, Xerox did produce the Star for a different marketplace. It does disappoint me that we were not in the market I would like to be in, but I knew that when I joined the company. The point is, Steve Jobs was smart enough to recognize a good idea when we showed it to him — and that's nice, that's a compliment.

But wasn't the point of sharing Smalltalk with the industry to get other manufacturers to use it?

Goldberg: Oh, absolutely. Well, let's see. There are different levels of sharing. When the Star was announced, everyone got to see the level of user interface we had developed, and that was not an issue. The only way we were going to get people working on the hardware was to get the software out there as a different direction for people to think about — not as an end, but as an evolution. In order to encourage an evolution, it takes lots of people competing, sharing and interacting with one another to solve these problems. Our goal was to share the software to get people to help think about the hardware.

What do you think about the way the Macintosh works?



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Goldberg: You have to spend too much time shuffling those diskettes around. I got beyond the pretty icons right away, since it was all essentially an adaptation of something I had been using for years.

There are microcomputers for different kinds of people having different needs. We don't think that everyone can wear the same dress any more than they can all use the same computer. So one of the things that I think the industry has to move toward is hardware and software "pluggability."

All systems need to be open systems, with modules that can be plugged together in a rational way so that we can have a variety of devices but still have the same functionality.

Your ideas could very well be carried out by IBM alone. There are at least 55 companies making Personal Computer look-alikes, and it could end up being the standard. Yet a lot of people don't think it's such a wonderful machine.

Goldberg: First we have to realize that there will be lots of variations in hardware and software and in the interface among them, either for a long time or forever.

The marketplace and the need to make money drive people to pick certain circles of standards. In the computer industry, there is the philosophy of the open system and the closed system. With the Macintosh, Apple turned its back on open systems, which was one of the things that interested people in Apple and especially the Apple II. You could plug almost anything into it and take it apart.

And what did Apple do with the Macintosh? It went 180 degrees the other way to a completely closed system. And if you wanted to develop applications on it, you would have to use nonstandard languages on Apple's own development system. Within less than a year, Apple had to change its tune on that one. People don't like that. They want to have choices.

The IBM Personal Computer is interesting because IBM simply put out a core system, which was not fascinating, but had a couple of things different enough about it to be attractive. First was the IBM logo — the company that businessmen believe in for service and longevity. The second thing IBM did well was that by coming into the marketplace late, it provided an open system. IBM was not going to do everything, and it invited everyone to join the bandwagon.

We are going to see IBM come out with a Unix system and its own window package, because it is not quite sure what is right, either. So there will be some variety in what the company produces. IBM has always been willing to try something new, but it is a little bit more cautious and conservative.

Afterward, it may shut everybody out, which will make a lot of people and companies mad. One of the things that has always been exciting about the American marketplace is the variety of companies that give you choices. Users may go to IBM because they prefer that choice, but they like the idea of having the choice.

What do you think the next step will be?

Goldberg: The next step is thinking of information in the sense of a library. You have a library in your home, your office, your community, your city and your state. There are levels of libraries and, depending upon how important it is for you to get information, you are willing to pay the cost of following the pathway to get it.

In the same way that we have levels of libraries, we will have levels of networks. One of the hardest problems to think about and understand is that the workstation, the node on the network, is the doorway into getting, using and exchanging information.

When I talk about interpersonal use, I don't think of access but of information exchange. The computer is a door, and through that door one travels on a pathway heading for somewhere else. On the way, one can visit other places — other way stations that offer electronic services that help you in some important way.

There are lots of things that just plain cannot reside in your microcomputer. So not only do you want to travel the pathways to get at stored, static information, like encyclopedias of the world, but also you want to get at the various kinds of information that give you power over your own life.

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LEININGER

(Continued from Page 15)

A lot of us worked in semiconductor houses, and we were aware that one way to reduce costs was to put everything on one board. It was inevitable that someone was going to do it. It wasn't so much a cold, calculating kind of thing as in today's business. It was more like, "Boy, this sure seems like fun." It was a very exciting group of people.

There were three computers that came out about the same time: the Radio Shack Model 1, the Apple II and the Commodore Pet 2001. They came out within two months of each other, and those three machines really set the world on fire. They were all relatively affordable; they all had Basic and ROM [read-only memory]; they all had video electronics built in; and they all used a cassette recorder for data storage. They were all developed independently, but they were surprisingly the same.

We were all at the right place at the right time. Anyone who tells you that wasn't a factor is blowing some smoke. You don't see as many 24-year-olds doing what we did back then. We didn't know any better. We didn't know that you couldn't do it.

After the Model 1, what did you produce?

Leininger: We turned out the Model 2, which was Radio Shack's first real business machine. The Model 3 evolved into the Model 4, which is still being sold. We have a very small engineering staff at Radio Shack, so most of our color computer came from Motorola and the Model 100 from a Japanese company. Since then, my input has been on a grander scale — horizon shots and things like that.

How does the Macintosh compare with your computers?

Leininger: The Macintosh is a great machine — with no software yet. The software issue is getting better, especially now that Apple has the Fat Mac. It was announced with very little fanfare. I found it in a crack in a no-big-deal article somewhere, which is kind of amazing to me. Of course, maybe Apple doesn't want to stir up everyone who's got the 128K ones.

The one thing Apple should get a lot of credit for is the fact that it is going out and plowing its own ground. It's like growing asparagus. It takes three to five years before you can harvest any of it. Apple has been working on the Macintosh since back in the Lisa days.

Apple's done the first brave step in burying the operating system. I applaud the company for that. You are hacking around when you're playing with an operating system.

Now if you really want to give credit, you need to give credit to people like Alan Kay and some of the other people out at Xerox Palo Alto Research Center for actually doing the icon-and-mouse-based interface.

How does it compare with what you are doing?

Leininger: We don't do things to that great a depth. We have a very small staff, and if you consider the number of products we have in the stores that we have designed in-house, it's an astounding number.

So you're not doing much research and development. Do you feel you are dependent upon existing technology?

Leininger: You have to consider that everything in the Apple is existing technology, too, except for perhaps the software. We sometimes buy software technology rather than develop it. Since we are a very high-profit-margin company, we tend to have cash available to purchase things, such as the Model 100.

Do you rework it or take it as is?

Leininger: We put our colors on it, and we had major input into the software. One thing you need to learn in this business is to build on good parts that others have and fix their bad points. In the case of the Macintosh, what Apple is doing is taking the Lisa and making the thing portable.

What do you think of what IBM has been doing with the Personal Computer?

Leininger: To say it's a crummy machine wouldn't give me too much credibility.

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IBM has a funny place in the market, but it's getting to the point where that market is becoming saturated. People get in trouble when they don't assume that IBM looks at other products and implements good ideas. It does it in a very slow and cumbersome way.

There's no question that an IBM is a computer. There's probably not a whole lot of question that an Apple is a computer. But given a choice between an Apple and an IBM, if you weren't very knowledgeable about the industry, you know IBM makes computers — Apple you're not really sure about.

I think the Macintosh is a great machine, and I think the IBM compatibles business is very, very, very dangerous. If you look at mainframe compatibles, like Memorex [Corp.] or Storage Technology [Corp.], IBM always takes them for a fast sleigh ride. It's like Mr. Toad's wild ride at Disneyland — except that the corners are sharp enough to make you fall out.

What will happen with the microcomputer in the business world?

Leininger: Microcomputers in the business world won't be much different for some time. I'll have to give it 10 years before it finally matures into a full product. It is pretty good now for the specific uses we talked about, but it's going to be like the telephone. You don't get all excited about your telephone anymore, but if you consider the technology behind it, it is pretty impressive. The local-area network stuff is fine, but the beauty of the telephone is that you can call from California and you can talk to me in Texas. It is an incredible tool. And, really, the phone isn't the tool; it is the network that is the tool.

Are microcomputers as useful as they could be?

Leininger: If you do any kind of word processing, it pays for itself. That's mostly what I use it for. If you do any kind of spreadsheets, it pays for itself. Other than that, there are lots of people who don't need computers. One of the big myths is that computers replace all the paperwork, when what they really do is generate more paper. People haven't reached the point where they would rather have it on a CRT than a piece of paper.

Where do you think the business is going to end up?

Leininger: I think we will end up with a few standardized types of microcomputers. And it will become more of a software business. I think IBM is going to do a very good job of maintaining its dominance in that part of the marketplace. Apple's got a very good chance of staying. Radio Shack, due to the fact that we have 9,000 stores out there, has got some critical mass that's hard to overcome.

When we first started this business, it didn't really matter what the computers were used for because people just wanted to have computers. We know what some of the applications are now, and those are pretty well taken care of, like word processing and spreadsheets.

For the industry to grow, I think people need to start taking a look at what people actually do at work and at what would make it easier. Computers might not necessarily be the right answer. They sometimes get in the way.

What would you like to see happen with the software for your computers?

Leininger: I guess one way would be to have a computer with Macintosh kinds of functions built in. That's a tall order, but if you take a look at some of the clever stuff that's come out recently like [Living Videotext, Inc.'s] Thinktank, which is an outline process, you'll see that there are some new classes of software coming out. I would like to see our Model 100 with all the software built in.

What is going to happen to the price of microcomputers and the software — do you think it's going to plummet?

Leininger: I think the price of the hardware has plummeted as far as it can for the short term — it's pretty deathly low. I don't think we have begun to see what is going to happen to the price of software. My guts tell me that $49 and $99 are the right prices for business software. Home software ought to be like records — $9.99 max. These are just my own feelings and don't necessarily reflect the view of the corporation.

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BRICKLIN

(Continued from Page 15)

uses a computer as a tool to make that job easier.

How do you feel about what has happened with Visi Calc? That you produced something that was innovative and attractive and then saw the multitudes crowding into the field?

Bricklin: That always happens. On the other hand, I'm the only one who is going to be first. Everybody, like the people at Lotus [Development Corp.], admits that we were the ones who blazed the trail.

What do you think of the other spreadsheets? Are they as good as yours?

Bricklin: Each has its advantages and disadvantages. Some of them did not understand the philosophy about creating a useful tool. Those that are most like Visi Calc are the most successful. The one that was closest to Visi Calc was Lotus [1-2-3]. Lotus tried real hard to be like it and to add things that we hadn't added yet. These were things people were asking for but which didn't break the conceptual framework set up by Visi Calc. That's one reason Lotus was successful. Multiplan didn't catch on as well because [Microsoft Corp.] did things a little differently.

Visi Calc was designed to be keystroke-efficient. In other words, it's got to be very natural to use because it may take you some time to learn it — all these things take time to learn — but it really pays off in terms of how easy it is. You are going up against paper and pencil.

I remember when [Sorcim Corp.'s] Supercalc was first being shown. It didn't have some of the very important basic features of Visi Calc, which the company didn't think were needed. It had not been tested, but when it hit the market, [Sorcim] had to quickly throw these features in. We all find it humorous thinking back about it.

What do you think will be the fate of all the companies that are producing similar products?

Bricklin: They all hope they are going to be the one that makes it. The same thing happens in every industry. Every industry has its dominant players, and the dominant player changes from time to time. First Radio Shack, Commodore and Apple were the dominant players. Then the industry started splitting into business machines and home machines, and IBM came into the picture. The perturbations and swings are really wide now as the industry develops. It's harder to change some things because they are starting to get embedded.

Silicon Valley is certainly going through some ups and downs right now.

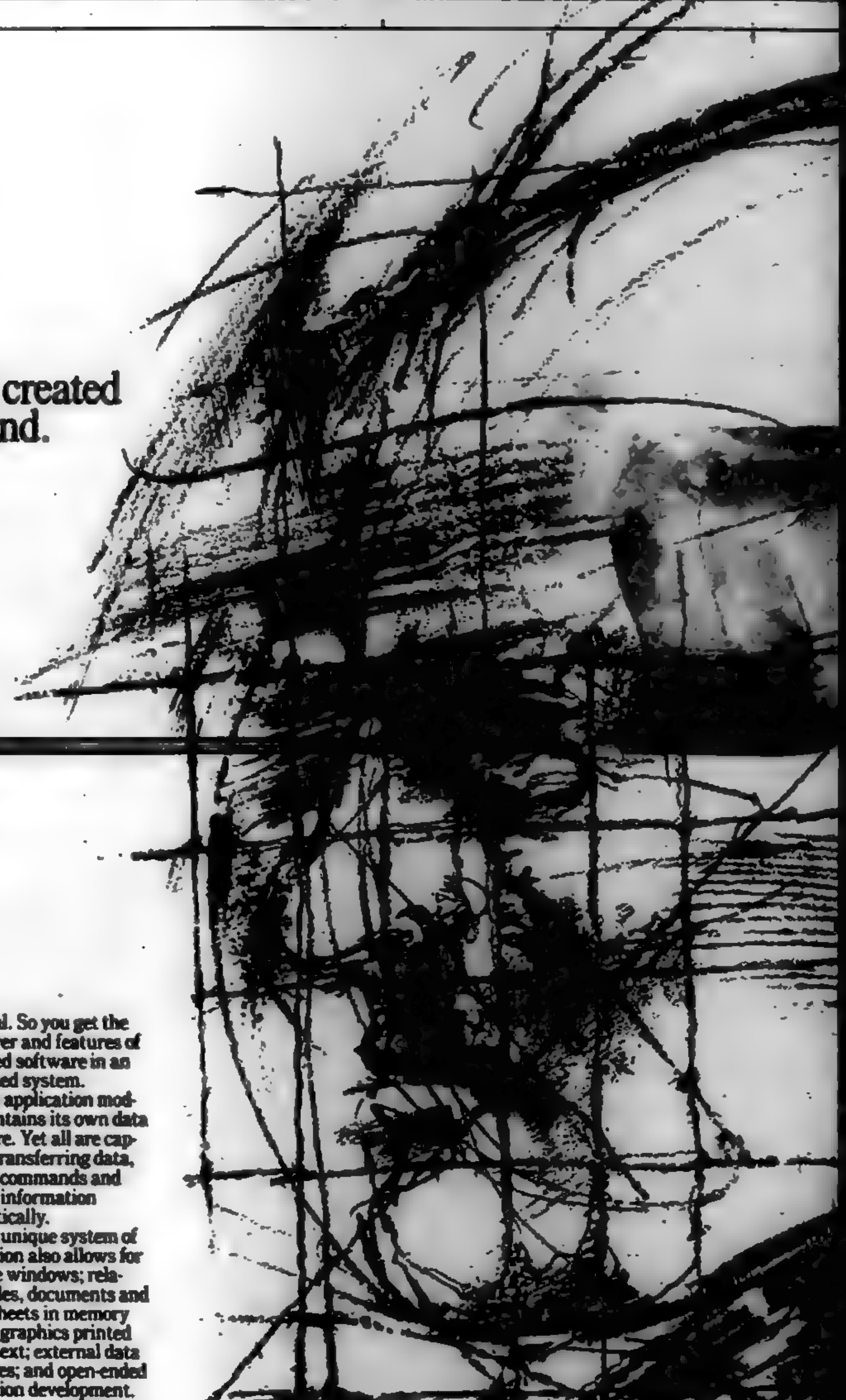
Bricklin: The semiconductor industry went through that, too. People are always trying different ways of doing things, and some work and some don't. They are taking great risks, and when you take great risks, sometimes you fail. This is especially true when the goal is to be No. 1, and there can only be one No. 1. By definition, you're going to see some falling by the wayside. There isn't enough market for everybody.

Visi Calc has always been a solid performer in the Apple market. There is nothing like TK! Solver, and we just started shipping it for the Macintosh. The Macintosh is a great opportunity for software developers, although it takes a long time to develop software for it. Therefore, most software that is available so far has not been very good. A good Macintosh program is harder than doing a good program for another machine because the Macintosh really shows flaws in the program.

Many people see the keyboard and the screen as a barrier to using computers. They don't want to see a computer, they want to see an appropriate tool.

Bricklin: You have to give people an appealing metaphor. A lot of people, unless they are writers, don't want to think in terms of the typewriter metaphor. They will think in the screen's metaphor if it presents what they are used to seeing on some other graphics medium. That is why spreadsheets were so well accepted: The screen looked like a spreadsheet.

People were really turned on by the Macintosh because



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It doesn't matter what is on the other side of the box. The idea, often, is to have the computer do things as if it were a person — except this person doesn't tire and is very quick.

it looked like something they would like to deal with. A lot of people don't feel that the keyboard looks like what they think they want to do, and they are right. For certain things, typing commands is not the best way. The Macintosh's interface caught the imagination of many people because it is the graphic representation of something physical, like dials, buttons and levers.

What I think is super about the Macintosh is that there isn't one right way of doing things. It's like those little dolls that they make for little kids with snaps and buttons and zippers and ties. In the different Macintosh programs, there are different ways of doing things. In the paint program, you use the hand, and on the word processor, you use a scroll bar. To the user, however, it all feels the same because it all feels natural.

The mouse is a little strange because you are doing something one place and seeing it somewhere else.

Bricklin: For doing a paint program, a mouse is more natural than a keyboard — just as a music program would not be natural with a mouse but would be with a music keyboard. The high-resolution screen, the mouse and these other interfaces are letting us get closer to the natural representation of the task.

Eventually, you would get used to using Macpaint to the point where it would seem natural, and all your old skills would be useful. That wouldn't happen if you were typing coordinates on a keyboard.

One great problem with microcomputer use is that the software seems to require so much input in relation to what comes out. Do you think there is ever going to come a time when the software is so sophisticated that only a few keystrokes are needed?

Bricklin: First, computers are very output-intensive, especially microcomputers, because people expect the screen to be very lively. They don't interpret the amount of output as being as immense as it is. What is important is that the amount of input you are doing feels excessive. Most of the things we do with computers, like word and number processing, require that you input the information into the computer, and that is kind of a drag.

However, once you get into a communications environment, like electronic mail, all the information is already in the computer, and you are only manipulating it. Then a computer becomes very manipulation-intensive.

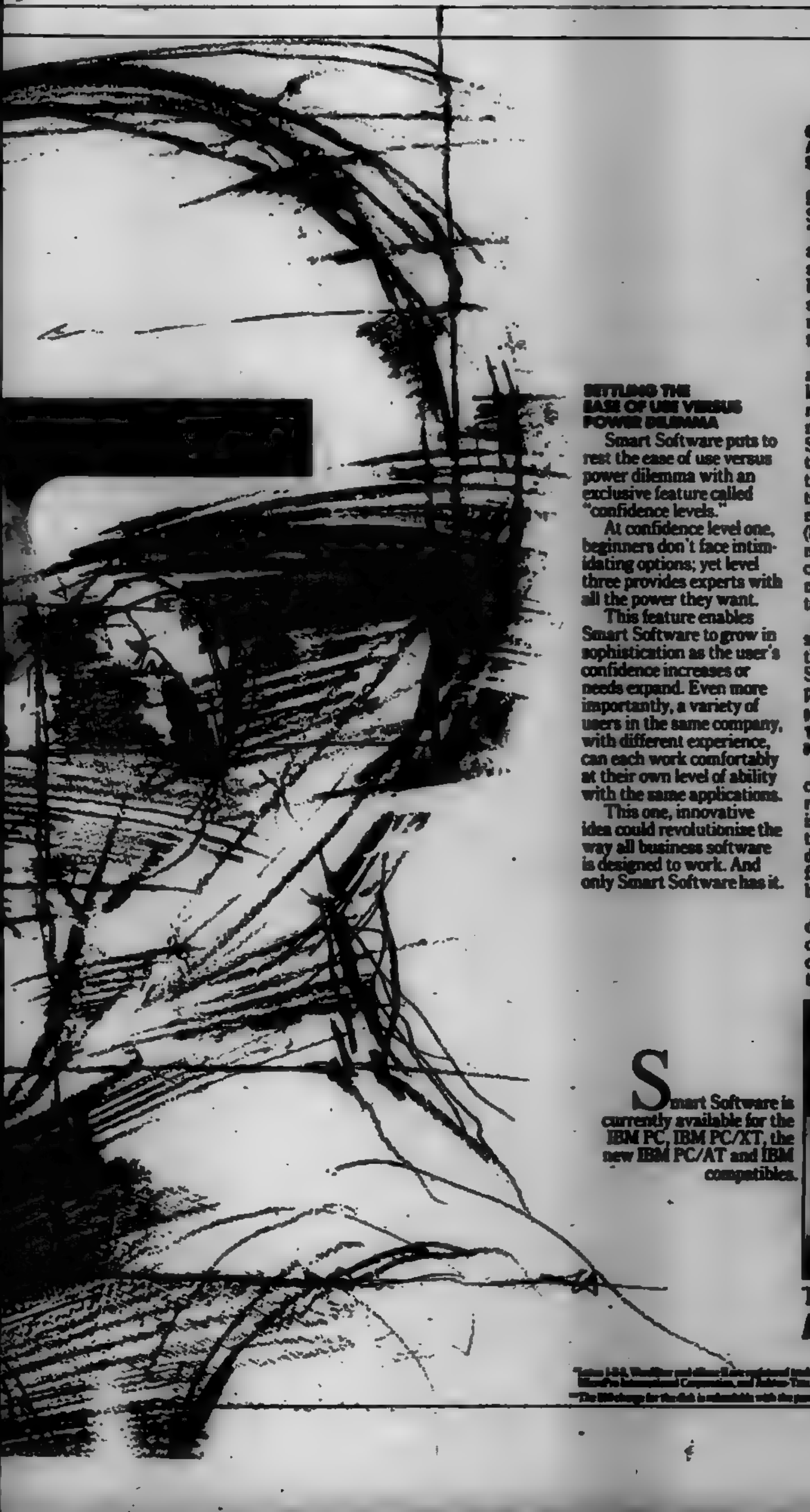
But you still have to key in the messages.

Bricklin: That's true, I do type my messages, but I only write a few a day and I get a whole lot sent to me. So there is very little typing in and a lot coming out. The interface on the commercial data systems is not very easy, but if you could get that wealth of useful, up-to-date information, it is no longer so input-intensive, it is only manipulation-intensive.

In order to get to that point, somebody has to input a huge amount of data.

Bricklin: Some of it would be originally produced on a computer, so that many people would be doing just a little bit each day. Eventually, the total volume of information that anyone could receive or access would be enormous.

Some of the new input devices will make it easier, too. Wang sells a device under which you can put a picture or document, and it is stored as an image. As storage and



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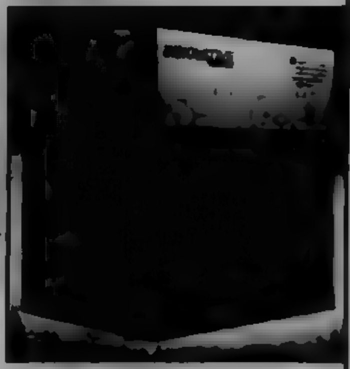

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data transmission costs come down, it will be more common.

It would be even more useful to be able to use voice recognition if they ever figured out how to do it right. When you can store and understand the voice, you can eliminate typing.

The more that original transactions are done on the computer in the first place, the easier it will all be. It is just as easy to produce the original on the computer as it is on any other type of equipment. One of the main reasons we are so input-intensive is that we are switching from manual systems to computer systems. We will eventually be typing everything into a computer, and if you ever need paper, you can produce it — just as the Xerox machine made paper a lot more valuable, because now you can copy a piece of paper and distribute it to many people quickly without having planned to do so in advance. The same thing could be true of computers.

There are advantages to using the computer, but you have to have enough of those advantages to make it worthwhile putting data into the machine in the first place. Then everybody must have a computer and be connected to the networks. There are many reasons for that to occur, and it's slowly coming about. I think that over the next few years, we are going to see more and more of that.

So you are seeing the interconnection of not only homes but businesses with enormous data bases.

Bricklin: The most important thing is to interconnect desks — one person's desk connected with the rest of the group. Then one group connected to another group within the company and all companies connected together. All of this is technology we have now. We just haven't put it all together, because there are so many different standards and so much work getting it all together so that it is easy to use. The hardware technology is there; the software technology is there, too; we don't have to invent anything. It's not like inventing voice recognition — all the pieces are there, but the volume has to be great enough to get the costs down, and everyone has to agree on a standard way of doing it.

Given the commitment we have to the current technology, do you think a computer that is radically different from what we have now will ever be developed?

Bricklin: I don't think it matters what's behind the box. All that matters is that the user uses the things that one normally uses to communicate — like hands, fingers or voice — in ways that seem natural to the senses. Then it doesn't matter what is on the other side of the box. The idea, in many cases, is to have the computer do things as if it were a person. Except this person doesn't tire and it is very quick.

So your view of the future is interconnectedness from person to group to company to everybody — and as human an interface as possible so that the technology becomes less visible.

Bricklin: The Macintosh opens up a whole new realm of how to communicate with a computer. It was designed to do that. They pushed the "enticingness" as much as possible because they want to sell machines. However, it is still uncomfortable for some adults to even think of using a machine, while many of the kids take readily to it.

We still have not truly integrated microcomputers into the home. They are mostly used for word processing and games.

Bricklin: That is because they are not connected. Today, the kind of electronic mail that is becoming prevalent is the answering machine. You always know that you can receive information at your leisure and that it will be received. Imagine if all the people you knew were actually linked together by computer. You could sit there with Macpaint and produce your own really nice message, send it off to everyone and be done. My friends are not on an electronic mail system yet. If they were, we would use it instead of answering machines.

What do you think of the fate of the microcomputer in the business world?

Bricklin: Just ask anybody who uses a personal computer on his desk if he would get rid of it and go back to the way he used to work. Most people will say no. The micro is here to stay.

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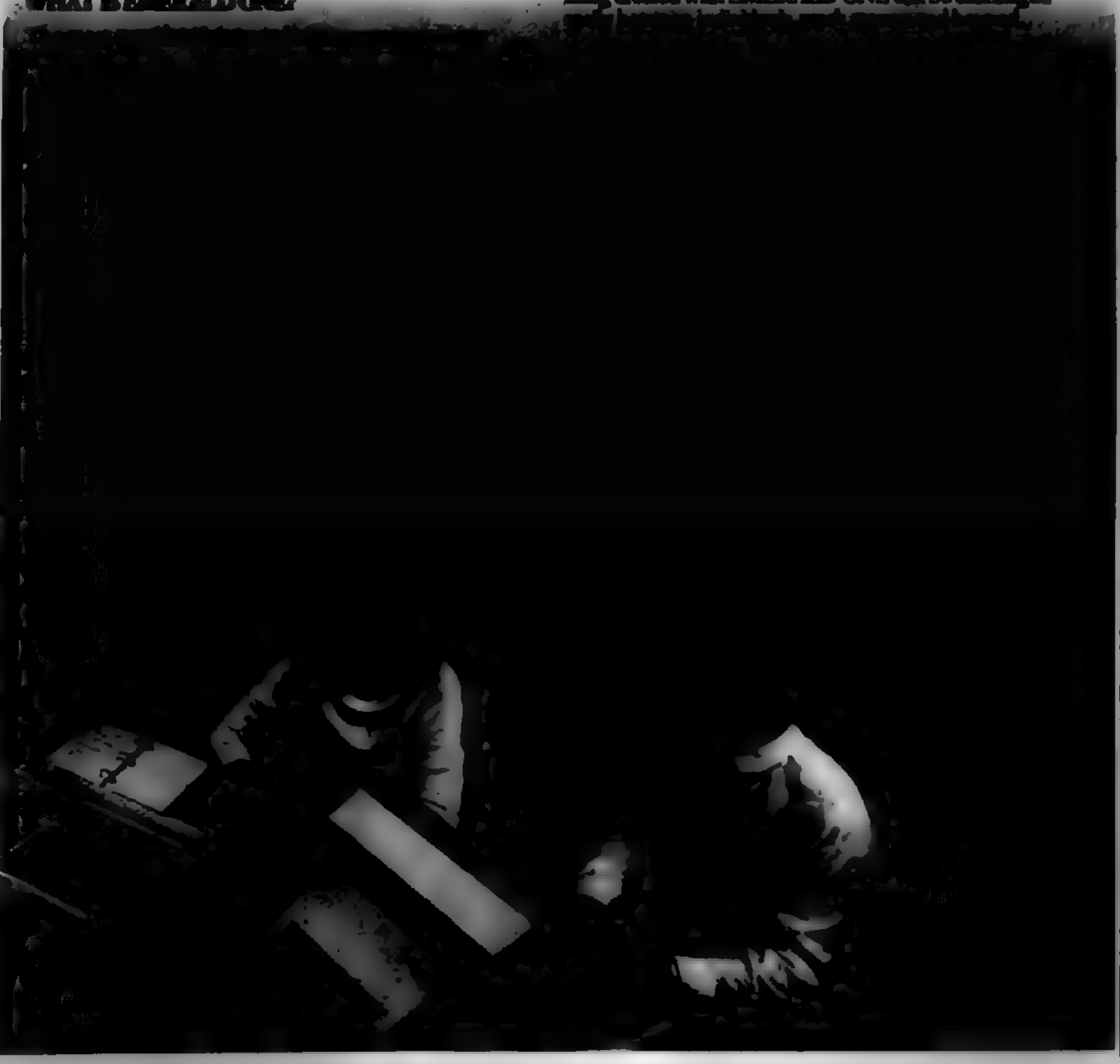

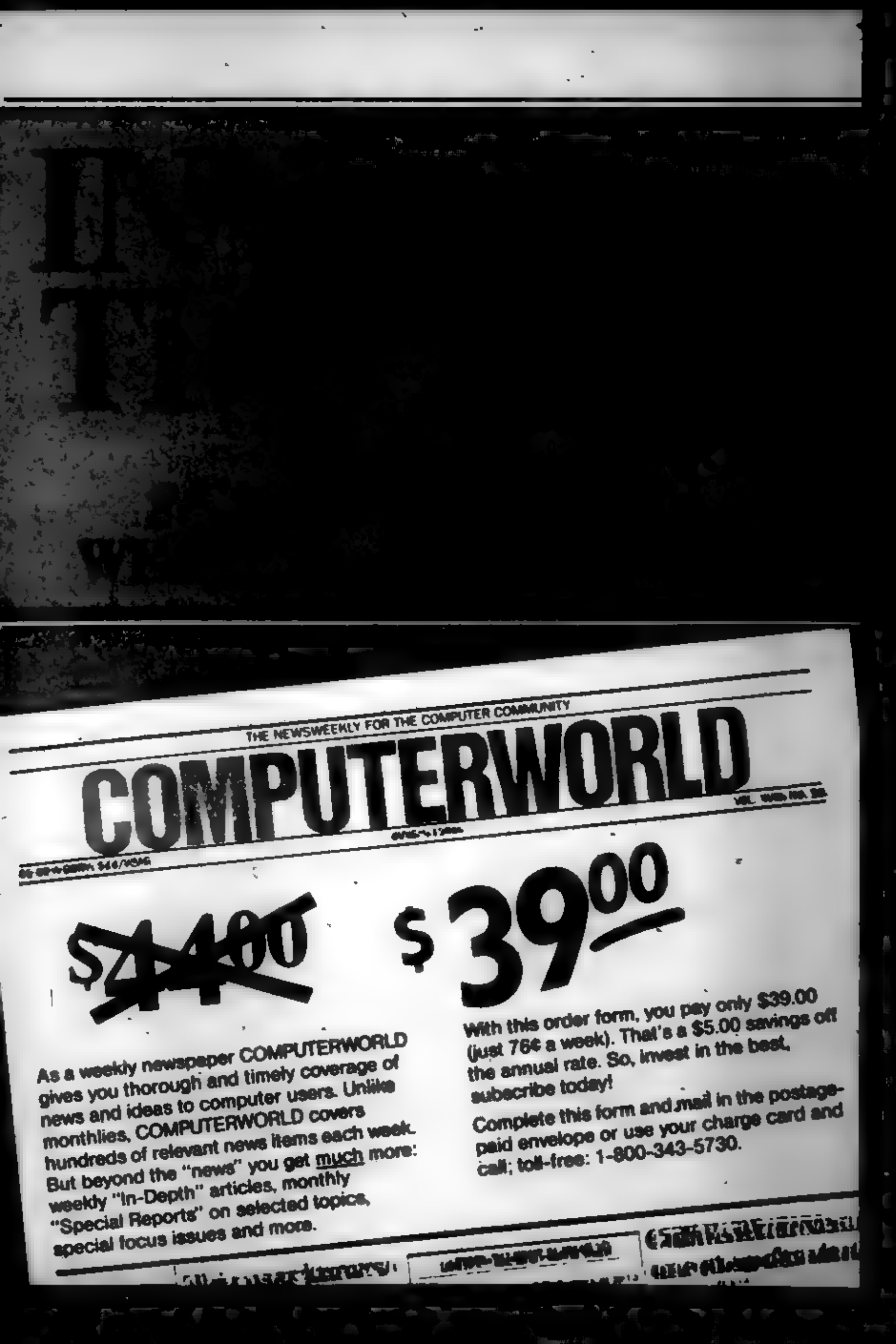
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30 Medicine/Law/Education
40 Wholesale/Retail Trade
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60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User ______________

Vendors

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85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor ______________

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12 VP/Assistant VP
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22 Director/Manager of Operations/Planning/ [illegible]
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31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
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38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other ______________

3. [illegible]

Types of equipment with which you are personally involved either as user, vendor or consultant.

A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

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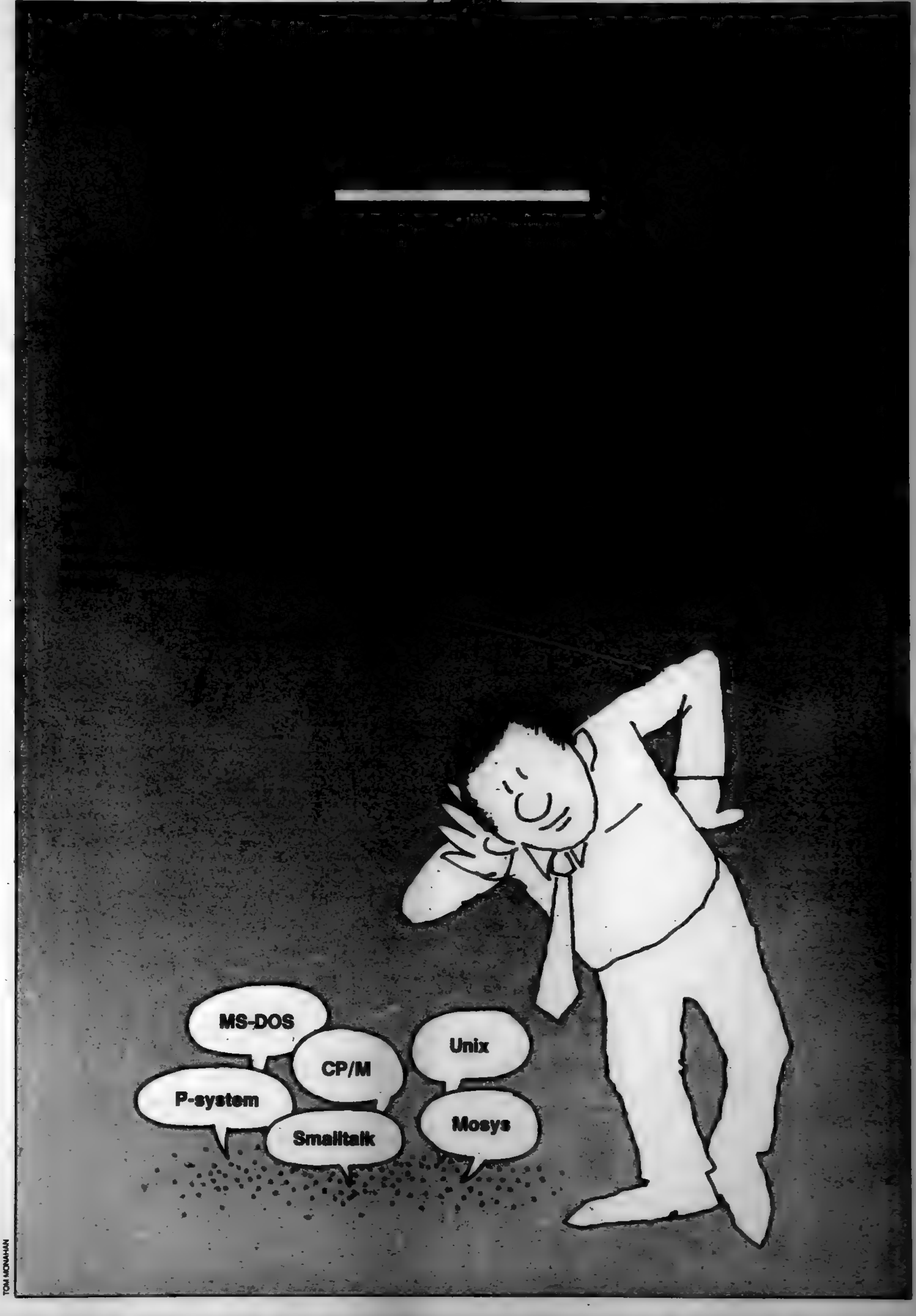


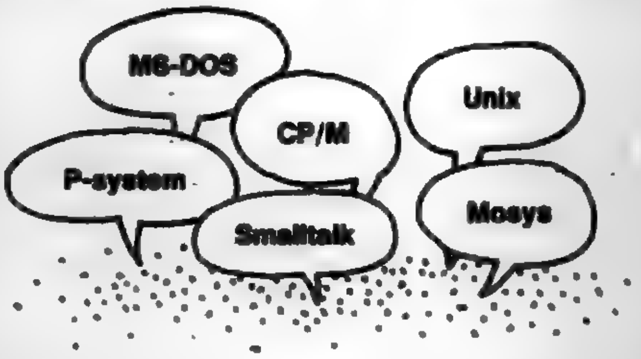
TOM MONAHAN

advantage of current technology.

For discussion, consider eight basic aspects: rapport, access, communications, flexibility, portability, reliability, capacity and performance.

Since the primary objective of an operating system is to allow a person to communicate with a computer through a collection of application programs, the human interface, or human rapport, is at the top of the list. If computers are ever to become widely accepted in the general marketplace, there's no doubt that they have to become easy to use. The prerequisite is, of course, that they be easy to learn. Someone once said that computers must become "intuitively obvious to the most casual observer."

Such a system will most likely take advantage of pull-down, noncryptic menus, windowing, bit-mapped graphics and a mouse-controlled cursor. These items have already simplified word processors and spreadsheets, and there's no reason they should not be used in operating system development. Other likely features will include the ability to back out of errors gracefully before information is lost and the ability to use a "scratch pad" to allow information to be passed from one application program to another in a consistent way. Finally, the standard applications such as word processing, data base and spreadsheet should be available as basic functions of the operating system itself. Their operation should not have to be relearned from implementation to implementation.



Access defines the computer's ability to store and retrieve various information. A window to hierarchical directories will be required to find a data object among much larger data systems. These data objects or files should have the appropriate security if they are available in multiuser or networked environments. A supportive file type should include fixed and variable record length, character strings, images, sound, index and directory files.

The operating system should handle these various files by type; that is, image files should automatically invoke graphics systems, sound files should deal with microphones, speakers and sound generators and so on. A multiple-accessed relational data base should be a basic facility of the operating system. Wild card and partial key access should also be included.

Because communications is rapidly becoming a mature technology, it is important that operating systems define standard methods of dealing with this information exchange. Remote access to material over the local or global network should remain transparent to the user, except for the physical limitation of response time. Facilities should be included to handle global communications such as Compuserve, the Source, electronic mail and other modem-based systems in a consistent manner. Local-area networks with even greater bandwidth should contain even more sophisticated facilities. Each user on these networks should be both a server and a client. This arrangement would allow equal exchange of information, files and even devices.

> Someone once said that computers must become "intuitively obvious to the most casual observer."

Of course, since this operating system will be inherently multitasking, it would also support a multiuser environment. An appropriate security system is required to limit access. Finally, as noted above, all of these network intricacies should remain transparent to the end user.

For any operating system to avoid being left behind as technology or marketing evolves, it must maintain high flexibility. This is the only way an important operating system can continue to evolve. One excellent method to achieve this flexibility is the use of the "software bus." This would allow the user to plug in various functions and features as required. The operating system should thus be able, in addition, to serve as a host to alien operating systems and read or write their various disk formats. If a routine can be accomplished better in a different operating mode (say, machine language), the operating systems should readily accommodate that interaction. The

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ment front end should be easily maintainable by the application programmer.

Portability is also a key issue. The concept involves not only being able to transfer files between various systems, but actually to move the entire operating system to different hardware. This ability to move the human interface from machine to machine means that users will not need to relearn the operation of a new computer when they switch to a system with a different microprocessor architecture. If a computer's basic I/O system (Bios) is designed as a software module to the operating system, portability can be achieved by substituting a new Bios module containing all machine-dependent functions.

No operating system should have to deal with arbitrarily small bounds.

The concept of a software bus with various plug-in modules is also important in considering reliability. For reliability to be achieved in large software systems, each component of the system must, in turn, be reliable. Maintenance of a series of sovereign modules is far easier than tackling an entire system as a whole. Security, transaction logging, backup and restore facilities are also important characteristics of a reliable system. The operating system should also be able to degrade and recover gracefully as it is stressed and unstressed.

As micros become more powerful, the question of capacity gains importance. Advancements in random-access memory (RAM) and disk technology have made it imperative that RAM capacities in the future be measured in gigabytes, with disks designated for terabytes. No operating system should have to deal with arbitrarily small boundaries, such as 64K bytes. These capacities will also encourage performance features such as utilization of RAM disk to gain processing speed.

Actual operating system performance is the final important consideration. Performance is actually one of the keys to achieving successful rapport. Despite the time savings micros afford, people still expect the machine to react instantaneously. An operating system must be efficient for large addressing spaces and have optimized compilers to generate fast native code. The ability to produce efficient assembly code must also be available to the programmer.

With this wish list of operating system features and definitions, it is interesting to evaluate products available today. Unfortunately, most receive poor marks.

MS-DOS performs well but falls behind miserably in rapport; the P-system has good rapport and excellent portability, but suffers tragically in performance; and AT&T's Unix possesses great capacity but little else.

Clearly, a major breakthrough in operating systems has yet to emerge. The Smalltalk project from Xerox Research Center offered great promise, and some of that work is now displayed on Apple Computer, Inc.'s Macintosh (not enough yet to be classified as a usable operating system). Mosys, a new operating system based on Modula-2, is currently being released in Europe. It appears to make great advances in portability, flexibility and especially human rapport, lacking only a good communications function.

While it still is too early to assess accurately the impact of the Smalltalk and Mosys developments, they do offer encouraging signs that the immense marketing pressure exerted from such established systems as MS-DOS and Unix will not completely close the door to technological breakthroughs. Clearly, the hardware to fulfill this wish list is already in production. It now will take only some courage and imagination to make these "dream" operating systems a reality.

Rod Coleman is president of Stride Micro, formerly Sage Computer Technology, Inc., based in Reno, Nev. His firm manufactures and markets supermicrocomputer systems based on the Motorola, Inc. 68000.

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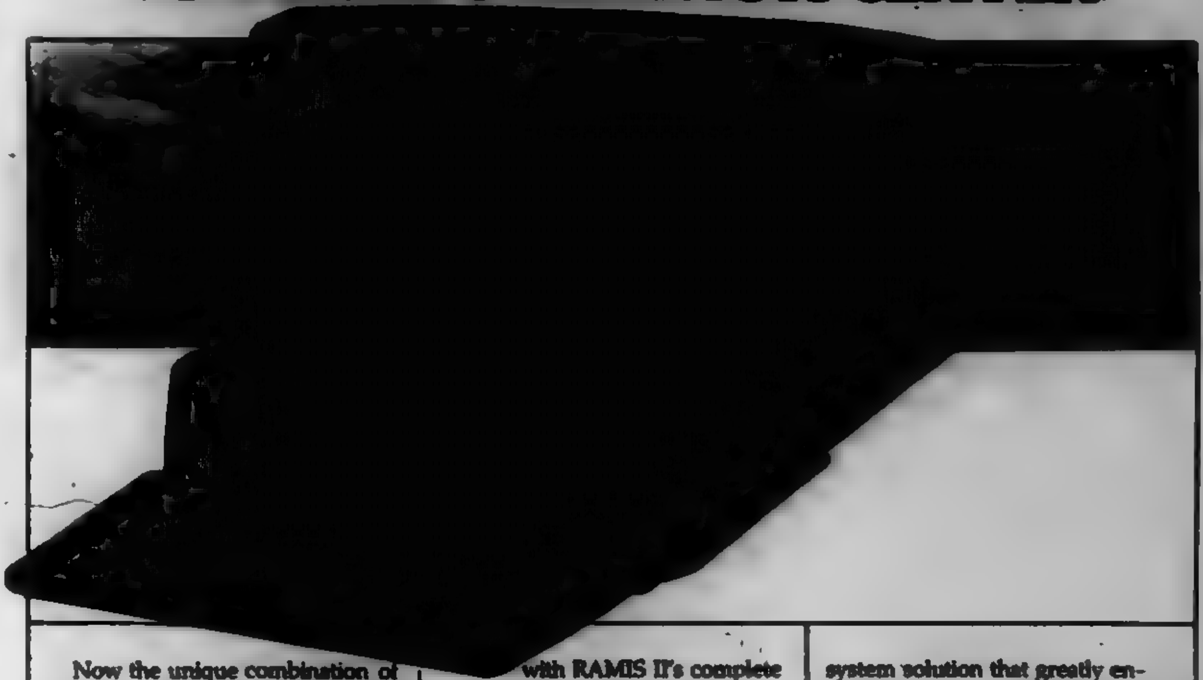

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a major role simply because that is the machine that supports the corporate data base — that central repository of the "soul" of the company. The deployment of micros across an organization, however, changes the way the corporate data base can be used. With micros comes the immediate demand for the ability to move data from the mainframe to the micro and from the micro to the mainframe. The ability to transport data is further complicated by the eventual need to move data from one micro to another.

Another reason for moving data from micro to mainframe may not involve the corporate data base at all — it may be a function of using the most cost-effective storage technology.

In most organizations, there will not be a single solution to the micro-to-mainframe problem. The solution will be partly determined by the intended use of the micro-to-mainframe link, the communications standard(s) used, the composite use of the micros and the sophistication of end users. Clearly, with these different objectives in mind, *the* solution will probably be a compromise among contending interests within the organization.

Another way of confronting the micro-to-mainframe link is to address the corporate problems involved in the deployment of micros. Even while applauding that deployment we must recognize that just as micros can contribute to clearing up many bottlenecks, they can also cause others.

The appropriate use of micros can improve white-collar productivity, limit the growth in demand for clerical employees and provide the tools for producing better information for better decisions. The demand for a reasonable micro-to-mainframe link can also lead to decreased security for corporate data, require more sophisticated communications between micro and mainframe and necessitate the establishment of an extensive support structure for education, maintenance and systems development for micros. Having hundreds or thousands of micros in an organization is very much different from having two or three.

Problem: transactions with the corporate data base. The issue here is simply making the micro function as a terminal. Today there are more than 150 terminal emulation programs or combinations of software and hardware on the market and more coming. A terminal emulation program makes the micro act as if it were some "standard" or popular terminal. Two very important terminal emulations are those that make the micro act like Digital Equipment Corp.'s VT100 family of asynchronous terminals and those that make the micro act like one of IBM's family of 3270-type synchronous terminals. In order to have adequate response time for transactional processing, 9,600 bits per second is the minimum communications speed we would wish to use.

Especially if we have a mixed-vendor or mixed-protocol computing environment — a single user having to access both IBM or plug-compatible machines and asynchronous minis, for example — then one solution is to use an asynchronous terminal emulator and a protocol converter on the IBM or plug-compatible mainframe to make the asynchronous "terminal" act like a 3270. For the Intel Corp. 8088-based micros (such as the Texas Instruments, Inc. Professional Computer, the DEC Rainbow or the IBM Personal Computer) there are a number of VT100 emulators available (the Rainbow comes with one built in, of course).

At the IBM and plug-compatible mainframe end, a protocol converter is plugged into the communications processor or is channel-attached. The protocol converter appears to the mainframe as a 3274 terminal controller. Every protocol converter seen so far supports numerous terminals, but always a VT100. The cost per micro of this solution — including a port on a protocol converter — is about $720.

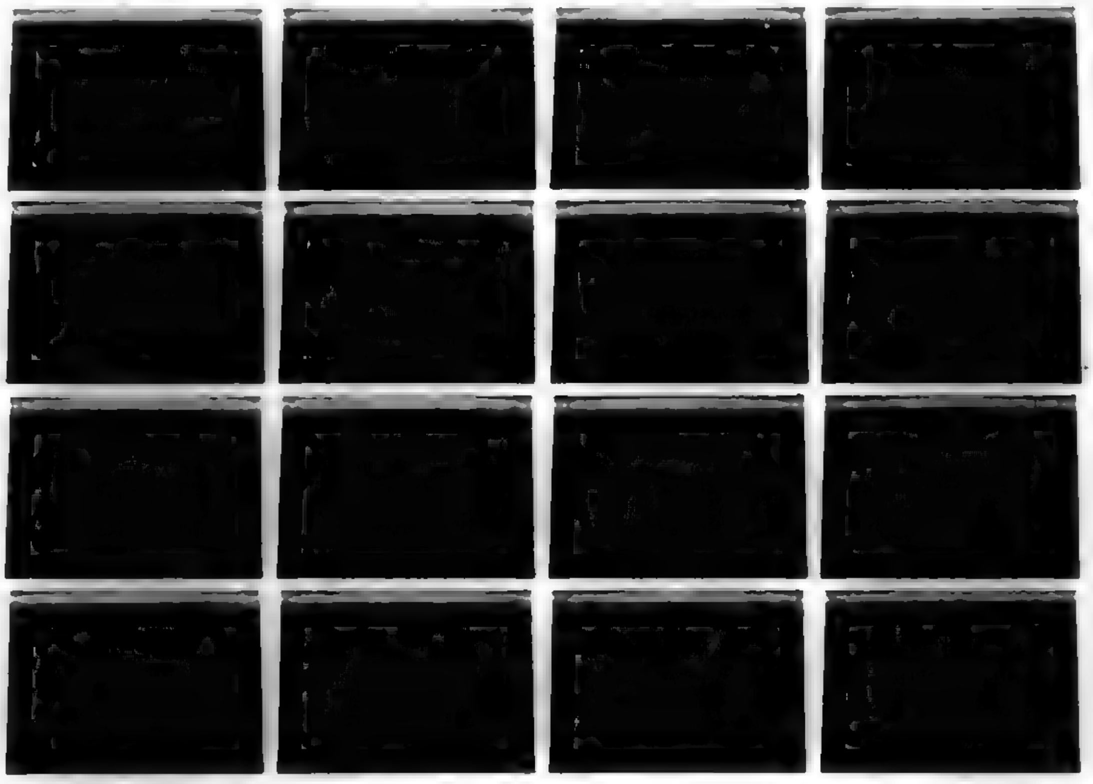
A second approach is to emulate some variety of 3270 directly on the micro. This method, even using the same line speed, frequently produces better response time, since the overhead of protocol conversion takes place at the micro rather than at some remote point.

In one sense, the least expensive way to go is to buy a software package (for between about $200 and $900, depending on the micro) that emulates a combination display station and controller (such as an IBM 3275 or 3276). Communications is via a synchronous RS-232 connection with the communications processor at the mainframe.

The disadvantage of this approach is that one micro workstation will take one synchronous port that otherwise could support up to 32 display stations working through a terminal controller. Some operating system software may have limitations on the number of synchronous lines that may be supported, or the cost of additional synchronous lines on the communications processor may not be warranted.

The alternative 3270 solution is a combination of software and hardware in an add-on board that contains the necessary circuitry for making the micro communicate with a terminal controller (a 3274, for example) via coaxial cable and software to drive the hardware. IBM's 3270-PC takes this approach to its maximum extent; the hardware is integrated into the design of the Personal Computer.

In this configuration, the micro appears to the user almost exactly like a 3270-type terminal and with equivalent speed. The disadvantage is the cost: about $1,200, including the port on the terminal controller and the Personal Computer hardware



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and software — not much different from a 3270-type terminal. The advantage: This solution precludes the necessity of putting both a micro and a 3270 terminal on a user's desk.

An interesting modification of the 3270 approach can be found in IBM's recent announcement of a broadband Personal Computer [local-area] Network developed by Sytek, Inc. of Mountain View, Calif. One product available for the PC Network is a 3270 emulator program that turns one Personal Computer into a communications server emulating a 3274 (Model C51) terminal controller and a 3278 or 3279 display station. Up to 32 of the Personal Computers on the network can operate through the server concurrently, acting as individual 3270 display stations to the mainframe. IBM's announcement may end up preempting other new or planned products of a (logically) similar nature, but the concept of interfacing a microcomputer-based local-area network to the mainframe system is important.

> **Downloading from the mainframe to the micro is at once easy to implement and difficult to implement effectively.**

Problem: moving quantities of data. After receiving a micro, a new user frequently wants to download data from the corporate data base on the mainframe to the micro for further analysis or inclusion in reports. Less apparent is the need to upload data captured or massaged on the micro to the mainframe for further analysis with mainframe tools. A growing need for uploading is in using the mainframe as a storage medium for the micro. Micro users also quickly realize the need to move output from the micro to the mainframe so that they can use specialized mainframe peripherals, such as laser printers. We can solve each of these problems in somewhat different ways.

Some mainframe software must interact with micro software. That interaction may not be very sophisticated, but it must take place. Downloading from the mainframe to the micro is at once easy to implement and difficult to implement effectively. If the data to be transferred consists of only printable characters in a sequential file, the only thing necessary on the mainframe end is some listing utility that allows the listing of the data to the terminal. On the micro end, the terminal emulator must only be smart enough to allow capture of the data in a file or memory. If the communications lines are not very clean, some error-checking protocol is desirable.

Many asynchronous terminal emulators allow such file transfer. If the emulator is smart enough, a simple mainframe program may be written that prompts the user for a file name then takes control over the micro to perform the transfer, thus making the downloading more automatic. This process requires a terminal emulator that can be remotely controlled.

In the micro-to-mini environment, the foregoing approach is often used. In a 3270-oriented, data base environment, however, the problem becomes more complex. The first problem is that the software at the mainframe end will be more complicated because files are rarely in simple sequential format. Furthermore, data is often accessed via a data dictionary, which requires intervention of a more sophisticated data retrieval program to obtain information. The block-oriented nature of synchronous communications can also complicate the mainframe software.

Assuming that all these problems have been overcome, then the micro software must also be smart enough to respond appropriately. Many of the manufacturers of 3270 hardware/software emulators are attempting to confront this problem, but it is complicated by the use of a variety of teleprocessing monitors and data base systems. The same technique cannot be used for IBM's CICS and IMS, much less for systems like Software AG's Complete and Adabas. Solutions for this problem will probably come from several sources, including the mainframe software manufacturers as well as the micro peripheral manufacturers.

A different approach to this problem is the use of a software system on the micro that turns the micro into an IBM 3780 or Hasp workstation remote job entry (RJE) terminal. An advantage of this approach is that virtually all IBM systems have the appropriate mainframe software as a more-or-less standard feature. A further advantage is that if appropriate IBM mainframe software is implemented, routing can take place to many other mainframe peripherals.

A major disadvantage is that an RJE line must be specified in the system generation on the mainframe, and it may not be accessible by more than one remote device. The micro acting as an RJE terminal will also take up a synchronous port on the mainframe's communications processor. Where it is appropriate, however, this file transfer technique can be very useful for both uploading and downloading.

A more interesting and exciting class of software just now coming on the market consists of systems that allow the micro to use the mainframe as a peripheral. In a large organization, this software could prove to be extremely useful for archiving documents and data originating on micros, since the mainframe disk drives are always backed up, usually on a daily basis, and security is normally much better. One of the earliest products of this type was Tempus-Link from Micro Tempus, Inc. of Montreal. A product expected to be released in late January is Rdisk from Tangram Systems Corp. of Raleigh, N.C. There may be others on the market or under development. These systems provide both micro and mainframe software with the result that a communications link is established, allowing micro users to think of the mainframe simply as another (although very large) disk or diskette on the micro, accessed in apparently the same way the micro's operating system accesses a local disk.

The speed of these products is dependent on the communications line speed and the method used by the designer to access communications on the mainframe. On the IBM or plug-compatible mainframe end, Tempus-Link uses standard teleprocessing systems, such as CICS or TSO, to take care of communications (a relatively limited technique), while Rdisk will probably use direct access to IBM's Virtual Telecommunications Access Method, which will result in a more flexible and possibly faster system. These products may optionally provide access to data base systems such as IMS or Adabas, as well as the capacity to transfer files from the virtual micro disk for access by other mainframe software. Although such products will probably operate best in a synchronous environment, they will typically allow either synchronous or asynchronous communications.

The two broad needs in the area of micro-to-mainframe links are for transaction processing on the one hand and for sizable data transfers on the other. If organizational policy demands that even when the user is doing micro applications, his work should appear to be in the context of mainframe software, then one set of solutions is appropriate. If, by way of contrast, the objective is to make the system appear to be an extension of the micros' operating environment, then another set of solutions is necessary. There is clearly a variety of products on the market that will provide various resources and facilities, and more are on the way.

Tom Madron is manager of computer services at North Texas State University, Denton, Texas.

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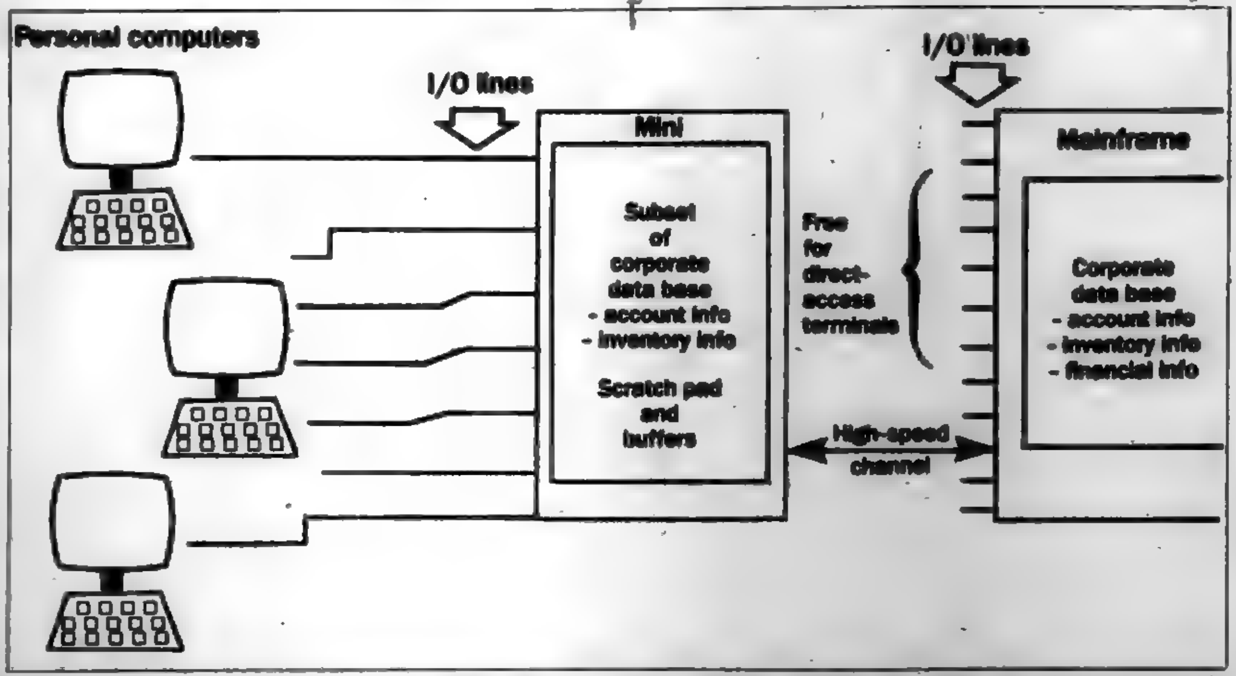
Overall system maintenance costs may actually be reduced with the go-between mini, especially in terms of user-experienced downtime.



Using a mini to facilitate the micro-mainframe link frees mainframe I/O lines and allows hardware-supported hierarchical access to the corporate data base.

(Continued from Page 29)

variable to an already complex problem. But this approach actually can reduce overall system cost, maintenance and complexity.

Personal computers typically entered corporate computing environments in an ad hoc way; individual employees selected the micro best suited to their particular needs. Often this freedom led to a proliferation of different types of boxes, all clamoring to access the corporate data base for as many purposes as there were micros. The DP manager had to adapt to the new, largely unanticipated needs of his users. Problems appeared in at least six areas:

1. Mainframe contention and performance.
2. Control of system access.
3. System maintenance.
4. Security and integrity of data.
5. Costs added by the introduction of micros into the system.
6. Overall system complexity.

The introduction of a mini between the mainframe and the company's micros preserves the performance of the corporate mainframe. Many of the software and network peripheral solutions to the problem impose a burden on the mainframe in terms of disk access, allocation of I/O and communications channels and even CPU time. By having the micros connect to the mini instead of directly to the mainframe, channel contention and allocation are drastically reduced. Disk access, demands of mainframe CPU attention and I/O traffic to and from the mainframe can be regulated and "bursted."

In most cases, personal computers use the corporate data base in a read-only fashion, accessing records from the disk and downloading them for use with the micros. In these environments, an image of the data base (or the most popular parts of the data base) can be downloaded to the mini for micro access, obviating the need for micros to access the mainframe at all. The mini can act as a large, intelligent cache, overlaying less popular segments of the data base with those more in demand.

For records that can be altered, the mini can do presorting, prequalification and other preprocessing, further unburdening the mainframe. The mini also adds to the system several new ports, while only using one mainframe port for its connection. Mainframe ports and channels are freed for use by terminals that must interact directly with the mainframe (see figure).

The mini can also act as watchman or gatekeeper for access to mainframe resources. Instead of trying to control access directly on the mainframe, using complex software devices that chew up CPU time, these control devices can be located on the mini. The data base can be controlled by only allowing micro access to it on the mini and only allowing certain parts to reside (in image) on the mini. The frequency, length and type of accesses the micro makes to the mainframe will be only those allowed between mini and mainframe, and these can be far more easily controlled using the mini.

Finally, control of data integrity and quality can be much better handled with the intervening mini. No valuable mainframe primary memory or disk space will be used for scratch-pad or buffer space. The preprocessing of records on the mini can also serve to quality-check the data before it gets merged into the corporate data base.

Unlike the most popular mainframes, the most popular minis and micros support the closest thing we have to a standard system software base, the Unix operating system. Unix works to smooth over hardware differences between the various types of micros and minis by providing a known, common interface to programs.

Unix allows several different micros to communicate and cooperate in a standard way to other Unix systems. Since it is more likely that the mini rather than the mainframe will support Unix, the mini becomes a key in providing more standardization and better control.

Unix allows programs written on micros to be recompiled to run on the Unix-based mini, and vice-versa. This portability encourages people to use one common set of programs and procedures for any specific application, and the software development process becomes more manageable.

Adding a mini to a situation in which one wants to control micros and mainframes may appear to add complexity to an already complex environment, at the least because it adds another system to be maintained. Overall system maintenance costs may actually be reduced with the go-between mini, especially in terms of user-experienced downtime and its associated costs.

First, many minis today, especially those using very large-scale integration (VLSI) microprocessors, do not need a special environment. No special provisions need be made for a raised floor or air-conditioning, and the mini can be placed close to micro users.

Second, many minis today are becoming fault-tolerant, or high-availability, machines. It therefore becomes unlikely that the mainframe and mini will be down at the same time. The mainframe, which is much more sensitive to maintenance needs, can be brought down for maintenance without closing out all micro users. Their activity with the corporate data base takes place on the mini, which is resistant to crashes and, in many newer architectures, can be maintained and repaired while still up and running with online users. The data base activity can be batched on the mini and bursted to the mainframe when it comes back up.

With respect to security, having the mini as a gatekeeper can allow control of access to the corporate data base and the integrity of the data merged with it. Security often amounts to what in the data bases is accessed when and by whom. These questions can be answered by the way in which micros are configured to the mini and how the mini accesses the mainframe.

There are perhaps many cheaper ways to effect the link, but when the added performance, features and flexibility are taken into consideration, the mini solution is probably the most comprehensive and best in terms of price/performance. Mini-mainframe software links are more stable than their micro-mainframe counterparts. It is as easy to install micro-to-mini software links as it is micro-mainframe links and just about as expensive; but with the intervening mini, much more is gained.

The combined benefits of Unix, fault tolerance, off-loading the mainframe and preprocessing and prequalifying data produce savings in costs related to software development and porting, system downtime, data integrity and mainframe productivity. If a comprehensive accounting were done, it would not be surprising to find that such savings offset the cost of installing a mini.

Gavin Villapiano is a marketing consultant based in Little Silver, N.J. He has been director of marketing programs at Auragen Systems Corp. and marketing/sales manager at Intermetrics, Inc.

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PORTABLES FOR THE MOBILE

The inherent limits of portables now prevail over their advantages.

By Hal Glatzer

The closer a portable's performance is to a desktop personal computer's, the broader its distribution will be through conventional channels. That's one reason people aren't yet buying many portables, according to Charles Satuloff, president of Teleram Communications Corp. They are waiting to see what's coming.

Truly portable computers — weighing only a few pounds and driven by batteries — have not yet reached that level of performance, and sales are languishing. Manufacturers and advertisers are targeting

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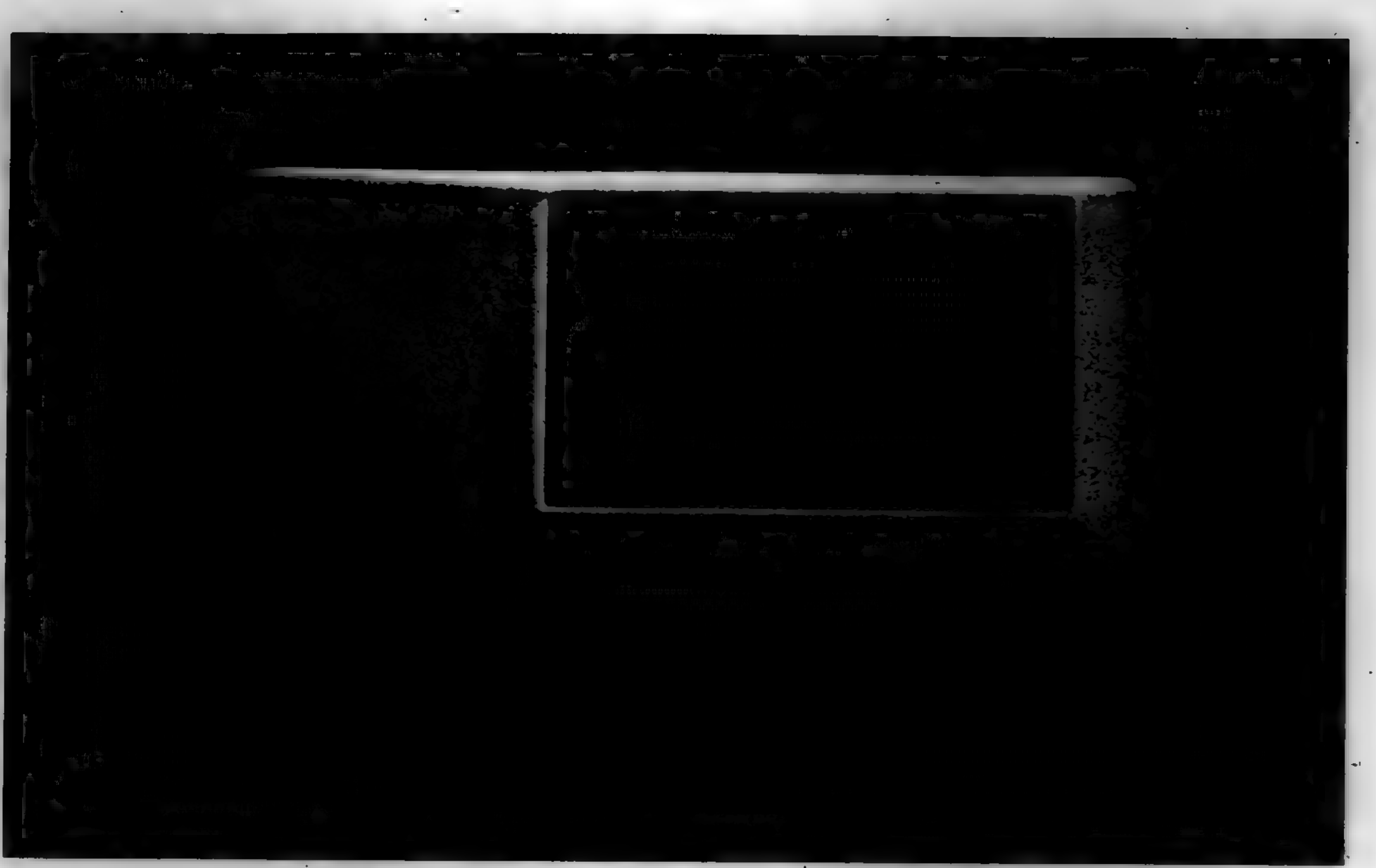

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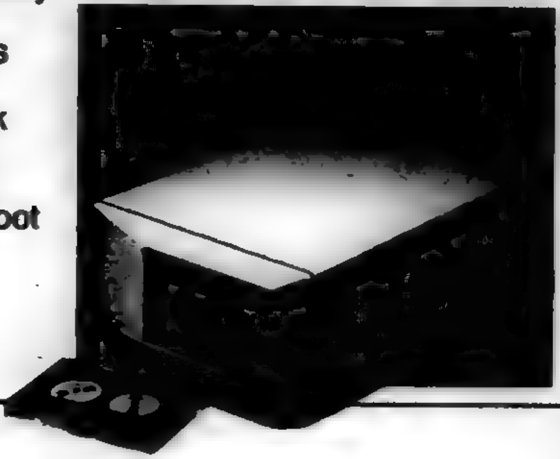

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mobile professionals who work away from their offices. Those people seem to want special-purpose software for standardized tasks, such as auditing or sales. They will be first-time buyers, but they want full portability without giving up functions. Price and software compatibility with other systems are secondary to them.

However, the current buyers of portables — the ones who have driven the market so far — are less mobile in their professional lives and more generalized in their needs and wants. They are also more sophisticated users for whom a portable is their second computer. They want portables that run familiar software packages for word processing and spreadsheet functions and whose files and operations are compatible with the desktop software they already use and understand.

The battle for the market today isn't between portables and desktops, but among the portables themselves. There are three sizes: suitcase, notebook and briefcase.

Suitcase systems weigh between 20 and 30 pounds. Such a portable ("transportable" or "luggable" might be a better word for it) is really a desktop computer that has been squeezed into a tight box, yet is every bit as powerful. It has a 9-in. CRT screen and at least one 5¼-in. disk drive through which it can load off-the-shelf software. The Osborne Computer Corp. system was the first successful portable, but since its decline, Kaypro Corp. (for the Digital Research, Inc. CP/M market) and Compaq Computer Corp. (running Microsoft Corp.'s MS-DOS) have been the leaders.

Most of the IBM Personal Computer clone makers offer a Compaq clone, too. Suitcase computers are portable offices that can be set up wherever there is an electric outlet. They are priced between about $1,500 and $2,500 (an optional hard disk doubles the price) and are popular with people who can afford to buy only one system.

Micro lightweights

Notebook computers are the ultralight aircraft of the computer world. Battery-powered machines like the Tandy Corp. Radio Shack Model 100 or the NEC Information Systems 8200 weigh only four pounds and are no larger than a looseleaf notebook, though they have full-size typewriter keyboards. Through a liquid crystal display (LCD), they present eight lines of 40 characters each. They can't run the same software as desktop computers do, but instead have built-in software on a read-only memory (ROM) chip.

Though limited in power and memory capacity, they can do serious work; journalists have adopted them as substitutes for portable typewriters and can send stories to their editors over telephone lines. Starting at only about $600, these systems are an inexpensive way to take work on the road — as long as the buyers keep their performance expectations within reason.

Briefcase computers are a second generation of portables after the notebooks. Weighing about eight to 12 pounds, they are more powerful than the notebooks in three important ways: They hold more memory (at least 128K of random-access memory [RAM]), they can display more text on their screens (16 lines of 80 characters each) and they come with programs (in ROM) that are almost identical to the most popular disk-based programs for desktop and suitcase computers.

> **The briefcase and notebook computer industry is waiting for IBM to introduce a product that will "legitimize" the market.**

Versions of Lotus Development Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Sorcim Corp.'s Superwriter come on Hewlett-Packard Co.'s 110, Epson America, Inc.'s Geneva and Sharp Electronics Corp.'s PC-5000, respectively. Those machines cost between $2,000 and $3,000.

The Data General Corp. portable, the DG/One, is operationally compatible with the IBM Personal Computer and runs applications such as Wordstar, Lotus's Symphony and Ashton-Tate's Dbase II. The 9-lb unit features a flat liquid crystal display that provides a 25-line, 80-column screen.

Because many users want complete portability, battery power is required for notebook and briefcase systems. But the most expensive briefcase portable, from Grid Systems Corp., needs AC to power its electroluminescent screen, bubble memory chips and 1,200 bit/sec modem. So, of course, Grid's vice-president for marketing, Alan Lefkof, challenges the assumption that portables need batteries. "If you're an auditor and your client doesn't have an AC outlet in his office, you don't want to audit him anyway!" he says with a smile. But Grid has developed a 3-lb, lead-acid battery pack, he notes, "in case customers ask for it."

The briefcase and notebook computer industry is, right now, in the same position the microcomputer industry was three years ago — wait-

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ing for IBM to introduce a product that will "legitimize" the market. (IBM's suitcase computer competes against Compaq in the market that Compaq developed.)

> **The automotive, publishing, government, legal and insurance sectors are ready to automate their traveling personnel.**

Tom O'Brien opened a store in Rochester, N.Y., that sells only portables. But he has noticed a fundamental problem that new users must overcome. "People who are out of the office are on their own. In the office, there's always someone to help you use the computer to get over a hurdle. Outside people need machines that make it clear how to use them — so the seller doesn't have to." He likes HP's Help screens for 1-2-3. "Making the computer do what you want shouldn't get in the way of closing the sale," O'Brien says. "The user has to be able to do what he wants to do in a natural and intuitive way."

Today's market is horizontal, with word processing and spreadsheets for everyone. But the next big wave of sales will come from vertical and niche markets. The automotive, publishing, government, legal and insurance sectors are ready to automate their traveling personnel. Niches within those industries include field sales, technical service and auditing.

"The office is automated, the factory is automated; the field personnel are next," says Teleram's Satuloff. "But the cost to automate them is high. They travel a lot, and their salaries are expensive. There will be an explosion of portable workstations — faster than prognosticators expect — but only with corporate sponsorship or when smaller companies can improve their payback time."

Compaq and the other suitcase computers are selling well, but people have not flocked to buy notebook and briefcase portables. Sales have been disappointing.

According to Bert Sperling, president of Dataccount, an OEM software house, "Radio Shack has sold only half of the 350,000 Model 100s for which it contracted with Kyocera [the manufacturer]. Convergent Technologies, Inc.'s Workslate is dead and gone because spreadsheets were not the answer to the world's problems. Xerox Corp. shut down its 1810 operation.. And I can't talk about sales of the Micro Office or the Teleram, because I don't know if they've had any yet."

Reliable sales figures are elusive. Egil Juliussen of Future Computing, Inc. admits he can't track the sales of many portables because so many are available through mail-order houses or are acquired in government purchases, neither of which are included in his surveys.

Businessland, Inc.'s product manager, Paul Schumann, says flatly: "For a primary computer, trade-offs are not acceptable. Portability does not make up for a small display, higher price or lack of disk. Portability is a feature — not a class of machine or reason for buying. But it makes a secondary computer acceptable, especially if it carries a discount from the desktop's price. After all, for $3,000, a person could buy another desktop computer. Portability shouldn't be expensive. Users set their minimum requirements for power and features, and the trade-offs they have to make for the current wave of portables are below the thresholds those users have set. That's why sales have been disappointing."

The problem seems to lie in the nature of portables themselves; so far, their inherent limitations are prevailing over their advantages. It hasn't happened yet, but briefcase computers are probably going to dominate the marketplace for portables after 1985. Increased demand is driving down the price of 25-by-80, flat-panel LCDs. There is a down-sizing of desktop machines, through innovative packaging, denser memory chips and new manufacturing techniques, such as surface-mounting of components on both sides of a printed circuit board.

A corresponding upscaling of features on notebook portables is bringing in 3½-in. disk drives and squeezing software more economically onto ROMs and programmable read-only memory in smaller quantities (for example, Microsoft Corp. is releasing Multiplan in ROM for the Model 100).

So, the two trends will probably meet in the middle. In the words of Visual Computer, Inc.'s marketing director, Bill Machanic, "The hybrid will be a desktop in a portable package that may never be moved."

John Banning, vice-president of software development at the now-defunct Gavilan, agrees. "A portable may be thought of the way a telephone is: Its value isn't in its portability but in its connection to a network." They may be powerful, he says, "but in terms of features, the portable computer will always be a generation behind the desktops."

■

Hal Glatzer is the author of five books on computers and communications. Based in Seattle, Wash., he contributes to anthologies, magazines and trade journals.

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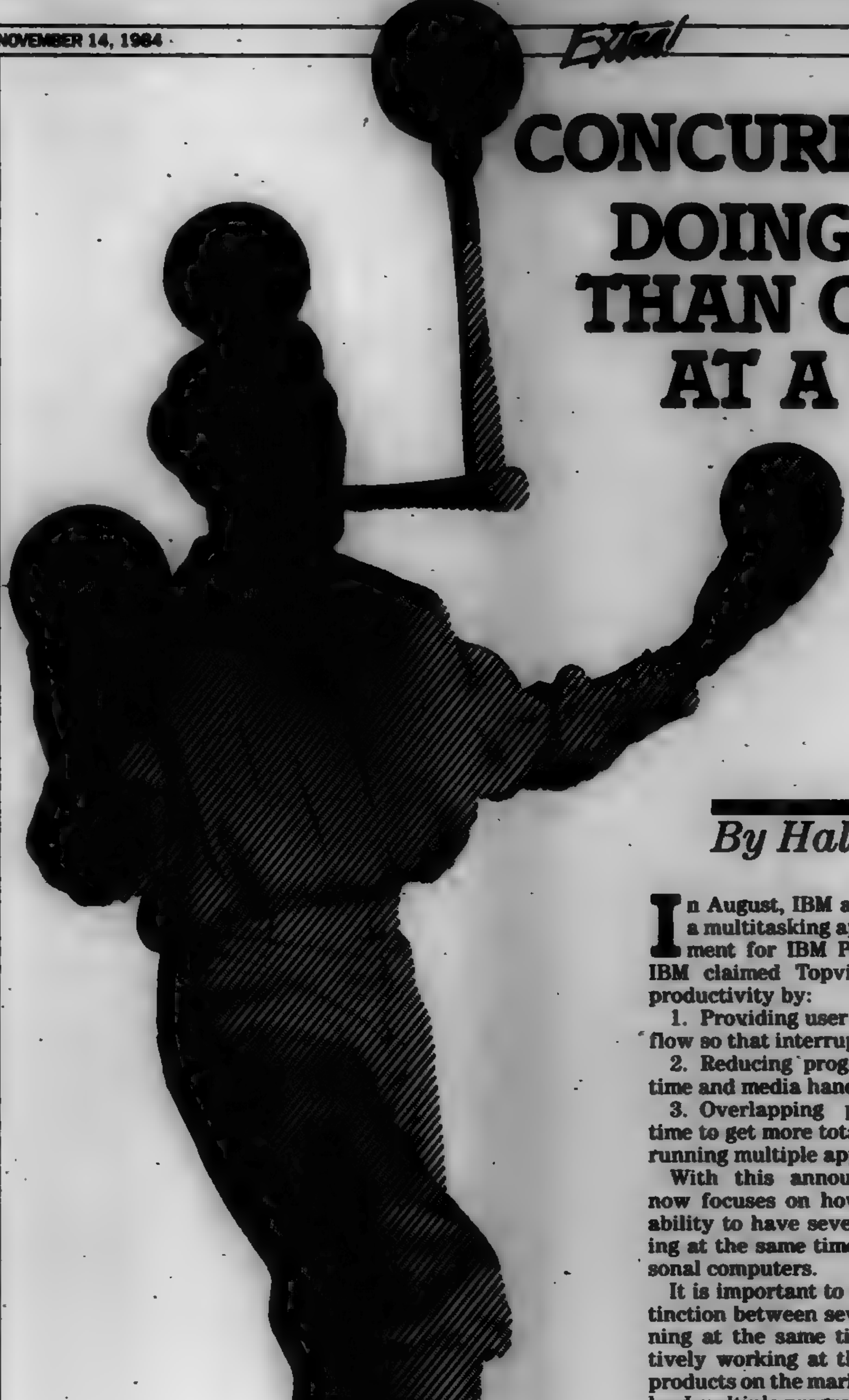

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CONCURRENCY — DOING MORE THAN ONE JOB AT A TIME

By Hal Steger

In August, IBM announced Topview, a multitasking applications environment for IBM Personal Computers. IBM claimed Topview could increase productivity by:

1. Providing user control of the work flow so that interruptions are easier.
2. Reducing program start and stop time and media handling.
3. Overlapping program execution time to get more total throughput when running multiple applications.

With this announcement, attention now focuses on how concurrency (the ability to have several programs working at the same time) can apply to personal computers.

It is important to understand the distinction between several programs running at the same time and several actively working at the same time. Some products on the market allow the user to load multiple programs at once, yet only one can be active at a time. Other products, such as Digital Research, Inc.'s Concurrent PC DOS, allow several programs to be actively working at the same time. A personal computer running Concurrent PC DOS could receive

> **Switching from one application to another is a much more natural, convenient way to work that leads to increased productivity.**

electronic mail, sort a data base, print a report and compile a program, all at the same time.

There are two main benefits of personal computer concurrency: increased personal productivity and low-cost solutions for the computing needs of a department or small office.

Increased personal productivity

What do these tasks have in common?

- Printing a report or plotting a graph.
- Sorting a file or generating a report.
- Compiling a computer program.
- Executing a long program or lengthy calculation.
- Checking a document for spelling errors.
- Receiving or sending files over the phone; talking to a mainframe.
- Backing up a hard disk.

These tasks require anywhere from a few minutes to several hours and do not need human intervention. They are usually performed one at a time on personal computers. The result is that the user waits to use the system while the tasks are running.

Concurrency allows the user to perform such tasks and still use the system for other work. Consider the financial analyst who spends 30 minutes a day receiving stock information from Dow Jones, updates his clients' portfolios, performs stock analyses and writes letters to his clients. With concurrency, the analyst could do everything at once. The result is that he has time to handle more clients or conduct more research. He increases his personal productivity.

Concurrency also increases productivity by allowing for smoother handling of work flow interruptions. Many executives use several software applications such as Lotus Development Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Software Publishing, Inc.'s PFS:File during the course of a day. As the person uses his computer, he is constantly interrupted by phone calls, visitors and messages. And as the person works, he needs to reference information contained in different programs. Without concurrency, the executive would have to save the files, exit an application and start a second application. With concurrent processing, he can run his most commonly used applications at the same time so that he can switch easily from one application to another. This switching from one application to another is a much more natural, convenient way to work that leads to increased productivity.

Low-cost, multiuser solutions

There are several obvious considerations when providing computers for a group of people. How much will each person need and use a system? How much information must be shared? What is the optimum way for people to share expensive peripherals like letter-quality printers and hard disk drives?

Depending on needs, the hardware/software solutions range from expensive personal computer networks to inexpensive time-sharing systems.

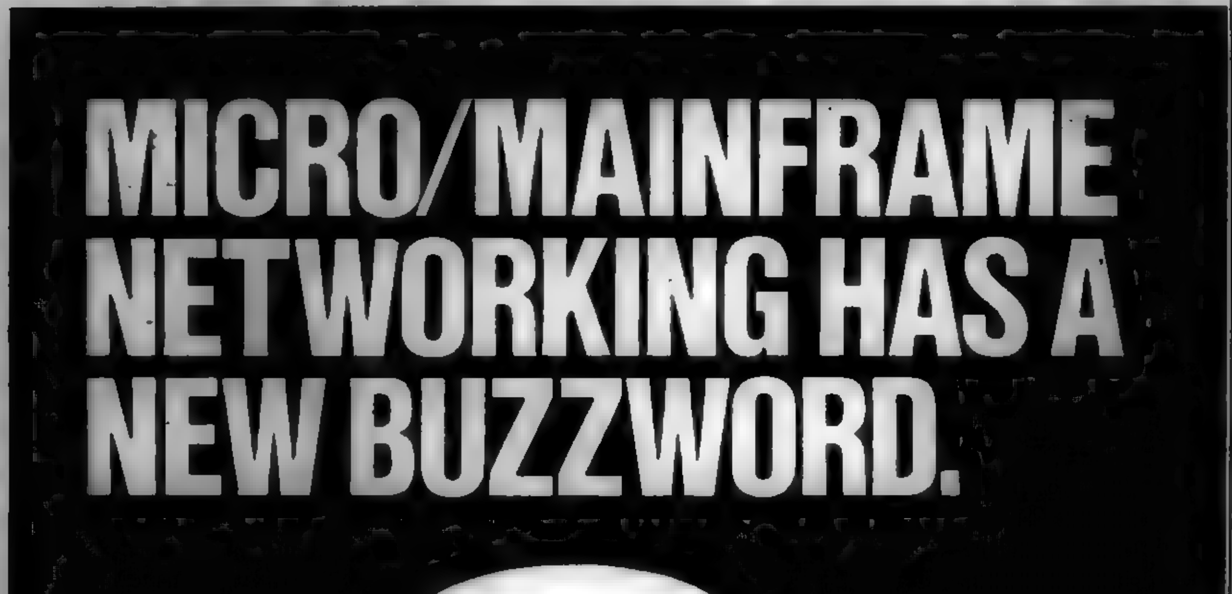
Personal computer concurrency leads to a low-cost solution to the computing needs of a department or small office. Consider an office with a manager, a secretary and a salesman. The secretary might need to use a computer all day for word processing; the manager will use the computer several times a day for project management and financial analysis; and the salesman might want to phone in orders or check inventory levels.

One solution is for each person to buy his own computer and for the group to network them together. A cheaper solution would be for the office to buy just one personal computer and give everyone a terminal. Concurrency allows this arrangement, combining the best of the microcomputer and minicomputer worlds. People can run the same software and get the same response time that has made personal computers so popular; yet they can share information and expensive peripherals in a way that has made minicomputers successful.

Concurrency holds several implications for Fortune 2000 companies and software developers. It is ideal for personal computer communications: Users can perform electronic mail, networking or micro-mainframe communications in the background and still use their personal computer for other work. Further, computerizing a department with a personal computer and several terminals is a low-risk way to learn about and implement multiuser systems. Several people can access the same applications and data simultaneously at little incremental cost over the price of a personal computer.

Fortune 2000 companies should also be aware, when evaluating and purchasing software, whether the software supports concurrent processing.

Software developers can realize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Developers will want to take advantage of safeguards such as record and file locking to ensure smooth operation in a concurrent environment.

productivity gains by developing software in a concurrent environment. It is possible for a programmer to compile a program, debug a program, print a listing and test a program, all at the same time.

As concurrency gains acceptance, a new class of applications will sell. We are beginning to see electronic mail packages that allow users to work on several tasks simultaneously. At the same time, developers should become aware that their products will be used in a concurrent, and perhaps multiuser, environment. One decision software developers face is whether to write software for specific hardware or write software that is "well-behaved" and written to the operating system.

The old trade-off was that software written for specific hardware performs much faster, yet cannot easily be rewritten to run on different computers. A new consideration is that applications must be written to the operating system to work in a concurrent environment.

As concurrency creates a market for itself, developers might choose to develop well-behaved applications to give their products a competitive advantage in this area. It also means that developers will want to consider taking advantage of safeguards, such as record and file locking, to ensure smooth operation in a concurrent environment.

Limitations and costs

There are three main limitations of personal computer concurrency. First, personal computers that support concurrency require greater hardware investments in memory and fixed-disk drives than computers that run only one program at a time. Both Topview and Concurrent PC-DOS, for example, recommend a computer configuration with 512K bytes of memory and a hard disk. These figures compare with 256K of memory and two floppy drives for a single-tasking computer.

Second, concurrency produces more processing overhead than the single-tasking counterparts, which makes running some applications in a concurrent environment impossible or less desirable. If a person performed only word processing all day, he would, of course, receive no benefit from concurrency. In addition, as concurrency supports several tasks simultaneously, system resources must be shared among tasks. Tasks that require dedicated resources, such as process control applications, are not well-suited for a concurrent environment.

Third, there is an extra cost involved in supporting concurrency because concurrent processing is more complex than running one application at a time. When more than one program is run at a time, a new class of problems can develop, because of the way programs interact and share system resources.

A class of concurrency-based software applications will emerge for the office. The first applications will focus on satisfying communications needs such as electronic mail. The next generation will be productivity-tool-oriented.

As personal computers increase in power yet decrease in cost, the hardware will support concurrency with better system performance and response time. As white-collar professionals strive for increased personal productivity, they will adopt concurrent computing tools.

■

Hal Steger is product manager for retail operating systems at Digital Research in Pacific Grove, Calif.

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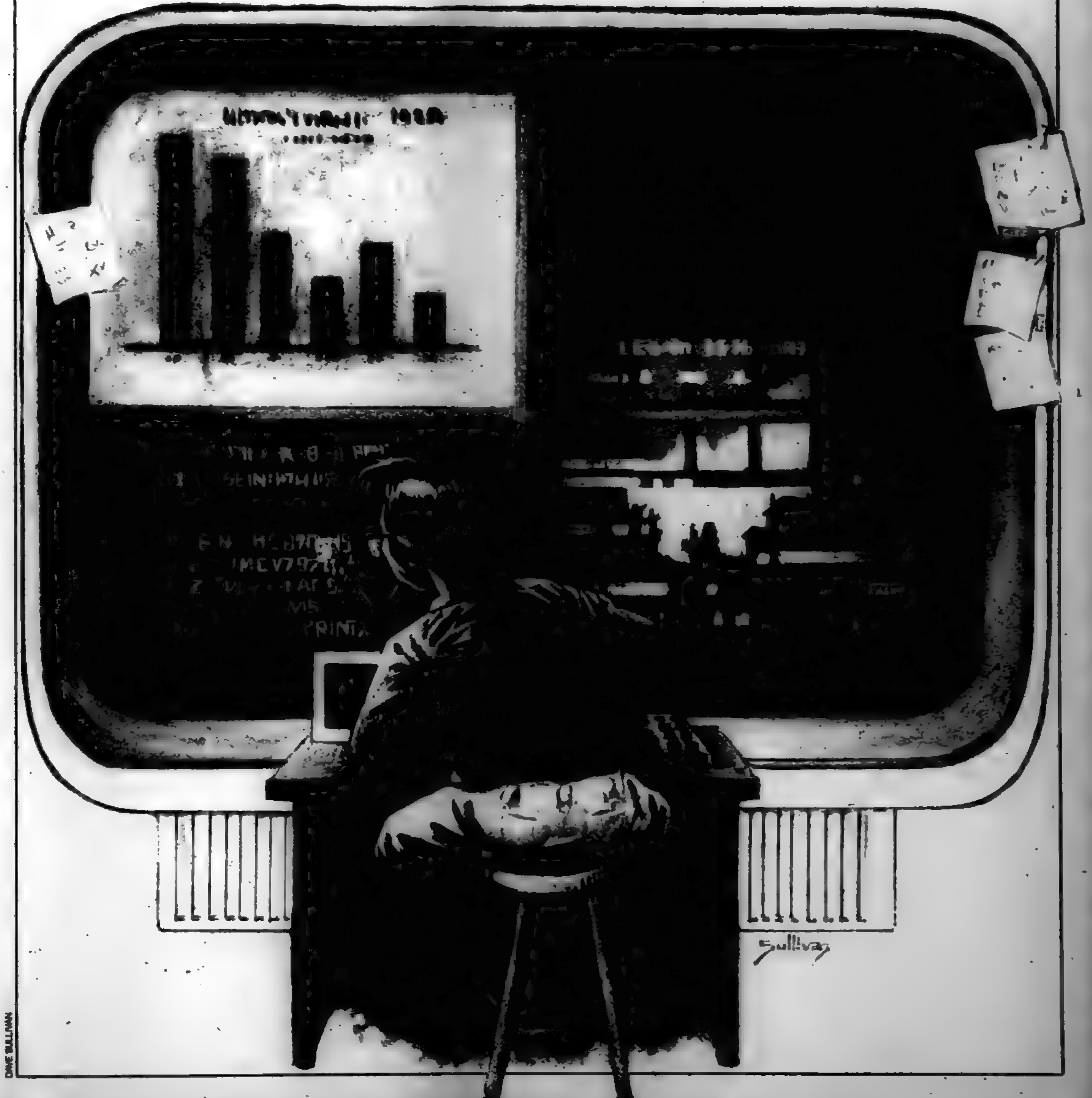
THE UNIVERSAL WORKSTATION

By Kenneth Sullivan

Many of today's stand-alone professional computers could turn out to be white elephants as corporations realize that micros that function in both stand-alone and networked modes are the better investment.

Information is most useful when it can be shared, compared and communicated to other people within an organization both locally and remotely. By choosing the right professional computer, corporations can both protect their investment and plan their office information processing requirements wisely.

The "right" professional computer addresses not only the personal productivity needs of the individual user but also the growing corporate need for truly integrated



DAVE SULLIVAN

systems and specialized communications networks and services, including data and word processing, image and audio processing and multiple business application software solutions. It is, in short, the multifunction workstation — a system that meets the broad needs of personal computing and office information processing with one desktop machine.

Professional computers function effectively as multifunction workstations in the business environment if they meet the following six major requirements:

- Stand-alone applications, including the wide range of IBM Personal Computer software.
- Host workstation applications.
- Communications flexibility, including terminal emulation and local-area networks.
- Participation in multivendor environments.
- Integration of office information processing tools.
- A growth path to new imaging, voice and multiuser technologies.

Stand-alone applications

Multifunction workstations should be able to run the variety of available stand-alone applications that meet multiple business needs, such as word processing, spreadsheet, data base and business graphics. Users today also want access to software packages and systems that solve problems specific to their industry.

In addition, the thousands of software packages on the market today written for the IBM Personal Computer make some degree of Personal Computer compatibility a major requirement in selecting a multifunction workstation.

The major difference between a professional and a personal computer lies in the availability of professional-quality software. While many of the stand-alone applications today run on both professional and personal computers, it is the user-friendliness of the more sophisticated, advanced packages that entices professionals to use them for individual processing tasks. In this context, professional quality is defined by how easy the software is to learn and use. It appears that menu-driven software, for example, will distinguish professional computer/multifunction workstation applications, as long as the procedure standardizes around a given menu approach.

Host workstations

Professionals solving today's complex business problems need information from many internal and external sources. They require access through professional computers to larger systems in the corporation, including departmental minicomputers and host mainframes. They need access to corporate data bases in order to capture segments of that data and format it into management reports; thus, the need for host-integrated workstation applications. A professional computer provides emulation capability for multiple host workstations.

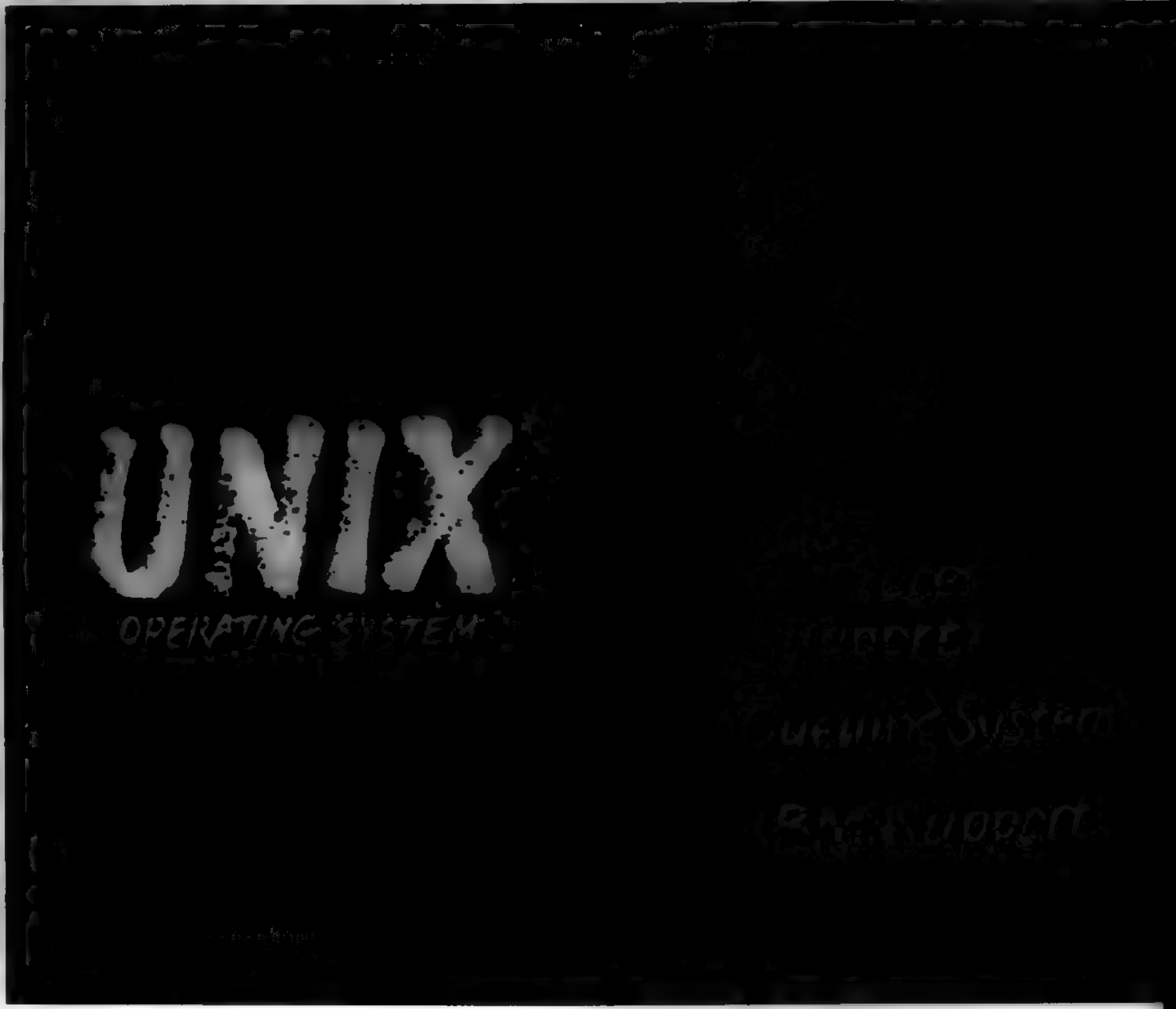
A user in an accounts payable department, for example, might require access to accounts on a region-by-region basis. If the professional computer is a stand-alone system, the information must be obtained by phoning or visiting the appropriate personnel, resulting in time and productivity delays.

On the other hand, a professional computer in host workstation emulation mode can electronically access that information quickly and easily.

In addition to host workstation emulation, a tremendous amount of communications flexibility is required by the end user. Information of all forms (data, text, graphics, image, voice and integrated combinations of these five) should be electronically transferred among devices within a system, among systems within a local or remote network and among multivendor systems.

The better professional computers emulate not only system workstations manufactured by their own vendor, but also those manufactured by competitors. Some professional computers on the market today can emulate system workstations from as many as three or four competitive manufacturers.

Multifunction workstation professional computers should support a wide variety of local and remote communications options, including asynchronous, binary synchronous, IBM's Systems Network Architecture and



Now you can have a complete UNIX System III implementation on most models of the IBM PC.

The IBM Personal Computer Interactive Executive† (PC/IX) offers you tools like the C language, programmer's workbench, communication facilities, a text processing system and much more. It's also a multitasking system that offers you the same facilities found on larger UNIX operating systems.

And PC/IX incorporates many significant enhancements. For example, a new full-screen editor helps you program more effectively. It offers such advanced features as windowing, function-key editing, the ability to execute commands from the editor, and automatic file backup. Beginning users of the editor can rely on a variety of "help" screens.

If you've been using PC DOS, you'll be glad to hear that it can co-reside with PC/IX. And that you can transfer files between the two systems.

PC/IX is specifically designed to take full advantage of the architecture of the IBM PC.

It transparently supports the 8087 Math Co-Processor. And PC/IX automates the management of input/output streams through a multipurpose queuing and spooling system.

IBM has other software for PC/IX

teletypewriter emulation. When purchasing professional computers, a corporation should obtain a firm directional commitment from the manufacturer to a specific type of local professional computer or multifunction workstation network, whether it be baseband, broadband or twisted pair.

If a corporation wants to connect professional computers in a single department, a baseband network will suffice. However, if the requirement is to connect many departments' groups of professional computers, as well as facilitate additional corporate communications needs, a broadband topology will allow the required multiple communications concurrently on separate channels.

In addition, if a corporation is investigating PBXs (or twisted pair), its professional computer vendor should have a clear directional statement allowing groups of professional computers to exchange information where PBX networks are installed.

There also need advanced file handling capabilities, such as the ability to convert automatically and transfer document files from one system format to another so they are usable at both ends. Filing and archiving functions allow common or private storage of files anywhere in the network. With file sharing, MS-DOS data files from the professional computers can be stored on a larger host and accessed by other professional computers.

Office information processing requires workstations that can participate in file management systems, allowing users a transparent means to distribute and retrieve documents on the network.

Multivendor setting

Few companies will rely solely on a single vendor for all of their office information processing needs. A workstation existing within a multivendor environment, therefore, should be able to do the following:

- Run programs using industry standard operating systems, such as Microsoft Corp.'s MS-DOS, IBM's PC-DOS, Digital Research, Inc.'s CP/M 86 and AT&T's Unix.
- Have program portability by using industry standard programming languages such as Basic, Cobol, Fortran, Pascal and C.
- Offer ease of text creation, editing and communications through standard document formats and communications protocols.

Multifunction workstations have to operate as part of the total corporate information processing solution, providing the user with concurrent access to a variety of tools.

Above and beyond the personal stand-alone processing functions, such as integrated word processing, spreadsheets and business graphics, multifunction workstations should handle information management tasks, such as electronic mail for delivering, receiving and responding to mail and phone messages, and time management tasks, such as a convenient notebook, "to do" lists and calendar function. It is extremely important that today's workstation integrate stand-alone, host workstation and communications tasks.

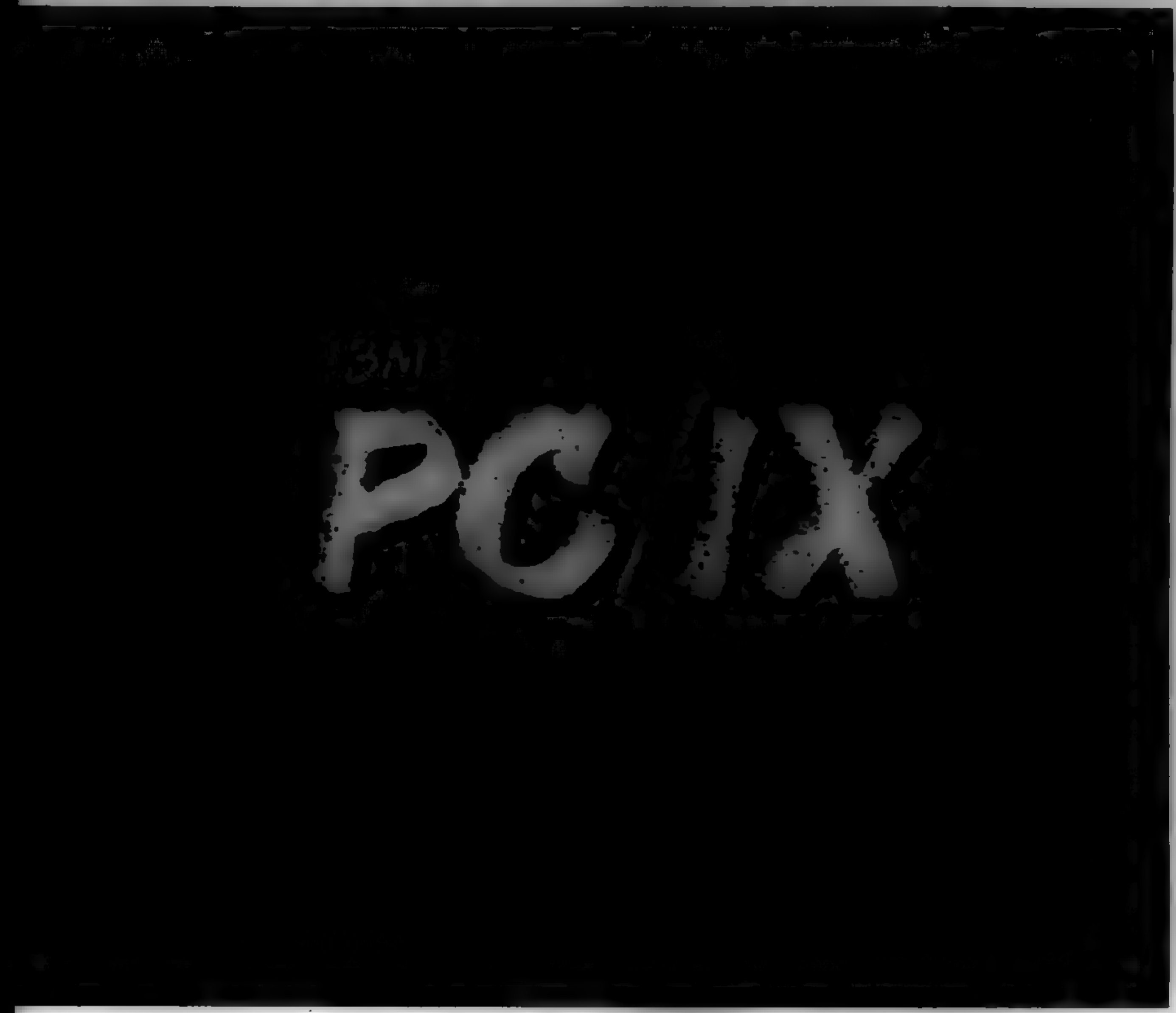
Products such as Microsoft's MS-Windows, Visicorp's Visi On and Digital Research's Concurrent DOS have brought the concepts of windowing and concurrent operation of multiple programs and access to multiple host data bases to the forefront of professional computer technology. Windows enable professional computer users to integrate different types of information quickly and easily from various sources. A word processing memo, for example, can incorporate facts and figures from a host data base, portions of a spreadsheet and a graph, with just a few keystrokes or the movement of a mouse.

Path to new technologies

A multifunction workstation must be fully hardware- and software-upgradable in order to protect the corporation's investment. A user should be able to buy a professional computer with just the amount of functionality necessary to do his job today, with the full assurance that as job requirements dictate greater functionality and as technology changes, his workstation can be easily upgraded.

Upgrading means adding functions, not replacing equipment.

New technologies such as voice, image and multiuser



available, too, including INfort (a FORTRAN compiler with programming tools) and INmail/INnet/FTP (an electronic mail and file transfer facility).†

And because PC/IX is from IBM, you get IBM's quality documentation, as well as IBM service and support.

PC/IX requires 256KB of memory on an IBM PC with fixed disk or an IBM PC XT, PC XT/370 or PC AT.

You'll find PC/IX at your nearest IBM Product Center or your Authorized IBM Personal Computer Dealer. To order, or for more information and the latest list of PC/IX application software, call IBM toll free at 1 800 IBM-2468, and ask for the PC Software Department, Ext. 90. Or call your IBM marketing representative.

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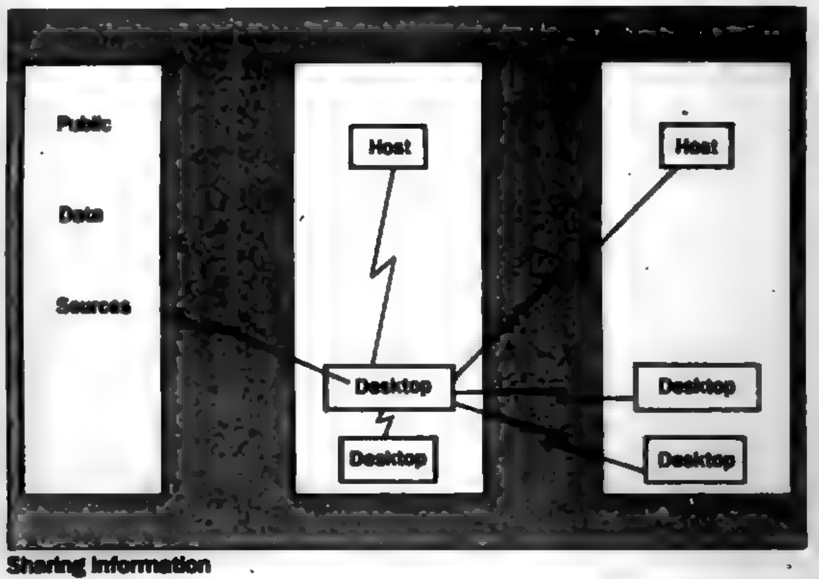
†Developed for IBM by INTERACTIVE Systems Corp.

The industry is quickly moving to the time when a multifunction workstation will be plugged into the wall as part of an end-to-end, truly digital network.



Sharing Information

and multitasking information processing environments are enhancing the personal computer industry today. A Wang Professional Computer, for example, can be upgraded to a Wang PIC image processing system that allows a high-resolution digitized image to be combined with text.

With image processing, images — whether they be handwritten notes, drawings, photographs or other forms of information — can be displayed, stored and edited as if they were text. They can be moved, copied, made larger or smaller, darker or lighter. The combined image-text document can then be printed by high-quality thermal or laser printers. They can be distributed as messages or mail and viewed on professional computers that do not have image scanners. As much as 90% of the paper input corporate professionals receive in their day-to-day operations is visual — forms, reports, graphs, proposals and so on — and was not amenable to computer automation until state-of-the-art image processing developed. Through PIC, users can also annotate this image-text document with digitized voice and then send the annotated document to one or more users.

Images captured at a professional computer-based workstation have to be treated as data and tied in with various local and host data base managers. Office communications have to be enhanced with the ability to record, store and forward voice messages on professional computer-based workstations.

Built for heavy use

In addition to the six requirements, multifunction workstation components must be designed for heavy use and systems reliability within the office environment. They should be workhorses, getting the job done quickly, efficiently and accurately.

No time should be wasted converting information, changing formats or deciphering data.

Multifunction workstations should possess outstanding CPU performance. Windows, concurrent tasks and unstructured data such as image and voice require a high-performance microprocessor design, such as the Intel Corp. 8086 or 80286 chip. They should also have a modular growth path, with options and add-ons provided by the workstation vendor.

The professional computer is the ultimate multifunction workstation. It provides transparent access to all types of information, regardless of the kind of system it is on or its location. It also allows concurrent integration of multiple business applications, whether stand-alone or host-connected. Communications of multiple types of information (text, data, image and voice) is also easily facilitated.

The future will bring a system that is "invisible" — where office workers think only about what has to be done, not how the system will do it. The industry is quickly moving to the time when a multifunction workstation will be plugged into the wall as part of an end-to-end, truly digital network.

Kenneth Sullivan is director of product marketing at Wang Laboratories, Inc. of Lowell, Mass.

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protect facilities from improper use. Such policies involve limiting the use of personal computing devices to experimental applications, isolating the facilities to prevent unauthorized use and restricting their operation to authorized persons only. Generally speaking, responsibility for security of data resources is placed directly upon user management, much as that group is held responsible for other valuable or confidential assets.

2. Data integrity. Management concern in this area takes the form of policies that tend not to limit physical access to end-user facilities, but rather to specify the conditions under which these facilities may have access to the mainframe, the data base or the communications network. Implementation of such policies is almost universally the responsibility of the management information systems organization and is built into the systems programming and operating procedures of the mainframe computer/communications system.

3. Compatibility of hardware and software. Management recognition of the need to move in the direction of integrated systems is evidenced by the many policies intended to promote compatibility of end-user hardware and software. They are most frequently implemented through procurement guidelines and approval procedures that are the responsibility of the MIS organization.

4. Justification of cost. Corporate policies involving expenditures for personal computing generally extend beyond the normal financial justification requirements. In addition, such policies require justification of the feasibility and appropriateness of the application from a systems viewpoint. This additional justification is usually the responsibility of user management in consultation with the MIS organization.

Utilizing the resource

Beyond these management concerns, what needs to be considered is the overall challenge of effectively managing the growth in the use of these resources and the rapidly expanding number of users.

An essential first step is recognizing that we cannot afford to accept this phenomenon as simply the growth of a costly inventory of equipment. This growth must be managed to ensure that the varieties of equipment used adequately support individuals in their current jobs, promote compatibility and generally use the resource as efficiently as possible.

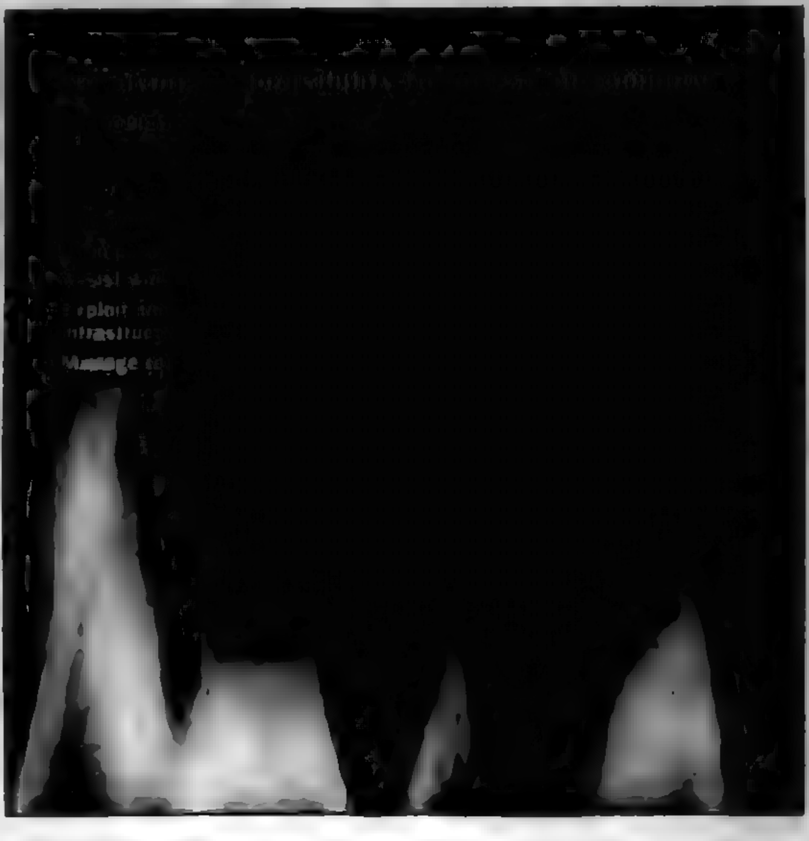
Organizations must look at the proliferation of personal computing equipment as a basis for building an information infrastructure that will support office automation as well as management decision making. To illustrate: As more and more terminals are deployed for decision-making support, the opportunities to use them for distribution of documents, for videotex and similar facilities become more meaningful, offering significant savings opportunities in terms of time, internal publishing costs, mail distribution and other office operating expenses.

In terms of costs, the goal of efficient deployment and utilization of resources is very much in tune with the larger goal of building an infrastructure. However, the importance of this objective must be recognized, because in some cases, developing an effective infrastructure will appear to cost more initially than allowing unguided proliferation of equipment.

Management concern must exist for several areas not yet recognized in day-to-day policies.

1. Support of work groups. A basic consideration is the need to distinguish between support for individuals and support for groups or departments, where the presence of an information infrastructure is particularly important.

For example, consider the office of a shipping distribution center, where the dozen or more order tracers in the office might require access to mass storage and communications linkage to points within the shipping center and to external sales offices as well. This group might effectively use a document generating and distributing system, an electronic mail system and a local data base system as part of the information infrastructure. It might be supported by nonintelligent terminals linked to a minicomputer.



2. Support of leading users. A major area of concern must be the identification and support of individual users whose work or work style turns them into "leading users." In that same shipping center, one shipment scheduler may emerge as a leading user who can benefit from sophisticated capacity planning, order sequencing and other quantitative approaches. Such an individual might benefit from a relatively powerful personal computer with extensive internal memory and graphics capability.

At some point, certain individuals will become heavy users of the computing resources, and it will become apparent that their own productivity and the effectiveness of the functions they perform can be further enhanced. These are the people who, in the normal range of applications, suddenly seem to need more or different resources.

To support such individuals effectively, it may be necessary to isolate their potential needs and capabilities, to determine their special requirements for additional resources and to evaluate the extent to which they can act as focal points for enhancing other activities within the organization. Applying and cost justifying additional support for such leading users is a major improvement opportunity.

3. User management involvement. Most companies simply do not have the resources to monitor and closely manage local use of computing resources. Typically, one staff specialist will support between 100 and 200 users, and most of this support is hand holding and trouble shooting, not monitoring day-to-day applications.

Attention needs to be given to working with user management to protect and enhance applications that become key to the workings of the department — particularly where perhaps only one or two individuals understand how to use the application. Further management attention is necessary, on the other hand, to avoid situations in which critical activities are exposed to unnecessary risk through improper use of the facilities.

A case can be made that support for most individuals will necessarily have to be limited to a basic level, with additional support provided for some advanced people. In addition, in each work group it is essential to search out opportunities to enhance the productivity of the whole group by creating an effective, cost-justified infrastructure of office automation utilities.

In most cases, the initial demand for such primary utilities as spreadsheets, word processing and electronic mail will provide sufficient benefits to justify creating the critical mass of users, applications and resources that provides the infrastructure upon which more advanced office automation and decision support applications can be built.

Dual responsibility for support

As end-user computing grows, it requires more than one kind of support. As MIS management considers support of the work group and support of individual users, it becomes a real question as to what people and computing resources should be made available.

While MIS operations, traditional applications development and the telecommunications function will increasingly be involved in supporting end-user computing, the key leverage points appear to be office automation and the information center. Currently there is a trend toward putting these functions under a single individual, but it is important to understand that office automation and the information center make distinct contributions.

Both the office automation group and the information center have legitimate involvement from different perspectives. Companies should be looking at ways of sorting out these two functions.

Supporting work groups with common utilities appears to be an office automation function that involves studying work and information flows to develop support activities such as electronic mail, document processing and other communications-based services. Support for individuals is more applications-oriented and may fall into the information center arena.

Essentially, the information center provides an environment in which the user can deal with the MIS department. There is, however, considerable variation as to how information centers are operated. Basically, they have grown up in two ways:

- One is along the lines of what we can call decision support — working closely with individual end users to develop applications suited to their particular decision-making needs. This approach typically uses mainframe-based data and systems already in place.
- In other organizations, information centers have grown up as a convenient way to disseminate and support personal computing. The information center was conceived as a place where people can walk in and try out different kinds of personal computers to familiarize themselves with the hardware and the basic software for such applications as spreadsheet preparation, text editing and data base manipulation.

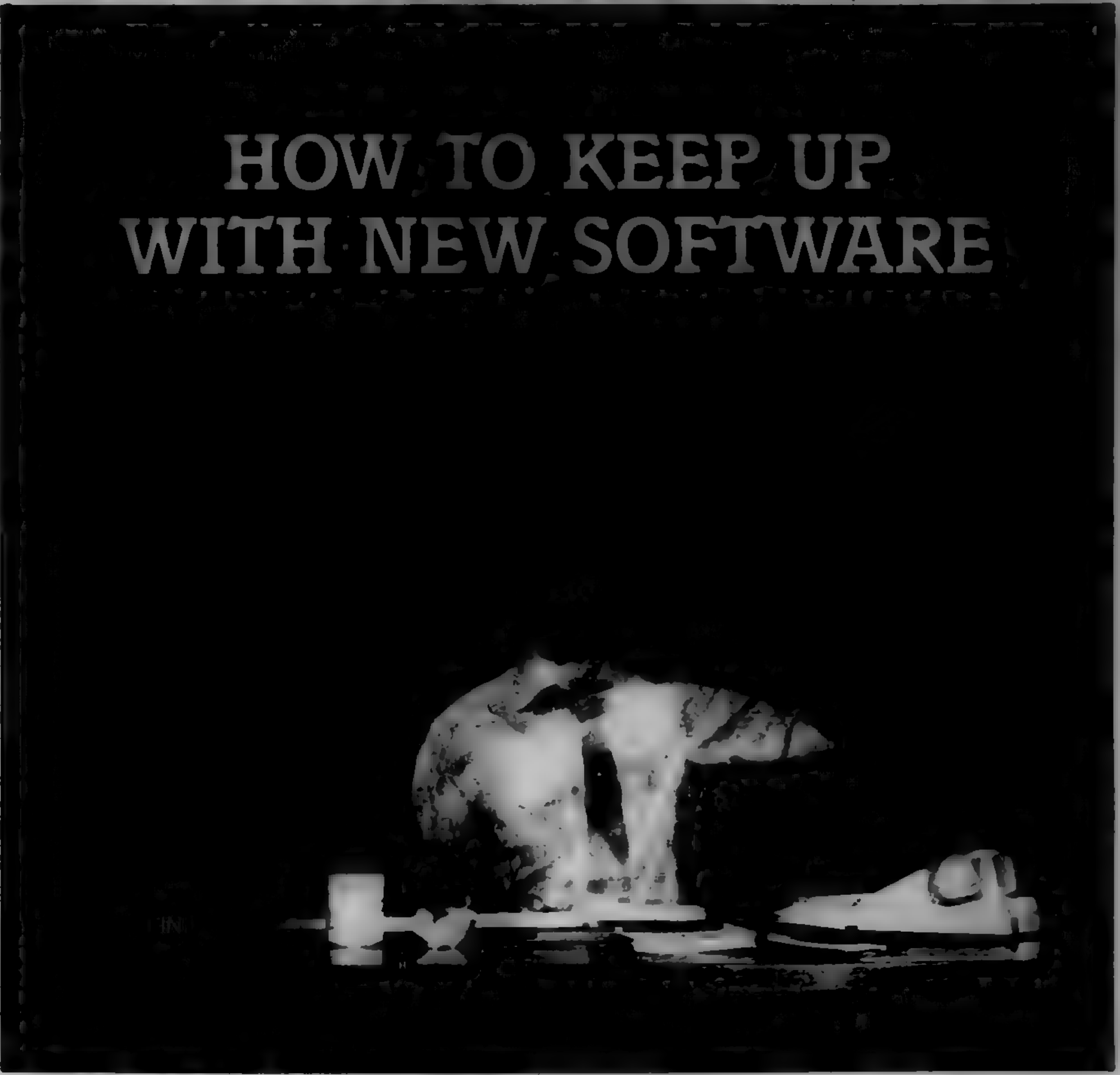
As the population of end users increases, it is unlikely that the information center will provide the locus of a great deal of day-to-day support for most people. Basically, they will be independent of it, using various utilities provided to them. Continuing low-level training will properly become embedded in the user organization through its own people. Increasingly, the information center will tend to specialize in the areas of new applications and new tools for application, leaving much of the utilities development and support to the office automation group.

The long-term benefits of personal computing will only be realized as it becomes embedded in the organizational culture.

In order to succeed with the limited resources available to MIS, user management must assume increasing responsibility for primary training, for organizational learning, for identifying potential applications and for assuring that use of available tools falls within the parameters of responsible management.

David Dell is director of research services at the Diebold Group, Inc., an international management consulting firm based in New York.

HOW TO KEEP UP WITH NEW SOFTWARE



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By Richard Strauss

Every month, 100 or more software products are introduced for the personal computer. Keeping up with what's available is like bailing out a rowboat with a thimble.

It's desirable, of course, to collect whatever information comes your way — and an especially good idea to keep files of software articles and reviews clipped from magazines. But rather than trying to keep up with all software developments, the bulk of your research efforts should be centered around specific needs within your organization as those needs arise.

Once you know what you're looking for, there are two approaches to finding it: Do it yourself or get help.

The first involves collecting all the product information you can and then making a selection. Since you do all the legwork, this method can be extremely time-consuming. If you are thorough, however, you are in an excellent position to make the ideal selection.

Getting help involves a middleman who collects and screens product information, then presents you with a narrowed field of products and a recommendation. You never look at products that for one reason or another have been disqualified. The final decision is still yours, but you have less to think about in arriving at your decision.

If the middleman does a good job of screening, getting help is clearly the more efficient way to search for a product. But if the middleman is biased or otherwise fails to consider the full range of products available to meet your needs — or if he doesn't understand your needs — you might be better off doing it yourself (if you have the time, of course).

Regardless of which method you choose, you have to get your information from somewhere. If you do it yourself, consider the following sources: books, directories, software reviews, magazine roundups, software reports, advertisements, vendors, trade shows, retailers, associates and friends.

Books. Most bookstores carry guides for selecting products in the more popular categories. The books written by a research staff are generally less biased than those written by a single author, but in either case you can pick up some good information about the products you are considering.

The problem with books is that they usually do not have the latest products, and many of the less popular categories don't have any books at all. Another problem with books is that they can be misleading because they often draw conclusions about the products that don't take into account the way the products will be used in your organization.

But if you can find a book that covers the area you are investigating, it's a good start for getting an insight into the pros and cons of the products in that area. It's also a good way to learn about the benefits of the software in general.

Directories. Most directories list a wide range of products with a paragraph or two describing each. These descriptions are usually summaries of the products' features or strong points rather than critical evaluations. A comprehensive directory is a good place to find out what products are available to meet your needs, but unless you are looking for special features, directories won't do much to narrow your choices.

Neither will they have the latest products. For example, one of the leading directories of personal computer software lists 75 word processors — but does not mention three of the newest and best: Office Solutions' Officewriter, an excellent word processor; IBM's Displaywrite, a word processor that emulates the Displaywriter; and Leading Edge Products, Inc.'s Word Processor, a package with the power of a dedicated word processor and a competitive price.

Besides directories in book form, there are electronic directories that provide product information on-line. The information is more up-to-date than in book directories, but it is also more expensive — and you need a personal computer with communications capabilities to provide access.

Software reviews. The software reviews published by computer magazines can provide insight into particular products, but you should not rely on them to make your selection. Reviewers generally write from a limited perspective — they don't consider the full range of the product's potential uses or the various types of people who might be using the product.

If the people in your organization will be using the program differently from the way the reviewer uses it or if your organization's level of experience with the product category is different from that of the reviewer, the review probably won't be highly relevant to your search.

On top of that, it's not unusual for reviewers to have a bias in favor of the products they review. And most reviewers do not compare the product with others in its category.

Thus a product that gets a good review isn't necessarily the best — or even good — for your purpose. The review does, however, give you a feel for the product, and any negatives in the review should be considered red flags.

Magazine roundups. Many computer magazines carry articles about specific categories of software (in addition to software reviews).

These articles are of two basic types: buyers' guides and feature articles.

Buyers' guides cover particular software categories accompanied by charts listing features. These guides are like directories: They tell you what products are available and what features they have, but they usually don't help the reader much in narrowing his choices.

Even if a product is shown as lacking a special feature you are looking for, don't be too quick to rule it out — the charts in magazine roundups are notorious for errors.

Feature articles concentrate more on text and less on charts of features. They talk more about the overall benefits of the software and less about particular products.

To make a feature article manageable, the author may eliminate certain products in the category. For example, a recent article on project management software overlooked Softcorp, Inc.'s Pro-ject 6, a relatively new, highly capable, inexpensive program for projects of medium complexity. Another article on project managers ignored products selling for more than $500 — which elimi-

A comprehensive directory is a good place to find out what products are available, but unless you are looking for special features, directories won't do much to narrow your choices.

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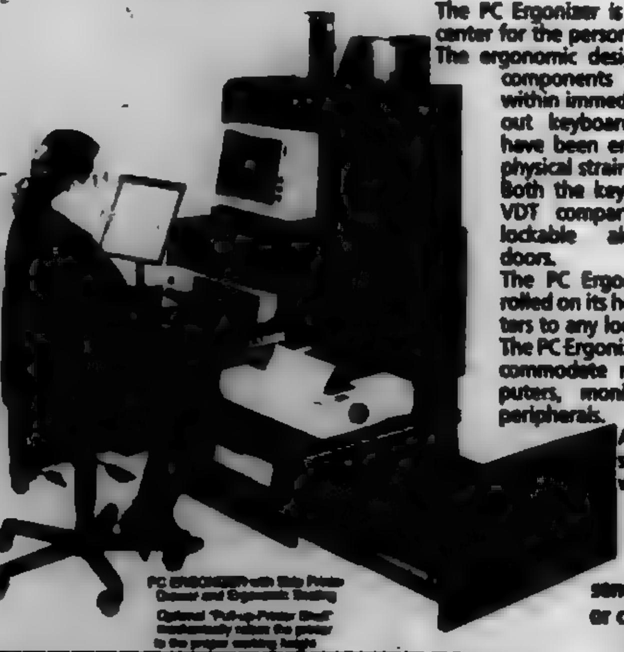

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nated two of the most capable programs for the professional project manager: Applied Business Technology Corp.'s Project Manager Workbench and Primavera Systems, Inc.'s Primavera Project Planner.

Software reports. A number of firms publish the equivalent of *Consumer Reports* for software. One is *Software Digest*, a periodical that reviews a different software category each month. A wide range of products is evaluated in each category, each product is examined by several evaluators and all products are judged by the same criteria.

As opposed to magazine reviews, *Software Digest* presents a collective opinion rather than an individual one and makes it easy to compare most of the products in the category.

There's a serious problem with software reports, however. Like the software review, they fail to consider that various users will be using the software for varying purposes — and what may be a good program in one instance may be totally inappropriate in another.

For example, in the data base category, *Software Digest* gave the No. 1 ranking to Powerbase Systems, Inc.'s Power-base, while Microrim, Inc.'s R:base 4000 ranked 15th. The two programs are as different as their rankings — but the difference is not their degree of desirability. Both are relational data base managers, but Power-base is a fill-in-the-blanks program and R:base is command-driven with a procedural language. Power-base is easier to learn, but R:base is more powerful. A middle manager setting up his own relational data base system would choose Power-base, while a programmer designing a sophisticated turnkey system would much prefer R:base. Reports like *Software Digest* simply do not provide the information to allow these distinctions to be made.

If you rely on ads to tell you what's available, you will miss a lot of products from smaller companies.

Software reports are best used to identify available products and to raise red flags to investigate further. If you know exactly what features you need in a program, reports are good also for preliminary product screening — but not for drawing final conclusions.

Software reports are best used to identify available products and to raise red flags to investigate further.

Advertisements. Software ads in newspapers and magazines can alert you to the existence of products and give you a rough feel for them, but they do little to help you compare the software with other packages you are considering. Ads don't even tell you what applications the products best suit, because vendors seem to think their products are best for all applications.

Advertisements are a good indication of what companies have the best financing, not necessarily the best products. If you rely on ads to tell you what's available, you will miss a lot of products published by smaller companies that do not advertise. Two examples of quality unadvertised products are Evergreen Software's PC-Calculator, a program that turns a computer into a sophisticated "pocket" calculator, and Applitek, Inc.'s DOS Commander, a utility that simplifies the use of IBM's PC-DOS.

Vendors. The best thing about advertising is that it tells you how to get in touch with another source of information, the software vendor. If a product appears to warrant further investigation, it is worth a call to the vendor to see if you can get a demo disk or evaluation copy.

Evaluation copies are usually full working copies of the program, and they give you the advantage of testing the software in your own working environment. You probably will not be able to talk a vendor into sending you an evaluation copy if you plan to buy only a single copy, but if you intend to make a large purchase, you have a good shot at getting one.

Trade shows. Attending computer trade shows can be an effective way of seeing what is available and at the same time getting a feel for the products on display. Although shows will not give you much hands-on experience, they are a great opportunity for requesting evaluation copies for your testing when you get back to the office.

If a program you are considering is a hot new release, don't expect to find out much about it at the show — unless you are very aggressive in fighting the crowds around you. You are better off concentrating on making a contact that can supply you with information after the show is over.

As with magazine advertising, you will miss a lot of small but important

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programs if you rely on trade shows for your information. For example, Kensington Microware Ltd.'s Remote Control is not at the shows, but it nevertheless is an excellent product for connecting your lap-size computer to an IBM Personal Computer. Eastern Software Products' LP-88, a linear programming package, is another important program absent from the shows.

Retailers. You can get a lot of good product information from a software retailer — if he carries the products you are considering. Sales representatives are glad to give you a product demonstration or let you sit down at a machine with a demo disk, but don't expect to walk into a store and compare half a dozen products that are in the running for your final selection. Retailers tend to concentrate their efforts on just a few products in each category, so the retail store is not the ideal place for comparison shopping.

> The first thing to consider in hiring a consultant is where he gets his information.

In fact, there are some categories of products that the retailer does not stock at all. Some manufacturers do not consider the retail store an appropriate distribution channel. For example, if you are considering SPSS, Inc.'s SPSS/PC — the most powerful statistics program for the IBM Personal Computer — you won't find it at your neighborhood computer store.

Other products are simply too expensive to be carried by retailers. Execucom Systems Corp.'s IFPS/Personal, for example, sells for $1,500. Its price keeps it out of most retail stores, yet it is a top-notch financial modeling package for corporate use.

Associates and friends. There's nothing wrong with word of mouth for judging software. Anyone who has used a product you are evaluating can provide valuable information.

But consider the source: If the person uses the product in a way that's different from how it will be used in your organization, take his comments with a grain of salt. Also ask him what other products he looked at before buying the one he's using. He may have missed the one he should have bought.

Now that you have collected all this information, what do you do with it? There's no magic formula — you just put it all together and decide which product looks best in light of how it will be used in your organization. Or you could take the second approach for screening products: Get help.

There are two primary sources of information for getting help: software consultants and specialized software distributors.

Software consultants. The first thing to consider in hiring a consultant is where he gets his information. As the discussion here indicates, information can come from a variety of sources, and gathering it is time-consuming. Ideally the consultant will have similar assignments from other clients so that he can realize some economies of scale in conducting his research.

Consultants are expensive — but so is your time. If your consultant is doing his job, he is probably worth every penny he charges.

Be on guard if the consultant spends significantly less than full time evaluating personal computer software. In fact, keeping abreast of software developments is more than a full-time job; covering the range of software categories requires several people. If your needs cut across several product categories, you probably need a research organization rather than an individual.

The biggest danger in using a consultant is paying an arm and a leg to come up with an adequate but not superior solution to your software problem. Consultants, like everyone else, tend to have a bias toward the products they already know — and they may overlook the best product in favor of the one they know best.

On the other hand, a consultant who is doing his job will take the time to learn

SURPRISE. YOU JUST TURNED INTELLIGENT PCs INTO DUMB

PROTOCOL. THE END OF THE DP

The biggest danger in using a consultant is paying an arm and a leg to come up with an adequate but not superior solution to your problem.

your needs, then systematically weed out the products that are inappropriate and present you with only the winners — along with a recommendation.

With only a few products to consider, you will not be distracted by an array of product features and claims. Your final decision will be far easier.

Specialized software distribution. There are a few relatively new companies that specialize in selling software directly to large companies. Those with in-house product evaluation staffs can provide the same services as a consultant. They narrow the field of products and present you with recommendations.

The process used by these distributors is less personal than that used by a consultant because the initial screening of products is made without a specific customer in mind. My company, for example, is a specialized distributor based in Waltham, Mass. Corporate Software, Inc. has an evaluation staff that screens thousands of products. The programs that survive the screening process — about 2% of those evaluated — are the ones that meet a need likely to be found in a large company.

Some specialized distributors publish the results of their evaluations. Corporate Software provides information on the products it considers "winners" in *The Corporate Software Guide*, a quarterly publication currently containing evaluations of 200 products in 20 categories.

Besides narrowing your choices, a publication like this guide in effect provides product recommendations by suggesting the programs that are appropriate and inappropriate for various corporate needs.

If you need further information, the distributor's staff can answer questions and provide demo disks and evaluation copies.

Although a specialized distributor can be valuable in helping you match products to needs, it cannot provide the personalized service necessary to define your needs in the first place. For example, if you are not sure whether presentation graphics software is a cost-effective alternative to your graphics department, don't look to a specialized distributor for a cost-benefit analysis.

But if you know that you need software and you know what you want it to do, a specialized distributor can go a long way toward helping you find it.

A word of caution: Specialized distributors target large corporations. If you are a small business, you may not qualify to receive the assistance these distributors provide.

Having described the two approaches for gathering information, we suggest you use neither exclusively but rather a combination of the two.

Doing it yourself is good for gaining an overall familiarity with the various software products that are relevant to your business, and getting help will save you time in narrowing the field. Once you've identified the finalists, go back to your own sources for help in making the final decision.

And let someone else worry about bailing out the rowboat.

■

Richard Strauss is vice-president, products, for Corporate Software, Inc., a Waltham, Mass., distributor that specializes in supplying personal computer software to large corporations.

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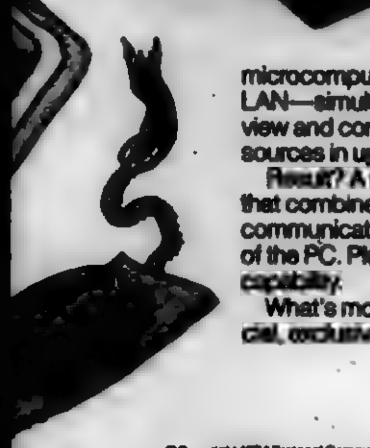

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NIGHTMARE.

By Eric Vogt

Software developers stand to realize sales of more than $14 billion over the next five years, market forecasters estimate. This prediction will hold up if — an this is a big if — developers get off the features bandwagon and shift their focus to the people who use the software.

Much of the personal computer software developed and marketed today emanates from the minds and practices of a clever few, rather than from thoughtful market research and testing.

To sell software in 1985, developers will have to realign their marketing strategies. Personal computer users, whose numbers continue to swell, are becoming more sophisticated, with more complex needs. The strategy of touting a single

THREE CONTENDERS	ELECTRIC DESK	FRAME-WORK	SYMPHONY
Number crunching	good	fair	good
Business graphics	none	fair	good*
Text management	good	good	fair
Thought processing	fair	good	bad
Intuitive operation	fair	fair	bad
Understandable display	good	fair	fair
Ease of learning:			
For novice	good	fair	bad
For spreadsheeter	good	fair	good
For word processor	good	good	bad
For data base user	good	good	fair
Accommodates increasing skill	fair	good	good
Quality of documentation	good	good	fair
Movement between capabilities	fair	good	fair
Movement between projects	good	good	fair
Integration with other software	fair	fair	fair
Central environment	svc. menu	desktop	sprdsht
Hardware requirements	256K bytes	256K bytes	312K bytes
List price	$345	$695	$695

* Symphony, while offering substantially enhanced graphics generation capabilities, shares with its predecessor, 1-2-3, the annoying necessity of booting a separate program for printing graphs.

Consider the [illegible] integrated software packages in terms of user and task [illegible].

Electric Desk from Alpha Software Corp. of [illegible], Mass., is a relatively [illegible] that integrates word processing, spreadsheet, data [illegible] and communications. According to [illegible], vice-president of [illegible] at Alpha, it was designed to be productive, intuitive and [illegible] to fill the needs of the [illegible] business user, who is [illegible] in results than [illegible] with unnecessary complications. A particularly attractive feature is its ability to act as an electronic Rolodex, placing phone calls automatically after locating a party using the data base function.

This package will find a home with administrative assistants, telemarketers and general managers because of its simplicity and strength in communicating.

Framework, the integrated entry from Ashton-Tate of Culver City, Calif., provides an interesting contrast to Electric Desk. It offers plenty of power, but requires greater commitment from the user. For instance, several of the keys have [illegible] functions in Framework [illegible] are unrelated to their [illegible]. In addition, the [illegible] approach to tasks or projects [illegible] adjustment.

Of particular [illegible] is Framework's ability to outline a [illegible] the appropriate [illegible] between modules [illegible] processing [illegible] sary for [illegible] Framework's [illegible] for the complete [illegible]

This package [illegible] range of users [illegible] alyst who is willing to unlearn spreadsheet technique, to marketing and human resources managers who will need to combine data base, analysis, communications with external data sources and excellent word processing. It is also a nifty tool for authors who need its outlining feature.

Without a doubt, the greatest amount of new [illegible] we saw was packed into Symphony, Lotus Development Corp.'s follow-up to the successful 1-2-3. In fact, the subtle improvements in the command structure of the spreadsheet portion alone argue for purchase of Symphony over 1-2-3 for any [illegible] number-crunching applications.

This is the tool of the financial modeler, not the general manager or administrative assistant. Its power, however, is [illegible] with occasional insensitivity to detail. The typing of [illegible] in a column to a spreadsheet [illegible] base is clumsy and [illegible] specify the column percent format for spreadsheet cells, the user must either move to it in the menu and select it with an ENTER, or actually enter a "%" (an uppercase 5). This requirement prevents the experienced user from quickly and easily formatting important information, such as return on investment.

There are several more minor pitfalls to user productivity in Symphony which have left many of us disappointed only relative to expectations that the package might eliminate all the [illegible] around 1-2-3 and present the same class of quantum improvement that 1-2-3 achieved over Software Arts, Inc.'s VisiCalc. [illegible] software package — even an "integrated" one — as appropriate for a variety of business users and their problem-solving styles won't work. Software developers must instead begin to understand and apply the concept of market segmentation.

Some argue that the software industry is simple and can employ record industry marketing strategies, albeit with more packaging and higher margins. Although this idea may at first seem humorous, the parallels are many: advertising on national TV, promoting a software author's or artist's personality to sell products, searching for new artists, negotiating contracts, priming the retail chains, designing an attention-getting package, fighting for shelf space and hoping for the hit. One can even draw parallels on the piracy issue.

When software is marketed as if it were just expensive records, a business user may spend more than $500 for a software diskette and end up feeling as though he has bought "Michael Jackson's Greatest Hits." But he gets only the drums and bass guitar parts. To produce the full value of his investment, he is expected to play lead guitar, sing and dance.

While this strategy works like a charm for Spinnaker Software Corp., Infocom, Inc., Broderbund Software and other companies whose products don't exceed a list price of about $49.95, as we move above the $50 mark in personal computer software, and particularly above $100, we enter another industry altogether. At these higher prices, we observe an industry in which the evolution and competitive dynamics are similar to those of the calculator industry.

Remember Texas Instruments, Inc.'s Datamath and the Bowmar Brain? Their software counterparts today are Ashton-Tate's Dbase II and Software Arts, Inc.'s Visi Calc. Hewlett-Packard Co. then came out with more features and a different user interface, analogous to Lotus Development Corp. 1-2-3's market entry. Even the great calculator war — during which the prices came down and suppliers scrambled to add features and flexibility, lower power consumption and increase speed — can be compared to Symphony's and Framework's appearances this past summer. Each package has flexible "DOS hooks" and the ability to be programmed for unusually complex and sophisticated applications.

Through the entire process, the people who earned consistent margins from calculator sales fell into three classes:

- Volume-oriented cost cutters: Casio, Sharp Electronics Corp.
- Market-oriented innovators: HP.
- Controllers of distribution channels: K-Mart Corp. and Sears Roebuck & Co.

Consider the opportunities this analogy defines for the next wave of software. Since the low-end limit of cost competition in software is clearly occupied by Freeware, one can dispense with this issue and focus on the opportunities in market-oriented innovation and distribution.

The essence of the market issue is embodied in two questions:

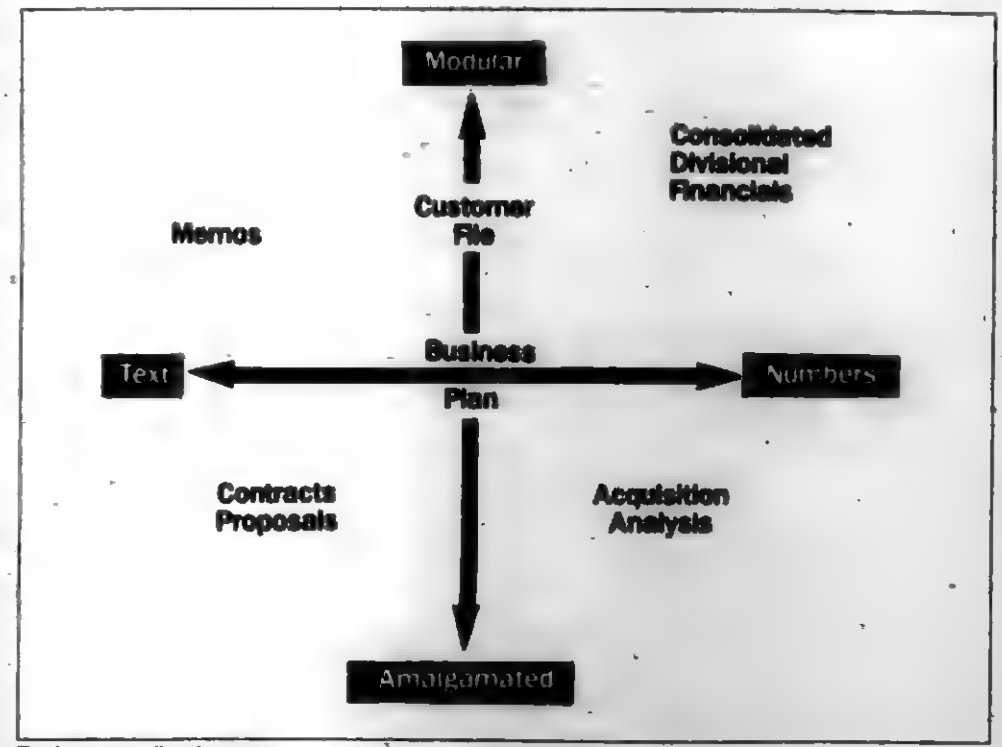
- Who will use this tool?
- What task will they try to accomplish?

Users may be grouped simply along two dimensions: degree of experience and, frequently, degree of need. For a software supplier, this structure can provide some guidelines with regard to the frequency level of on-screen reminders and the tolerance the user might have for multiple features.

In considering the universe of possible business tasks to be performed by the target population, the following questions must be asked:

- Will users work mostly with text or with numbers?
- Are the tasks modular, or do they naturally form one amalgamated problem?

From the software developer and marketer's point of view, a market segmentation in these terms clarifies the performance trade-offs that must be made during design and development. Large-scale numeric analyses will cry out to utilize an 8087 microprocessor, while pure text applications must grapple with the issues of random-access memory (RAM) speed with limited storage vs. constant disk access.



Business applications map

The era of the "across-the-board" software package is long gone. In fact, one might argue that some of the new integrated software products suffer from trying to spread themselves too thin across these divergent applications. A clear-cut needs analysis will identify those applications for which a tried and true stand-alone package, such as Software Publishing, Inc.'s PFS:File or Micropro International Corp.'s Wordstar might, indeed, solve the problem most efficiently.

As the user becomes more sophisticated, one might add a third axis to the matrix: access to other data, either external data (via modem) or internal data, residing in other disk files, for instance.

Lotus' Symphony and Ashton-Tate's Framework have answered this need by supplying communications software as well as the ability to move through DOS and attach other applications, such as Dbase III. These are marvelous tools, yet presenting these options to people whose tasks don't require them and whose experience makes them feel shy and unsuccessful could pose a barrier to wide-scale acceptance.

Ironically, as the software itself is showing a clear trend toward user and task segmentation, the evolution of distribution continues to lag, with what is essentially a single channel. The major retailers parcel out their limited shelf space (both physical and psychic) to those products for which they anticipate the best sales. Clearly, this channel is overloaded.

New entrants in the software market must revise their approach. The development process must, in the future, be driven not by the capabilities of technical personnel, but by a systematic investigation of conditions in the market. If they are to identify "windows of opportunity" in the software market, successful software publishers will not wait until the code is written to have their first contact with their users. Rather, they will turn to the users beforehand to direct their efforts.

In addition to the trend toward software with greater market focus, we expect to see successful personal computer software publishers developing new channels of distribution — perhaps channels that incorporate pieces of added value currently missing from today's offerings, for example, user education. Drawing on analogies from other industries, someone is bound to develop the "Avon" and "Tupperware" distribution channels as well.

Finally, once the new software is ready to ship, developers will no longer be able to delegate the selling task completely to the retailer. They will have to take on the marketing task themselves — a trend already evidenced by the advertising budgets of Lotus and Ashton-Tate.

But can a 30-second spot say enough about the relevant aspects of one of today's software packages? We think not. Developers, to fill this information gap and reduce demands on the retail sales representative, will increasingly include demonstrations and completed applications as part of their marketing efforts. Software houses will also intensify their direct competition for corporate sales.

In this environment, effective user education will assume an even greater role, both for the corporations depending on the productivity of the technology for their success and for the publishers depending on the rapid adoption and popularity of the software within the target market segment for their success.

Eric Vogt is founder and president of Micro Mentor, Inc., a Cambridge, Mass., company that provides executive-level instruction in the use of personal computers.

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hardware) setting. The AT is the centerpiece of IBM's new PC Network — an offering that fits into the company's larger scheme to link all of its computer products.

Mix and match

The Personal Computer AT comes in two basic models, both of which can be easily customized. Model 68, priced at $3,995, has 256K bytes of installed random-access memory (RAM) and a single half-height, 5¼-in. floppy disk drive with 1.2M bytes of storage, four times the amount of the Personal Computer's 360K-byte floppy drive. Model 99 lists for $5,795 and features 512K bytes of installed RAM, the 1.2M-byte floppy disk drive, a combination serial and parallel board and a full-height, 20M-byte hard disk. (By comparison, $4,395 buys a Personal Computer XT with 256K bytes of RAM, a 360K-byte floppy disk drive, a serial board and a 10M-byte hard disk.)

Both AT models are built around the Intel 6-MHz, 16-bit 80286 microprocessor and IBM's new 16-bit I/O bus, performing at a rate two to three times faster than the Personal Computer. While the added speed won't make you a more accomplished typist or quicken the pulse of your printer, it will hasten copying files, recalculating worksheets and sorting data base records. Common to the two versions of the AT are 64K bytes of read-only memory (ROM) (including an enhanced Basic interpreter), the capacity for up to 3M bytes of user memory, a real-time clock/calendar with battery backup, a socket for the 80287 math coprocessor, a combination floppy disk and hard disk controller board, eight expansion slots and a 192W power supply (including a fan whose speed varies with the temperatures, reducing noise).

The AT boasts a revamped 84-key keyboard with modifications that are apt to please critics of the Personal Computer's. The AT keyboard, however, cannot be used with the Personal Computer or any other product in IBM's Personal Computer family. One other accoutrement of note is Keylock, a security lock on the front of the system unit designed to control access in network settings. Locking the AT prevents rebooting, shuts down the keyboard and prohibits removal of the system unit cover. Keylock is also available for the Personal Computer, the XT and the XT/370.

IBM's confidence in its latest entry extends to service. The company is including a one-year warranty with the product.

The new IBM machine does not include a video board or a monitor. The Personal Computer's monochrome and color graphics boards work on the AT, but quite a bit of the existing Personal Computer hardware doesn't. Among the options for the AT are a half-height, 5¼-in. 320/360K-byte floppy disk drive, a second internal 20M-byte hard disk, a floor-standing enclosure and a tilt-and-swivel monitor stand (suitable for the entire Personal Computer line).

Although it is a slightly different kind of option, DOS 3.00 is the AT's new single-user, single-tasking operating system; it is priced at $65.

Media and the message

The AT is most modular in the area of disk storage. The machine is equipped with compartments for three disk drives — either two half-height floppy drives and a full-height, 20M-byte hard disk or a single half-height floppy drive and two full-height, 20M-byte hard disks. The second hard disk is tucked beneath the 1.2M-byte floppy drive in the AT's right-hand compartment. Incidentally, a 1.2M-byte floppy lists for only $225 more than the new half-height, 320/360K-byte drive.

In addition to mixed and matched disk drives, the AT offers a choice of floppy disk drive capacities. DOS 3.00, the AT's primary operating system, reads and writes in the traditional 320/360K floppy format, but IBM is selling the AT's 320/360K unit only as a second floppy drive. DOS 3.00 is tailored to the 1.2M-byte floppy drive — and that means certain limitations as well as added storage space.

If you require data interchange via standard 320/360K disks, you'll need to add the AT's 320/360K floppy drive. The 1.2M-byte floppy drive can read and write in the 320/360K formats, but what it writes can only be read by the 1.2M-byte read/

write head. That head is narrower — and thus more sensitive — than the read/write head in the Personal Computer's 320/360K drive.

Not surprisingly, the AT relies on new disk media capable of handling the higher density format. IBM's high-capacity disks were designed to be formatted with twice as many tracks in the same 5¼-in. space — 80 as opposed to the old 40. The high-capacity format uses 15 sectors per track, in contrast with the eight used for disks formatted under DOS 1.00 or 1.10 and nine for those under DOS 2.00 or 2.10. Data stored in the new format cannot be accessed under DOS 2.00 or 2.10 without the addition of drivers. A box of 10 high-density disks runs about $80, but the new format proves to be a better value per byte of storage than its predecessor.

Playing the slots

The AT was built to grow. The machine features eight full-length expansion slots, each with a standard 62-pin connector that accepts boards designed for the Personal Computer's 8-bit data bus. Six of the eight slots are accompanied by an additional 36-pin connector that makes it possible to transfer data in 16-bit segments and address more than 1M byte of memory.

The combination floppy and hard disk controller board fills one 16-bit slot on the Model 68, leaving seven slots free. The combination serial and parallel board takes up an additional 16-bit slot in the Model 99.

Power users can have a field day with the AT's potential for additional RAM. IBM has filled half the 36 RAM sockets on the Model 68's motherboard with "memory modules," each consisting of two 64K-by-1-bit RAM chips piggybacked one atop the other. (Nine regular 64K-by-1-bit RAM chips provide 64K bytes of RAM on a Personal Computer; nine of the piggybacked chips provide 128K bytes.) The AT motherboard accepts only these unique modules and only in increments of 18 — thus supplying the Model 68's 256K bytes of RAM. The Model 99 features 36 such piggyback modules, filling the motherboard RAM sockets. To beef up the Model 68's RAM to 512K, you can buy a 256K memory module expansion kit for $495. But before you can add the memory expansion board to the Model 68, you'll first need to fill the motherboard's RAM sockets.

Either AT model can accept one 128K-byte memory expansion option once the motherboard is filled with RAM. This brings the machine up to 640K — the maximum addressable RAM in the Personal Computer's architecture. (The Intel 8088 addresses 1,024K bytes of memory, but the last 384K is reserved for functions other than user RAM.) Part of the appeal of the 80286 is its ability to address up to 16M bytes of RAM. Accordingly, IBM enables you to increase the 512K-byte AT to 3M bytes, in five allotments of 512K.

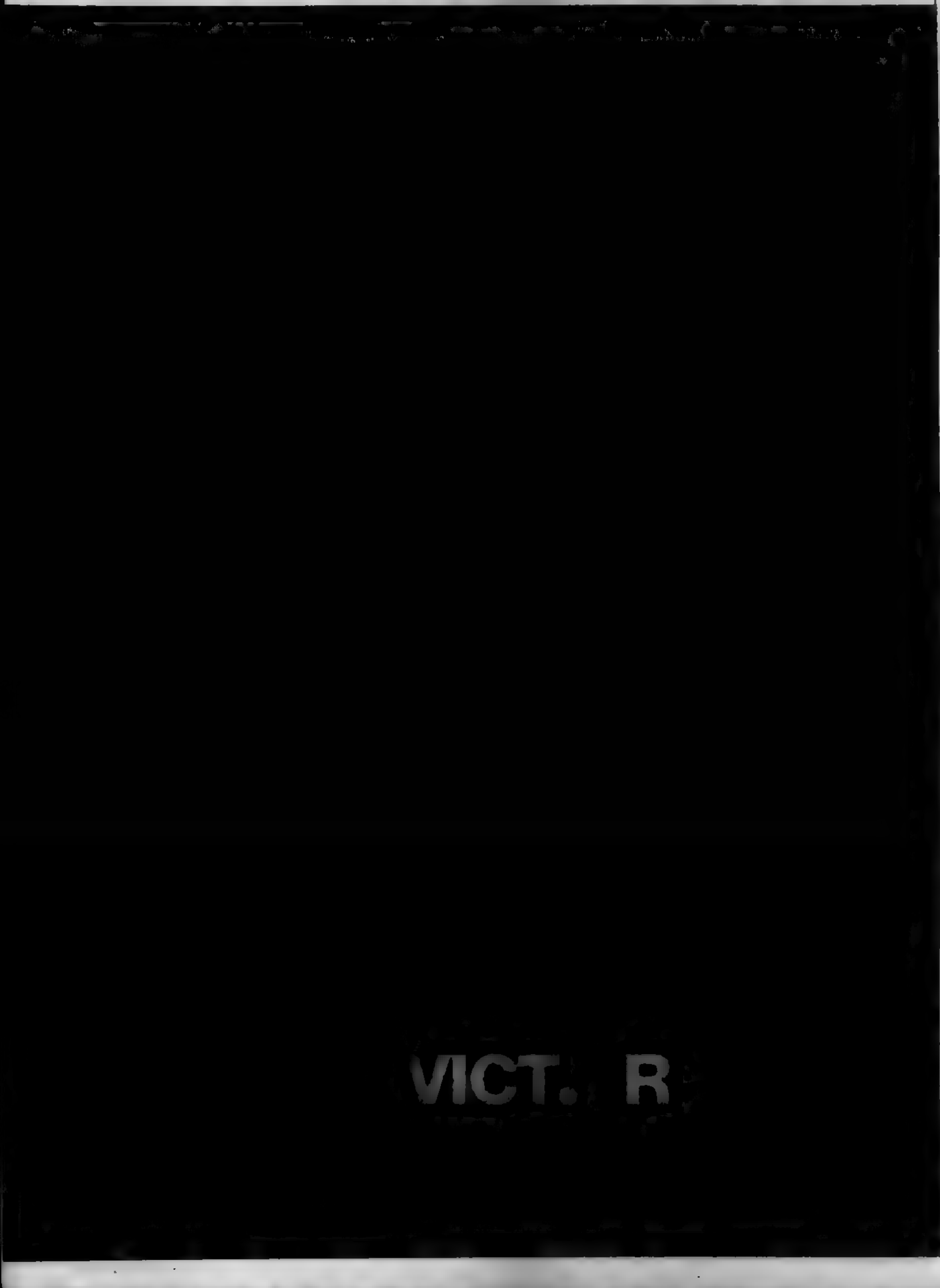
Power users can have a field day with the AT's potential for additional RAM.

Theoretically, products from third parties could boost RAM beyond 512K bytes per board, which would enable RAM in the AT to exceed 3M bytes. All this RAM is open to Xenix users, but aside from DOS 3.00's Vdisk (RAM disk) utility, DOS 3.00 function calls (upon which application programs rely) cannot recognize more than 1M byte of RAM.

None of Big Blue's memory expansion options includes the new (and still scarce) 256K-by-1-bit RAM chips. All the new memory expansion boards for the AT require a 16-bit slot.

Managing memory

What will you do with all that RAM? Tim Sammons, a consultant who heads Sammons & Associates in Berkeley, Calif., suggests that the AT's capacity initially will encourage users to rely on multiple RAM disks. "You'll be able to bring software and data into memory and then do your processing without repeated floppy disk reads. This increase in speed will be helpful in large data management applications."



Sammons says he is convinced that, over time, extra RAM will make software both easier to use and more intelligent. Help files and truly helpful error messages will be readily available and not confined to a disk. Expert systems and artificial intelligence in general, now suffering under the RAM limitations of current machines, may also get a shot in the arm from the AT's prodigious memory.

But perhaps the major assignment in store for the AT's extended RAM is multitasking — the capacity for one machine to execute several jobs simultaneously. In this role, the 80286 truly shines. When multitasking applications are assigned to an XT, for example, there are no hardware circuits to keep tasks separate, and, thus, applications can write over each other in memory. The 80286 partitions memory, essentially setting up fences between segments of RAM. In this case, good fences do make good neighbors. The XT's 8088 can perform multiple tasks, relying on such window managers as Topview and Desq, but RAM is defenseless against overwrites.

In addition to its multitasking prowess, the AT has the ability to function in a multiuser environment, enabling several users to share it simultaneously. The machine's supply of serial ports initially limits it to three users — two at workstations and one at the host.

In order for the 80286 to serve multiple users and perform multiple tasks safely, the AT requires an appropriate operating system. Enter PC Xenix, a version of Unix System III adapted for IBM by Microsoft Corp. The 80286 is capable of operating in two modes. Under multiuser/multitasking Xenix, the chip works in the protected (that is, memory-protected) mode. When the AT runs under DOS, the 80286 operates in the compatibility mode — so called because the 80286 works with software for the 8088/8086 family of processors. When you boot the AT, the operating system used determines whether the machine is in the compatibility or the protected mode. (PCIX, a version of Unix for the 8088, runs on the AT in the compatibility mode.)

AT as server

PC Xenix unquestionably makes good use of the 80286, but the AT's multitasking/multiuser operating system won't be available for a few more weeks. Applications written for Xenix may not be plentiful for quite a while, and with the AT initially supporting just three users simultaneously, IBM has only skittishly entered the Personal Computer-based multiuser market. Even if third parties load the AT with serial ports (which Xenix and the 80286 can handle easily), IBM has another communications role in mind for its latest machine. Networking is the name of Big Blue's new game.

At the time it introduced the AT, IBM unveiled its PC Network for resource and data sharing. The network places the AT at center stage as a file server capable of simultaneously acting as a workstation. But consistent with its emphasis on peer-to-peer communications, the PC Network accepts an XT or another hard disk compatible as server.

In this way, IBM's Personal Computer-based local-area network enables the company to maintain a "PC philosophy." IBM, after all, is interested in selling and linking Personal Computers, not Ascii workstations. While a true multiuser system shares processing power among users who typically rely on dumb terminals, the PC Network fosters file and hardware sharing among users equipped with processors of their own.

Consultant Sammons puts it this way: "Relying on shared logic systems diverges from IBM's basic strategy. IBM would rather have customers buy minicomputers, not personal computers, for shared logic." Will Zachmann, a market analyst with International Data Corp. of Framingham, Mass., concurs: "Multiuser systems represent a much more limited market [than stand-alone personal computers do]. Networking Personal Computers is a perfectly viable alternative — one that individual managers prefer."

Betting on broadband

Early this year, IBM announced that its proprietary network to link Personal Computers, minis and mainframes would not be released for roughly two years. This

IBM claims that the PC Network can easily be installed in a small business. It can link as many as 72 Personal Computers within a 1,000-foot radius.

ambitious network is based on a token-passing ring arrangement that relies on twisted-pair cabling. (In a token-passing ring configuration, computers are connected in a circle. A single "token" or signal, representing the right to transmit data on the network, is passed around to each computer. Twisted-pair wires provide an inexpensive connection among computers and transmit frequencies over a single channel.)

Aware that market interest might burn out while the company fiddled, IBM released its version of a broadband Personal Computer-based network developed by Sytek, Inc. of Mountain View, Calif. (A broadband local-area network links computers with a cable capable of rapidly carrying many signals at once.) IBM claims that the PC Network announced in August can easily be installed in a small business. Tim Sammons agrees, calling the network "ready-to-wear."

The PC Network consists of the kind of coaxial cable used for cable television, a $695 network board for each Personal Computer and a $595 translator unit for each network. The translator, which converts the incoming signal to a frequency that all network adapters can receive, is connected by cable to as many as eight Personal Computers in a 200-foot radius. Connecting more than eight systems or extending the radius requires a Base Expander, which is essentially a repeater that boosts the signal.

The PC Network can link as many as 72 Personal Computers within a 1,000-foot radius. This is achieved through the use of Base Expanders and Short-, Medium- or Long-Distance Kits (which include cables and connect up to eight Personal Computers). IBM claims that with the addition of third-party hardware and installation help, the network supports a

AT PRICES

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IBM Entry Systems
Division
P.O. Box 1328
Boca Raton, Fla. 33432

List price: Model 68, $3,995; Model 99, $5,795; 128K memory expansion option, $350; 256K memory module kit, $495; 512K memory expansion option, $1,125; 1.2M-byte disk drive option, $650; 20M-byte hard disk option, $1,595; 360K disk drive option, $425.

PC Network Hardware
List price: network board, $695; translator unit, $595; Base Expander, $59; Short-Distance Kit, $39; Medium-Distance Kit, $79; Long-Distance Kit, $89; 25-ft cable, $29; 50-ft cable, $39; 100-ft cable, $59; 200-ft cable, $99.

PC Network Program
List price: $75

Topview
List price: $149; Programmers Toolkit, $395.

PC-DOS 2.00
List price: $65

PC-DOS 3.10
List price: $65

PC Xenix
List price: $395; software development system, $455; text formatting system, $145.

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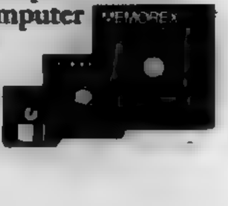

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maximum of 1,000 nodes within a three-mile radius.

Data is transmitted throughout the network at a rate of 2M bit/sec via the CSMA/CD (carrier sense multiple access with collision detection) protocol. (CSMA/CD is a common, proven networking technique in which a Personal Computer sends a packet of data only when the network is quiet. If two computers send a packet at the same time, each will recognize that the packets have been scrambled, then will alternately check network traffic before resending.)

From computer to computer, the data transfer rate is 200K bit/sec. By using coaxial cable to transmit a broad band of frequencies, the PC Network can send voice and video as well as data.

The heart of the network is the board, made by Sytek to IBM's specifications. The board fits into an 8-bit slot in any member of the Personal Computer family, except the PCjr and the PC Expansion Unit.

PC Xenix doesn't support the PC Network, but DOS 3.10 does.

The adapter includes a pair of Intel coprocessors, the 80188 and the 82586, which operate at the same 6-MHz rate as the 80286.

The 80188, which incorporates the 8088 and support chips into a single unit, works with a 32K ROM module on the board to manage the network (including power-up, protocol processing, error detection and transmission). The 80188 also governs the 82586, which controls communications with the network via an RF modem on the board.

An 8K-byte ROM module, the Netbios, serves as the basic I/O system between the network and the host Personal Computer. The software on the network board generates a "session-level interface" (that is, menus). The board also includes 16K bytes of RAM, set aside as a buffer. IBM released the board in August in the hope that software developers would write applications directly for the Netbios.

Another DOS on the way

PC Xenix doesn't support the PC Network, but DOS 3.10 does. DOS 3.10 will replace DOS 3.00 but not DOS 2.10. DOS 3.10, which IBM says will be available as a "trade-up" option for $30, is 3.00 plus support for PC Network hardware and software.

DOS 3.10 will work with all members of the IBM Personal Computer family (except the PCjr) and will occupy the same amount of memory as DOS 3.00.

DOS 3.00 has file-sharing capabilities (via the SHARE command) but lacks 3.10's network "redirector" facility. According to Dave Crane, a Dallas-based consultant, the redirector intercepts application program calls (such as those for disk or printer services) and redirects them into the network as required. The redirector also fields responses from the network and passes them to the application program.

The PC Network requires local-area network software in addition to that etched in ROM. The PC Network Program, priced at $75 and scheduled for release around the same time as DOS 3.10,

DOS 3.10 will work with all of the Personal Computer family (except the PCjr) and will occupy the same amount of memory as DOS 3.00.

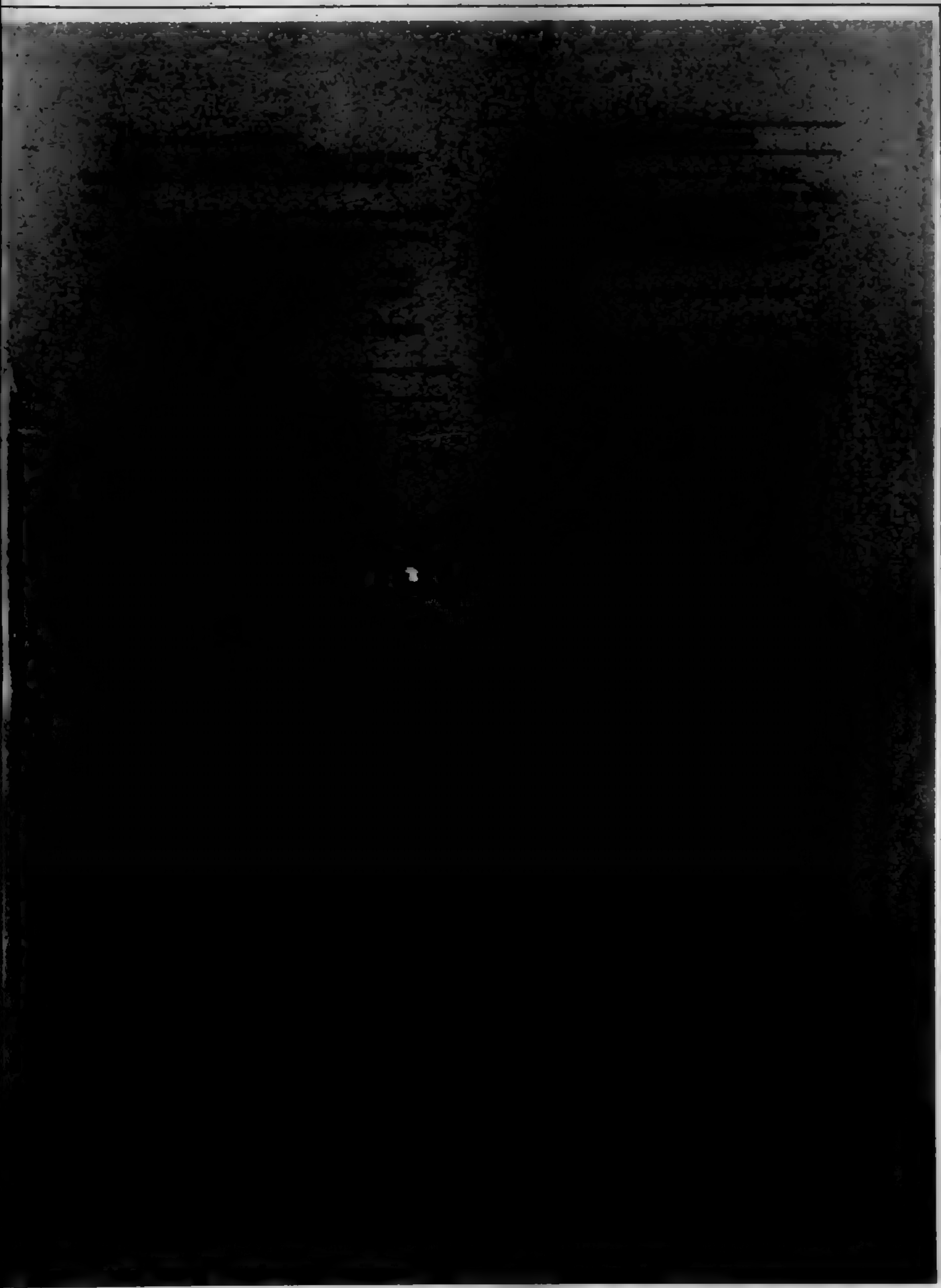
will provide server capabilities for file, print and message functions.

Crane notes that the PC Network Program will use DOS 3.10 to share resources and information among Personal Computers. The majority of applications running under DOS are expected to work with the new server functions.

"The software obviously controls the local-area network hardware, but unlike a lot of networks out there, it supports multiple file servers and peer-to-peer communications," Crane says. "Concurrent access to data by multiple users is also supported through sharing functions that still manage to maintain data integrity."

The PC Network is hardly IBM's last word on local-area nets. In addition to this peer-to-peer offering, IBM has endorsed the token-ring network, an industrial broadband coaxial network and the PC Cluster announced last spring.

IBM is especially committed to building a bridge between the local broadband PC Network and the potentially more pervasive token-ring plan.



Mindful of these seeming disparities, Big Blue has issued a "statement of direction" affirming its intention to connect all its networks. IBM is especially committed to building a bridge between the local broadband PC Network and the potentially more pervasive token-ring plan.

"Personal Computers will be able to be attached to both networks," says Bill Osborne, a senior planner for IBM.

"There are multiple ways of doing so, and we could do it now — it's not a technological problem," he adds.

(Of all of IBM's networking strategies, the PC Cluster remains the most rudimentary. The PC Network permits file sharing using hard disks as servers, but the PC Cluster doesn't.)

Tim Sammons, who relied on Sytek's local-area network in wiring the Democratic National Convention last summer, points out that the IBM/Sytek network fills a [redacted]

Gaining mastery of the AT may entail a lengthy learning process.

"It enables incompatible equipment — printers, character readers and so on — to communicate," Sammons says. "But Sytek is not the answer for everyone — it's primarily for those who have an eclectic mix of equipment already. Sytek doesn't provide top-flight integration, just a good level of performance."

With the AT batting cleanup, IBM is a formidable player in the network ballgame. But the new computer is surely among Big Blue's most complex small machines, and gaining mastery of its stand-alone and communications characteristics may entail a lengthy learning process.

"For some organizations, this could even be a first computer," says IBM's David Camm. "The network will provide interesting capabilities, but I don't want to categorize the AT's market size or the machine's niche. Let's just say that the facility for expansion is there."

Ken Greenberg is an assistant editor at PC World, *based in San Francisco. Karl Koessel is technical editor. This article is appearing in the December issue of* PC World *as part of the Hands On section devoted to the AT.*

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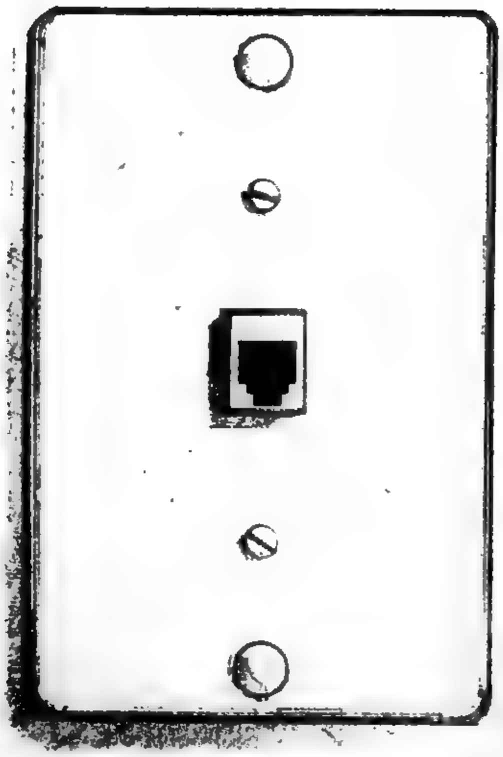

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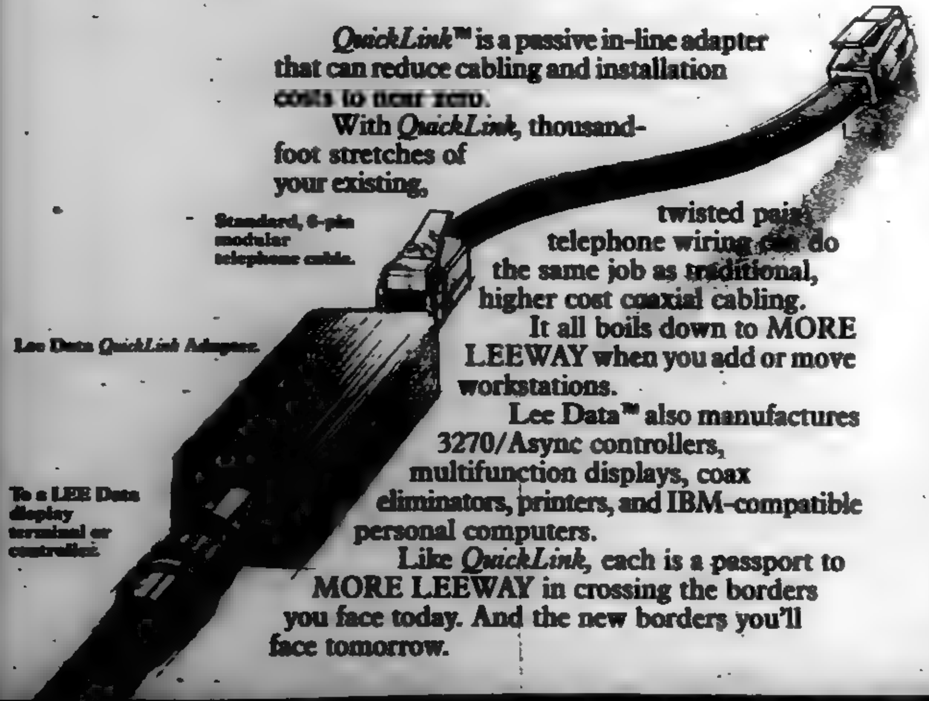
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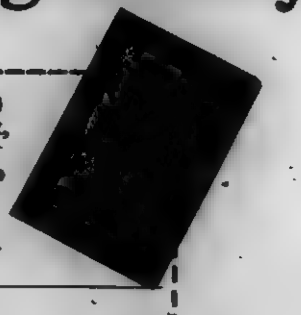

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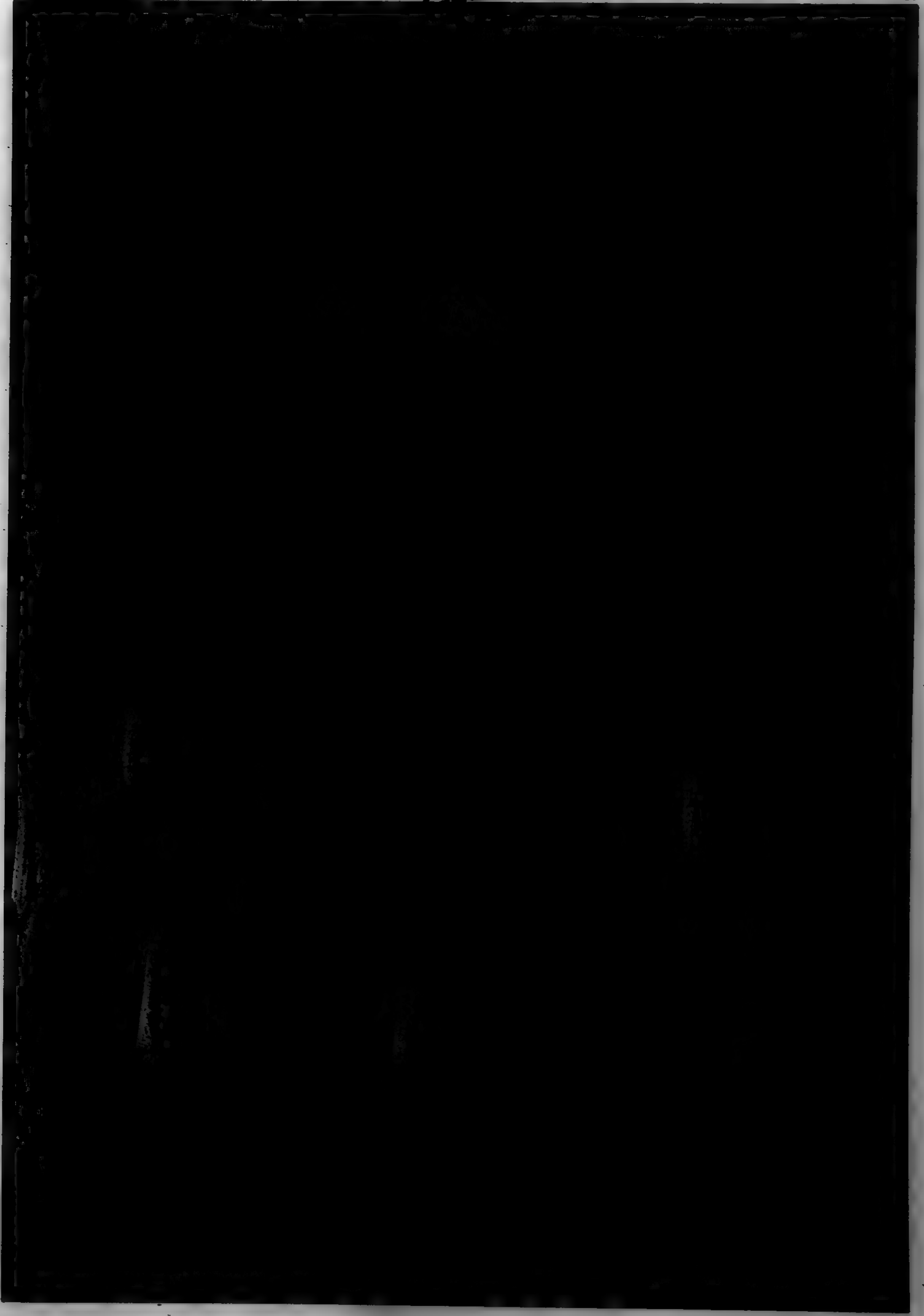

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THE SURVEY

The study took place this summer among individuals on a list of top computer executives compiled by ACR Corp. of Phoenix. ACR randomly drew 1,000 names from its total list of 8,950. Each was sent a questionnaire on June 6, and 439 usable responses were received. The CW Communications Research Department tabulated the results.

Nearly half of all respondents were directors, managers or supervisors of MIS or DP services, and another 14% classified themselves as directors or managers of operations, planning or administrative services. Twenty-three percent were corporate officers.

Respondents' organizations represented all industry categories, with the largest percentages from manufacturing (22.4%) and finance, insurance or real estate (13.2%). Median company size, measured by sales revenues, was in the $50 million to $249 million range, with nearly 4% of companies claiming sales revenues in excess of $10 billion.

Respondents as a group were overwhelmingly male (94.8%), with a median age of 42 to 45. They earned a median salary of $50,000 to $60,000; more than 30% took home $60,000 or more.

> **Thirty-four percent of respondents said that a staff member had been added to handle purchase and use of micros.**

of the organizations (Item 7).

Among the two-thirds of respondents who said that one department is primarily responsible for personal computers in the organization (Item 3), 81.7% said that the department to do this is MIS or DP (Item 3a). Forty-one percent of these same respondents said that the specific person responsible for personal computers was the director of DP (Item 3b).

Thirty-four percent of respondents said that a person had been added to their organization's staff to handle the purchase and use of personal computers (Item 4), and 66% reported that this person, whatever his title, was to be found in the MIS or DP department.

In a separate question, respondents were asked in what ways the MIS or DP department gets involved in the purchase and utilization of personal computers. That involvement is extensive (Item 6). In more than three-fourths of the cases, the MIS or DP department takes part in:

- Advising the user department on purchase.
- Coaching users in setup and operation.
- Coaching users with specific problems.

In addition, half of the respondents said their MIS or DP department is responsible for training users. In almost half the cases, they are involved in:

- Planning use and applications.
- Establishing an approved vendor list.
- Buying personal computers for other departments.

Nearly three-fourths of respondents said their MIS or DP department "plays the major role" in personal computer software recommendations and purchasing. The next department is the user department, but that is cited by less than 20% of respondents, and top corporate management comes in a weak third with 7.2% (Item 8).

Operating systems

With regard to operating systems standards, respondents were asked which operating systems they thought personal computers should support, and the winner was Microsoft Corp.'s MS-DOS, with nearly three-fourths of the vote. Unix was next, with 51.3%, and all others were selected by less than half of the respondents (Item 9).

It is perhaps an indication of the difficulty of training people to use personal computers that so many methods seem to be employed by these companies. All four of the training methods we asked about received a substantial number of votes (use of training packages, training by MIS or DP staff, in-house classroom training and outside seminars).

In sum, we see a pattern of heavy use of personal computers across a broad spectrum of industries and organizations. We find the MIS and DP departments heavily involved in implementing this technology in their organizations.

In addition, the study shows extensive plans for increasing numbers of personal computers as well as more integration of these devices into corporate networks with mainframe access.

Jack Edmonston is group vice-president of communication services at CW Communications, publisher of Computerworld, *in Framingham, Mass.*

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THE USER EXPERIENCE

INFORMATION SERVICES

General Electric Information Services Company, U.S.A.

EXECUTIVE SUITE

This senior vice-president's story holds out hope for executives over 40 coming late to the microcomputer age.

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INFORMATION FOR ALL

Manufacturers Hanover's goal is to put information resources within the reach of 75% of professionals in three to five years.

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Raychem

MICRO NETS

Raychem, a Fortune 500 manufacturer, finds networking micros a cost-effective way to keep tabs on a business unit.

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EXECUTIVE SUITE

(Raymond W. Marshall is senior vice-president, Technology Operations, at General Electric Information Services Co. in Rockville, Md. His firm applies micros to operational analysis, decision support and business management.)

There is no doubt that micros have changed the fabric of doing business for many executives. A management consulting firm recently estimated that 17% of the nation's managers and 13% of the top executives now have access to microcomputers.

This rapid growth in the use of micros reflects the trend toward the integrated office where mainframes, minicomputers and micros will share the same information more efficiently. It will result in more productive people integrating electronically, allowing independent analysis of more data than ever before possible.

The micro has become a "window on the information world" for the busy executive. Rather than being a dumb-terminal user out at the end of a network connected to a host, the manager is now the center of his information universe.

Although many executives over 40 missed the evolution of computers and genuinely fear using one in their work, it is virtually mandatory for them to learn and become proficient in using a micro or they will be left behind.

Whether he likes it or not, the modern-day executive is being forced to more integral use of his micro — doing things differently than in the past, not just automating current operations.

At General Electric Information Services Co., more than 1,500 micros are in use by executives, managers and individual contributors. Because the company operates the world's largest voice and data telecommunications network, the use of micros by our managers and executives is probably slightly different from the experiences of other companies.

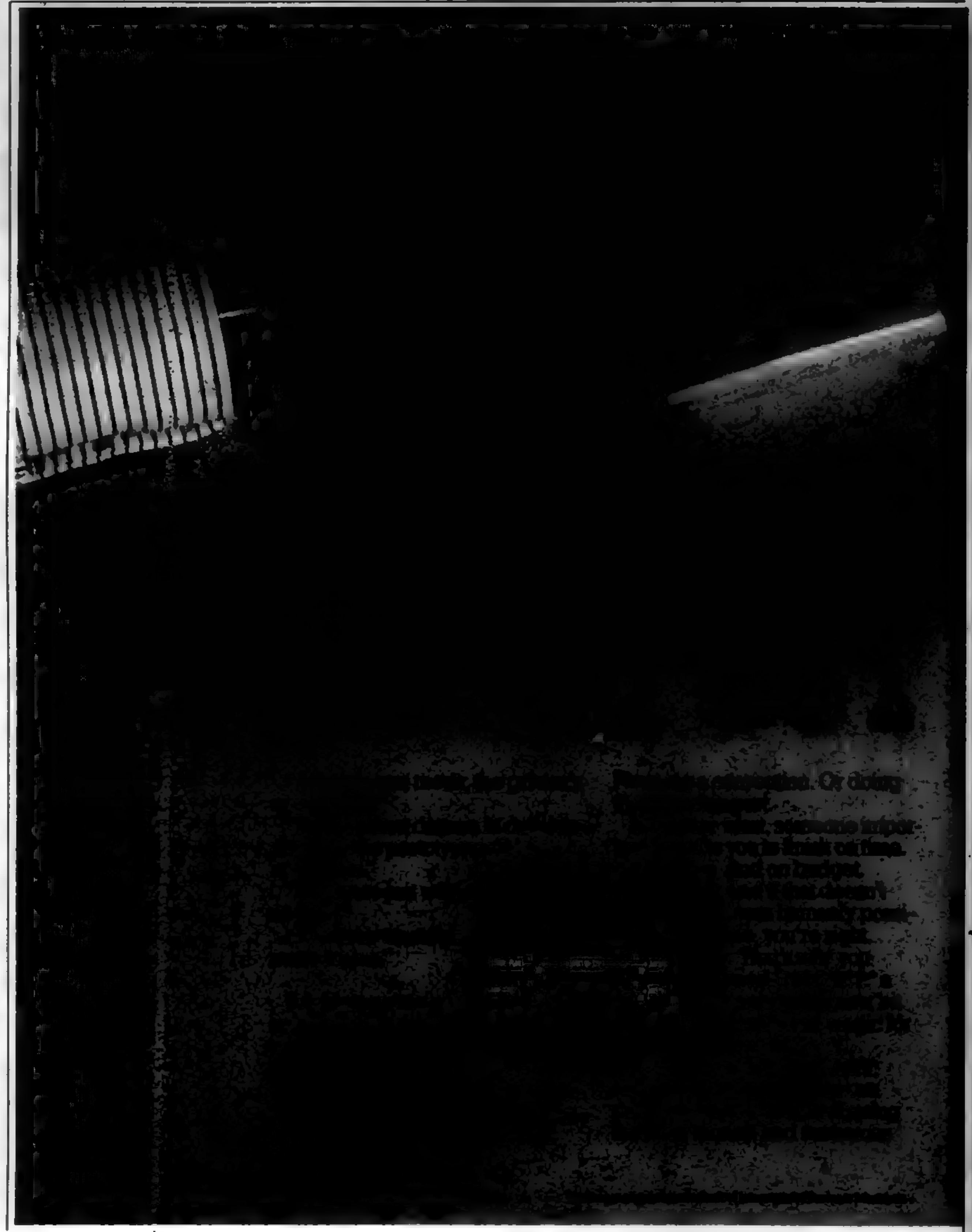
Basically, our micros are used in three main areas: operational analysis, decision support and business management.

In terms of operational analysis, micros allow us to keep constant tabs as we plan and manage our communications networks. Data can be collected and verified, either on-line or offline, by using a micro and then transmitted to our network for further processing, if needed.

For example, our micros are used in telecommunications planning and operations analysis of Dial Comm — General Electric Co.'s long-distance telecommunications network, which is the largest private industrial telephone system in the U.S. Micros enable us to track new orders for Dial Comm service throughout the company, review service contracts and monitor the system's quality control. Similarly, micros are used in the data network to provide both planning and real-time network monitoring.

In the decision support area, I use my micro in reviewing various company worksheets and spreadsheets, for financial analysis and to ask what-if questions that no one had the time to answer before.

Raymond Marshall uses a micro to review company worksheets and spreadsheets.



I use the micro at least three different ways in the area of business management. First, I use it extensively as a communications device in the office and when traveling on company business.

Through our electronic mailbox system, Quik-Comm, which is accessed by my micro, I am able to keep in communication with my office in Rockville, Md., and with many other GE components throughout the world while traveling. When I return home from a trip, or in the evening and on weekends, I use the micro to pick up and send messages to my secretary and my colleagues.

I can also use the micro to access centralized data bases that may be of value to me in doing my job more efficiently.

A third business management use is in critical project analysis through our Mark III teleprocessing network. I am able to review project schedules, do inquiry/status checks and to review quality assurance reports and other engineering reports.

In addition, I see micros used extensively in financial analysis of the company's operations and business opportunities.

Market forecasts

According to the Yankee Group, this year the number of micros in use in the office will double to 6.4 million units. A market research group also contends that by 1987, nearly 80% of the U.S. labor force will interact with the computer on the job.

Two major factors will cause the use of micros in the corporate world to expand: One is the increased exposure of corporate executives and middle managers to new hardware and software as a result of massive advertising campaigns and increased news coverage. The other is the incorporation of micros into the nation's educational system — from elementary school through college.

Frequently the business manager views micros only as stand-alone devices. In essence, he has a short-range view of their potential. The business manager who uses micros strictly for word processing, electronic spreadsheets and charts and graphs is only beginning to use the micro to its full capability. The intersection of the microcomputer, a large-scale communications network and a large mainframe will provide a magnum increase in the value of micro use in the second half of this decade. This arrangement will allow for the balancing and pulling together of all available data within a company.

INFORMATION FOR ALL

(Donald E. Smith is president of Manufacturers Hanover Financial Management Systems, Inc. in New York. He says that while technically oriented managers and professionals were the first to show interest in personal computers at his company, the balance is now beginning to shift to business managers.)

Manufacturers Hanover Trust recognized in 1981 that personal computers were significantly different from the front-office technologies it had been using. It was relatively easy to predict the impact of the earlier tools on the organization and to avoid disruption. Personal computers, with their richness of applications and potential for connectivity, are more complex and, therefore, more capable of disruption.

Corporate officials acknowledged, however, that personal computers could solve many of the integration problems with which the business had been struggling. In one cost-effective package, they can perform many functions that are typically performed in less integrated fashion. Most important, personal computers also can give users direct control to customize solutions to their particular business problems.

Manufacturers Hanover's General Administrative Board issued a "Personal Computer Acquisition Policy" in June 1982. The policy requires that all requests for personal computers be approved by user senior management and be acknowledged by the office automation group. In response, office automation has formed a separate personal computer unit to focus on the task.

In-house computer stores play several roles. They are learning centers in which demonstrations and tutorials are conducted to teach the basics of the most commonly used software. Manuals are available and prospective users are encouraged to learn more about a package of interest by actually running it themselves. In short, the stores ensure that MHT does not wind up with an expensive inventory of unused, unsupported, misunderstood systems hidden in closets.

The first group to call for personal computers was data processing professionals. Since Manufacturers Hanover made extensive use of IBM mainframes in its data center, IBM

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One less thing to worry about.

By concentrating on IBM and Wang, the office automation department feels it is capable of providing the support needed by its users.

was a logical choice for this user set.

The traditional office automation customer was next to seek personal computing. In this arena, the front office, user friendliness is a key consideration, and a large base of Wang VS and OIS systems had already been installed. Compatibility in these environments was ensured by the choice of the Wang Professional Computer.

Manufacturers Hanover does not expect to be a one-vendor shop, but the office automation department believes it is important to limit the number of vendors. By concentrating on IBM and Wang, the department feels it is capable of providing the support needed by its users.

While the company feels this approach is desirable now, as experience increases and costs become more predictable, the policy will undoubtedly change.

That is the perspective from the company's internal point of view. But now consider the automation plan for an entire generic business, and you will see that an important element in that plan is the central or host processing computer and its offspring, the data base of corporate records.

In a very simplified way, every act performed within the business relates to those records in one way or another. These acts can be broken into three large classes.

First is the activity designed to ensure the accuracy and currency of the data base. Data capture and work flow are the primary focus here, and interconnection to the host computer generally is the overriding factor in product selection, although there are unexploited independent niches of opportunity in any organization within this activity.

Today, Manufacturers Hanover has about 450 personal computers installed.

The second activity uses the data base without amplification or enlargement to inform or instruct others, both internal and external, as to status or required action.

Reporting is the primary focus here, and the facilities used are largely those of the central site for billing or status reporting, augmented by word processing and electronic mail — that is, basic office automation services. There are not many independent niches here; the heavy volumes and high visibility of these activities have traditionally received close attention from the DP organization.

The last activity analyzes the changing contents of the data base to understand the health of the organization and redirect efforts to enhance or maintain it. The people involved in this activity are the knowledge workers and decision makers. The great personal computer market that is perceived to exist in business has its foundations here. This group contains the curiosity seekers, data manipulators and problem solvers; the personal computer seems to be the inspired solution to their particular needs.

Dynamic and diverse in their use of data and analysis tools, the group is served with difficulty by the central host. They are the what-if players, and the large, highly organized machines are generally inappropriate for their purposes. Independent niches of opportunity abound in this area, but there generally will be corporate bias toward viewing these as the province of the office automation group.

Today, Manufacturers Hanover has about 450 personal computers installed — a two-year average growth rate of about nine systems per month. The rate is increasing, and by year-end, the total is expected to be more than 500. While technically oriented managers and professionals were the first to show interest in personal computers, the balance is now beginning to shift to business managers. The last personal computer users group meeting was attended by more than 150 people, most of whom were business and not data processing professionals.

Manufacturers Hanover's strategic objective is to provide information resources within arm's reach of 75% of managers and professionals within three to five years.

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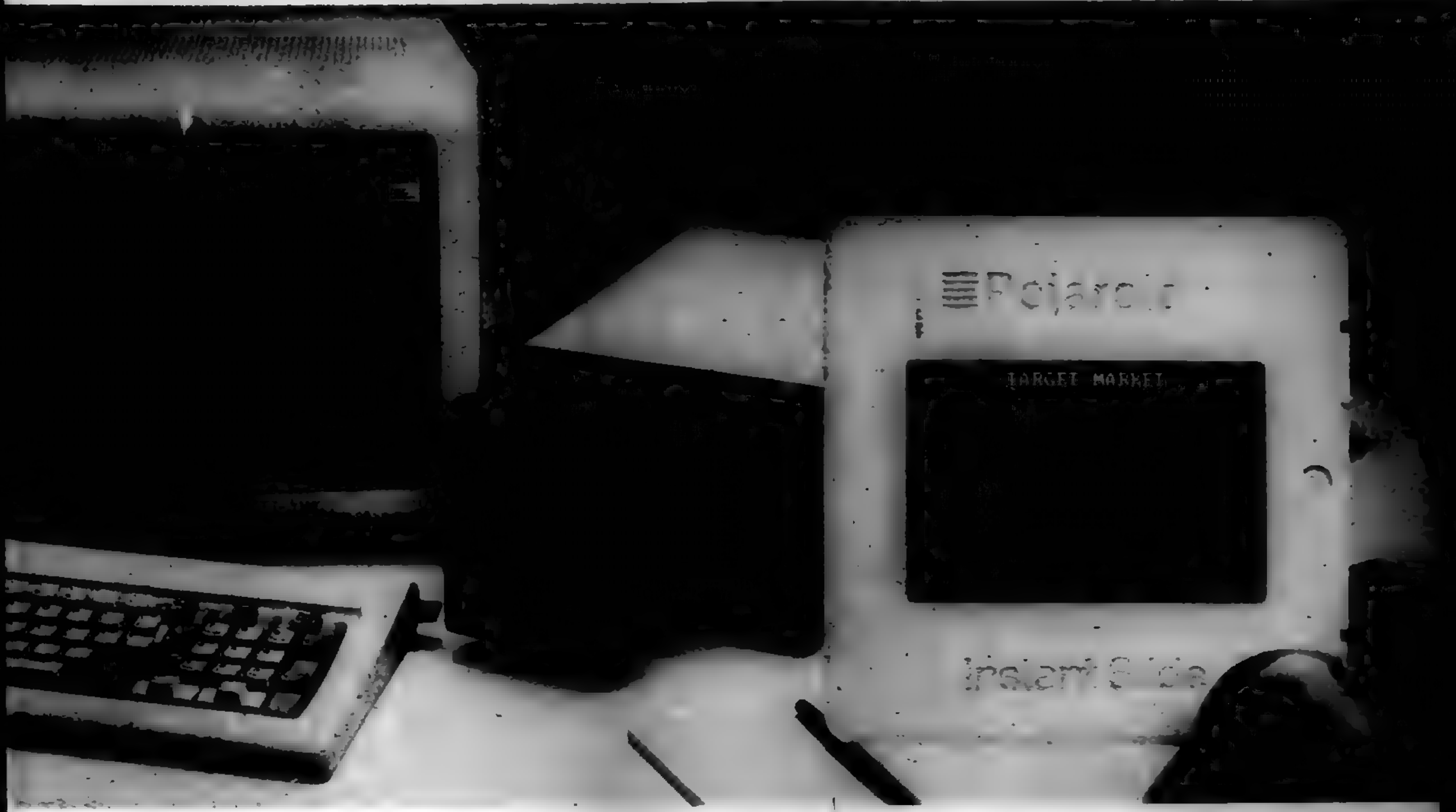

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MICRO NETS

(Marcia Brooks is associate editor of the "Office Automation Reporting Service," a monthly newsletter published by International Data Corp., an industry market research firm in Framingham, Mass. Here, Brooks describes how users at Raychem Corp. and other firms are setting up personal computer networks.)

When Thomas Peters and Robert Waterman published *In Search of Excellence* in 1982, the book soared to the top of best-seller lists. Recession was fresh in people's minds, and a renewed interest in enterprise under a strongly pro-business administration built a business advice-hungry audience. The book promised insights into what management was doing right at what were, in the authors' opinion, some of America's best managed companies.

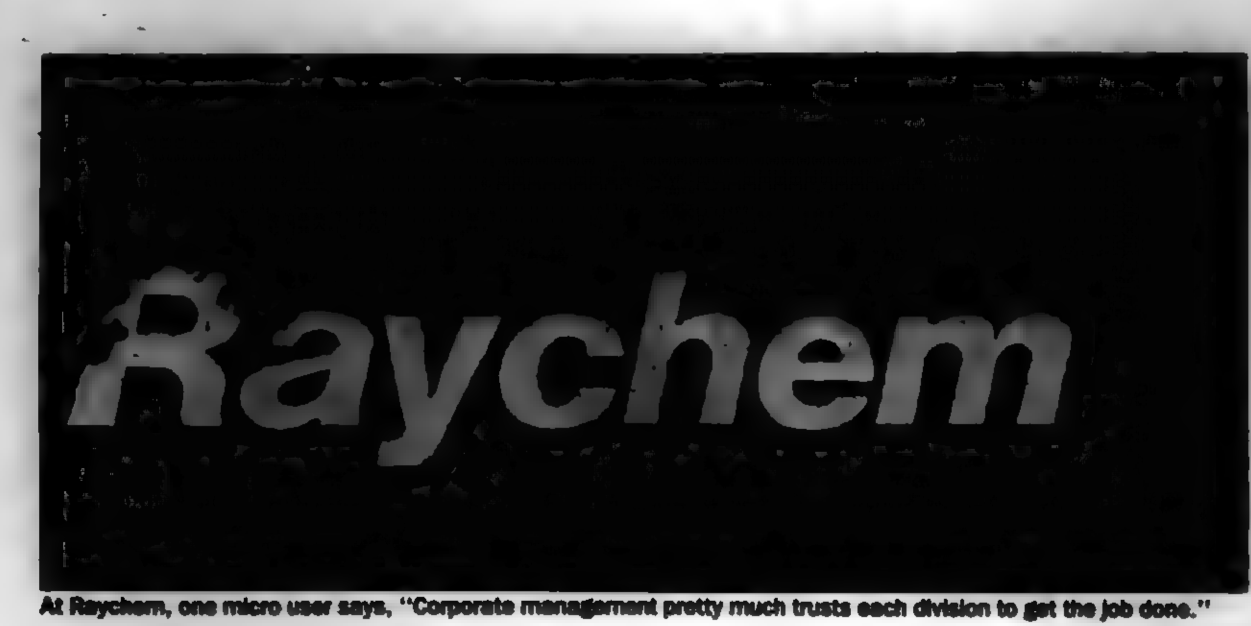
In a special report available this fall, International Data Corp.'s (IDC) "Office Automation Reporting Service" went in search of "excellent" companies to find out what, if anything, they were doing to communicate with personal computers. If they did so many other things right in administering their businesses, their personal computer strategies might provide some guidance to others lurching along the personal computer communications trail.

The "excellent" companies seldom proposed networking solutions that could be described as innovative or out of the ordinary.

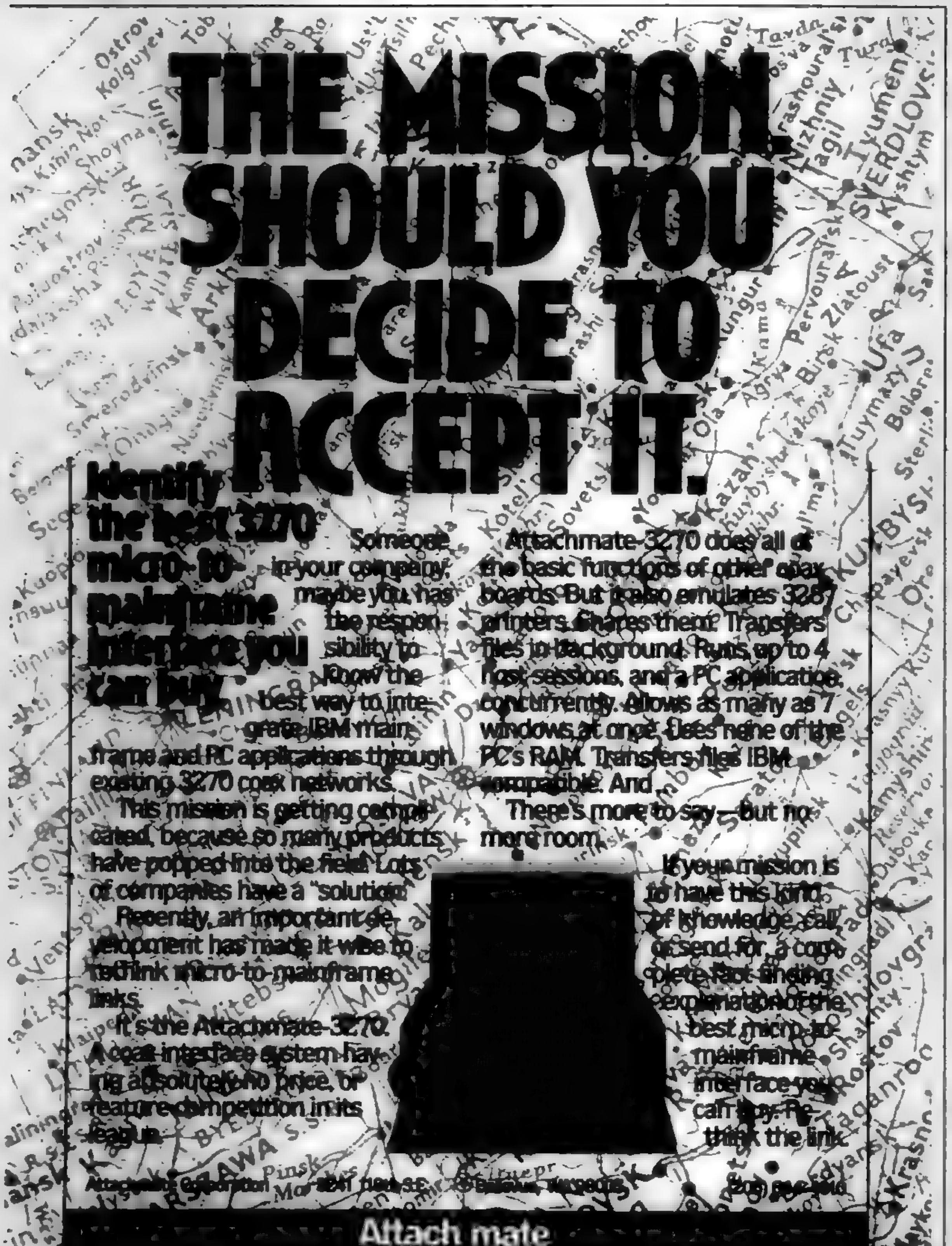
More than 30 large companies were contacted for the study, "Personal Computer Networks in Large Organizations," including several major office computer manufacturers. Employees at 18 companies (16 of them "excellent") were interviewed extensively about their personal computer communications plans.

Each company saw personal computers in terms of corporate strategy and culture. However microcomputers were deployed in a given company, they were to be used in a way consistent with the company's basic style of doing business. Personal computer networks, too, were designed with corporate culture in mind. If a company tended to be entrepreneurial, it developed flexible systems that responded to user demands, often with no particular concern for existing mainframe environments or entrenched office systems.

If, on the other hand, a company had strongly centralized management control, personal computer network access tended to be more formally structured and more strictly controlled.



At Raychem, one micro user says, "Corporate management pretty much trusts each division to get the job done."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Rethink the link

The so-called excellent companies seldom proposed or implemented networking solutions that could be described as innovative or out of the ordinary. In most cases, in fact, they were doing the most unimaginative thing of all: terminal emulation to a mainframe or minicomputer via hard wire. A few, however, arrived at unconventional solutions to data sharing.

But discussions with those companies pointed out that the single most important objective in personal computer communications is to gain access to host computer data. Even in the few companies that had implemented or begun pilots with peer-to-peer personal computer networks, the ultimate goal was to create a comprehensive, large system network of which personal computers were an integral part.

The special report findings on the excellent companies are bolstered by recent data from a survey conducted by IDC of large corporations' personal computer sites, also discussed in "Personal Computer Networks." Forty-one percent of large companies surveyed that have personal computers reported that more than half their personal computers had access to mainframes.

Peer-to-peer links appear to be a lower priority now, both for the companies interviewed and for respondents to the personal computer user survey. Seventy-six percent of personal computer user companies indicated that less than 5% of their installed personal computers were linked via small networks. Of the companies interviewed, only five had local personal computer nets in place. In many cases, however, companies were very interested in using peer-to-peer networks in the future. They hoped to make more efficient use of peripherals and storage or to improve intradepartmental communications.

One of the companies held up by Peters and Waterman as one that allows its units and employees a measure of autonomy is Raychem Corp., a Fortune 500 manufacturer of electronic components based in Menlo Park, Calif. Autonomy is exactly the thing Robert Hummer, formerly MIS manager at one of Raychem's divisions, said characterized the company: "We're an autonomous division. Corporate pretty much trusts each division to get the job done."

The personal computer network that evolved was not what Hummer had in mind when he went to a nearby computer store, Computers Plus in Sunnyvale, early this year. He started out just looking for a solution to his data storage problem and went in search of a hard disk. "But as soon as I looked at mass storage, it seemed obvious that it would be a good idea to network the machines," he said.

Why did it seem like such a good idea? "Well, the quality control department is downstairs at the back of the building. People upstairs do reports. With the network in place, they can have accurate data right there," Hummer explained.

Using microcomputers in a network is, Hummer thinks, a cost-effective way to keep tabs on a small company or business unit. "Mainframes give you complex reports, and managers won't read them. With micros, you can take data that previously wasn't even kept on mainframes and produce simple reports. It gives us a clearer picture of our situation, so we aren't wasting resources."

Of the companies interviewed, only five had local personal computer nets in place. However, many of the companies were interested in using peer-to-peer networks in the future.

Hummer started off with just three Apple Computer, Inc. Apple IIes in place, for which he chose Corvus Systems, Inc.'s Omninet with a 6M-byte hard disk. The net consists of a hard disk for file storage, a disk server that acts as an intelligent interface between the disk and workstations and an interface card in each personal computer. Data is carried over twisted-pair wires installed in certain walls within the building. The workstations are shared by users in several function areas. Hummer would have liked to wire the entire building, but he was in no hurry as long as AT&T and IBM apparently had set no clear course.

"The Corvus performed flawlessly with the Apples," he said. Satisfied with the network, he then decided to add two IBM Personal Computers, making a true multivendor network.

For the time being, Hummer will remain a loyal Corvus customer. He is enthusiastic about the network software Omninet provides, a critical factor, to his mind, in the operation of a personal computer network. But he is aware that Omninet has its limitations, too. "If you're going to use many more than about 10 files, you probably can't use a system like Corvus," he said.

The experiences of Raychem and others are detailed in "Personal Computer Networks in Large Organizations," which may be ordered from IDC Publications, 5 Speen St., Framingham, Mass. 01701.

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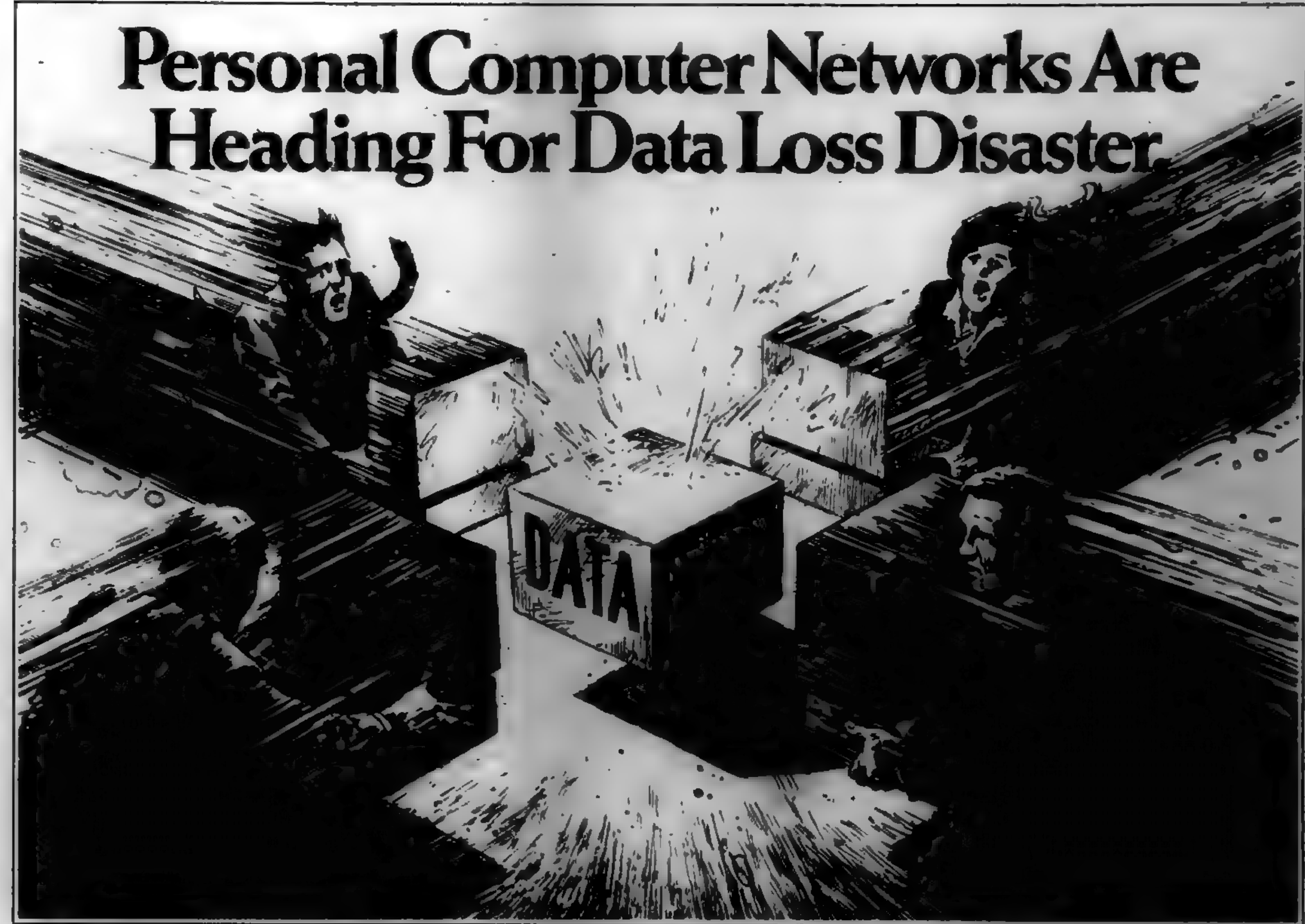
Personal Computer Networks Are Heading For Data Loss Disaster.



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There are some people who wouldn't buy a Rolls Royce for a buck-ninety-five if it didn't come with a hood ornament.

Mercifully, there are other people: those who purchase things (like computers) because of logic, rather than insecurity.

For those, we offer this chart showing how the Leading Edge Personal Color FXD Computer differs from the IBM* XT, not a self-serving litany of trivial distinctions, but a straight-up comparison of basic things of righteous concern.

After you read it, bear in mind that any consequent action you take requires only admirable lack of cowardice.

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Ports	Both Parallel and Serial Standard	Serial Standard, Parallel optional—$75.
Expansion Slots	7 slots Standard of which 3 remain open after expansion to 640K	8 slots Standard of which 1 remains open after expansion to 640K
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Comdex host to myriad micro debuts

Show features few surprises

By Eric Bender
CW Staff

LAS VEGAS — While Comdex/Fall '84 saw hundreds of new microcomputer products fighting for the spotlight, the giant computer reseller show produced few major announcements and no blockbusters.

Unlike last year's show, when competing announcements of IBM Personal Computer-compatible systems and windowing software packages held center stage, no high-profile introductions dominated the conversation at Comdex/Fall.

The predicted crop of IBM Personal Computer AT-compatible machines did not materialize, but the show did display scores of new

See COMDEX page 13

DEC users get head start implementing Cobol-80

Supporters of proposed standard cite improved readability, maintainability, coding productivity

By Paul Gillin
CW Staff

As the computer industry continues its vigorous and lengthy debate over the nuances of the proposed Cobol-80 standard, a sizable body of Digital Equipment Corp. VAX users has been busily coding, using a compiler based on the unratified version. In recent interviews with *Computerworld*, several of these users praised many features of the new language and added that conversion from existing Cobol-74 programs has posed few or no problems.

Most users pointed to improved readability and ease of maintenance as the main benefits of the new implementation. They specifically said several new verbs, such as in-line PERFORM and EVALUATE, have improved coding productivity. In addition, other features that allow files to be defined externally have enabled programmers to write more modular and flexible code, they said.

"I'd guess we save 20% to 25% in development effort over Cobol-74, mostly because debugging and logic are easier," said Tom Sprawls, president of Gray Matter, Inc., a Phoenix-based systems house that does data processing for 10 companies. "Writing in Cobol-74 is a pain in the neck. But Cobol-80 has eliminated virtually all of the problems," he said.

Thury O'Connor, vice-president of Lexi-Comp, Inc., a small Hudson, Ohio-based software services, programming and facilities management firm, said,

See COBOL page 6

Sperry ties systems to Unix

Also releases supermicros, software at Comdex

By Edward Warner
CW Staff

LAS VEGAS — Sperry Corp. introduced AT&T's Unix operating system to most of its product line in one fell swoop here at Comdex/Fall '84 last week. It announced that Unix versions would be provided for nearly all of its computers, from its personal computers up to its 1100 mainframe series.

Along with that announcement, Sperry revealed its Series 5000 Unix-based supermicrocomputers and factory and office automation software to run on them.

At the low end, Sperry's implementation of Unix for its personal computers will come via Microsoft Corp.'s Xenix 3.0 Unix derivative. At the high end, the 1100 series will gain an AT&T Unix System V operating system called SX 1100.

SX 1100, priced at $1,000 to $1,500 per month, will reportedly execute as an application on the machine's 1100 OS standard operating system, providing access to 1100 OS formatted files. It will also reportedly be able to maintain multiple concurrent SX 1100 environments, each with its own file system.

Sperry will offer Xenix 3.0, meanwhile, for its Models 40, 45 and 50 Personal Computers and the hard-disk version of the Sperry Portable Personal Computer. It is said to require 512K bytes of random-

See SPERRY page 11

A license to save on software

By Paul Gillin
CW Staff

SAN DIEGO — North American Philips Corp. has found a novel and efficient way to save hundreds of thousands of data processing dollars. It licenses only one copy of each of seven financial software packages and makes them available to its 19 subsidiaries.

In that manner, North American Philips not only saves licensing costs, but also employs a much smaller maintenance and education staff for its widely diversified business. In fact, it needs only 11 people to support the applications software for 19 subsidiary companies, explained Kenneth Ary, a financial package coordinator for North American Philips. Ary, who is based at Philips' offices in Itasca, Ill., estimated the company saves 65 programmer-years per year under the arrangement. Ary was interviewed at the 15th Software International Users Group meeting held here last week.

There is nothing illegal about the arrangement. Divisions simply load executable versions of the software into their on-site mainframes from the firm's New York data center for on-line data entry. The data is then formatted to update the data bases at the local sites. Not only does the company save money, but the arrangement also allows it to install new

See SAVE page 8

TOP OF THE NEWS

A first user of IBM's DB 2 relational data base management system had no major problems using it to query a 1.5-million-record data base. Page 4.

■

All that Jazz. Lotus Development Corp. skipped Comdex last week, but made news there anyway by announcing Jazz, a five-function integrated package for Apple Computer, Inc.'s Macintosh. Page 5.

■

On the up and up. Data processing operations managers are enjoying salary increases this year that are larger than those of other operations managers. Page 8.

■

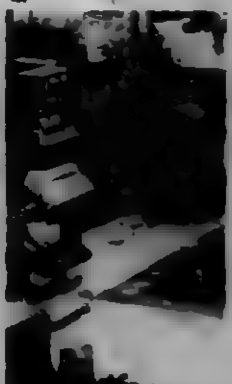

Photo by D. [illegible]

Stuck in a rut. That's where Comdex keynoter John Sculley placed the personal computer industry. Meanwhile, Sperry Corp. unveiled a superminicomputer at the Las Vegas extravaganza. Page 11.

■

Computer technology isn't keeping pace with security threats to computer systems. At least that was the opinion of some attendees at a computer security conference last week. Page 15.

■

Texas Instruments, Inc. unveiled a 10½-lb laptop computer with a 12-in. display, while Radio Shack introduced another member of its IBM-compatible micro family. Page 57.

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NEWSPAPER

IRS seeks system to monitor media reports

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Internal Revenue Service is advertising for an "on-line automated media diagnostic system" that would help IRS press officers do a better job of feeding the news media statements on federal tax regulations.

The computerized system the IRS has in mind — and which officials concede may not exist — would monitor print and broadcast reports to see if the IRS message is getting across to U.S. taxpayers, according to IRS officials and documents. The agency is now searching for a private firm with media analysis experience that can supply such a system.

"Since we don't own the media, we need to find out how best to reach them and communicate with them," said Mike Williams, an analyst with the IRS taxpayer information program. The system is expected to "measure changing IRS objectives and messages . . . against what was actually used [by the media]," an IRS statement said.

For example, the "media diagnostic system" could help press officers determine which publications actually use IRS press releases and identify what format or timing changes are needed to get the information reported, Williams said.

Asked if the system would be used to manipulate the press, Williams responded, "That's why it's called 'media diagnostic system' and not 'media management system.' . . . The opportunity for abuse is out there, but that's not what we intend to do."

> *'The opportunity for abuse is out there, but that's not what we intend to do.'*
> — Mike Williams, IRS

In a solicitation published in the government's *Commerce Business Daily*, the IRS said it seeks an "operational, on-line, automated media diagnostic system for 85 sites throughout the nation that will allow IRS management to determine the effectiveness of its nationwide taxpayer information program."

The IRS said the computer system should supply detailed statistical reports and graphics that will help IRS management measure "the impact of IRS materials on the media, the value of media coverage, the type of audiences reached, media news preferences, the need for localization of media releases and the best distribution methods."

Furthermore, the IRS said, the system must provide categorized mass media listings and must be available to users — the press officers — seven days a week, 24 hours a day.

Williams said the IRS apparently is the first federal agency that has tried to automate its media relations effort. "We're pioneering in this area," he said.

But Williams said it remains an open question whether the solicitation will turn up any vendors that can supply the computer system the IRS wants. If none surfaces by early December, the plan will be dropped, according to Hiram Wilcox, an IRS contracting officer.

Williams stressed that the automated system would help the agency's 63 public affairs officers communicate more efficiently and effectively with the nation's 40,000 media outlets.

Tell us your news views

[illegible]

Datapoint rolls out 32-bit supermicro

By John Desmond
CW Staff

LAS VEGAS — Datapoint Corp. last week announced a 32-bit supermicrocomputer for the office automation market based on dual microprocessors and featuring a Unix look-alike operating system.

Called the Datapoint 3200, the supermicro uses dual Motorola, Inc. 68000 microprocessors and runs Charles River Data System's Unos AT&T Unix-like operating system. It allows connection of up to 28 terminals.

The 3200 is compatible with Datapoint's Attached Resource Computer (ARC) coaxial-cable local-area network and supports Ryan-McFarland Corp.'s RM/Cobol relational data base management system.

In the 3200 hardware, one 68000 processor with a 4K-byte cache memory is dedicated to all applications processing; the other is dedicated to I/O operations, a feature said to result in better response time. Main memory is expandable to 8M bytes, and on-line storage is expandable to 152M bytes, according to the company.

The 3200 interfaces with the ARC network via Datapoint's Intelligent Network Executive-32 (INX-32) Adaptor, an optional internal card and accompanying software. Software utilities reportedly allow ARC users to perform tasks in the Unos context and use the results in their own applications.

The Unos operating system is said to provide file management facilities including multitasking, device-independent I/O, I/O redirection, dynamic file allocation and hierarchical directory structure.

Software options available include the C programming language, RM/Cobol and Databus, Datapoint's business programming language. These are said to provide access to many independently developed application packages. RM/Cobol, previously unavailable on the ARC, is said to allow users to maintain single entries of data and to access required information from a single source.

Ace Microsystems, Ltd.'s LEX word processing program and Microsoft Corp.'s Multiplan spreadsheet are also supported by the 3200, the company said.

An entry-level 3200 includes 1M byte of memory, 32M bytes of disk storage with 1M byte of diskette storage, a 4K-byte cache memory and four serial ports. A choice of three types of terminals, three types of printers and a communications adaptor to emulate IBM's 2780/3780 protocols is available.

The base system is priced at $15,430. The price for Unos is $1,000 and for the INX-32 Adaptor with software, $2,500. The system is available 90 days after order, the vendor said.

Datapoint is located at 9725 Datapoint Drive, San Antonio, Texas 78284.

NEWS SUMMARY

A division of General Motors Corp. has plunged headfirst into relational data base management by becoming a first user of IBM's DB 2 data base management system/4

Lotus Development Corp. launched Jazz, an integrated software package for the Apple Computer, Inc. Macintosh, last week/5

DP operations managers are said to be experiencing higher salary increases than other operations managers this year/5

CW at Software International Users Group: Packaged software installation can go more smoothly if DP and user departments define each other's responsibilities, one user said . . . Looking ahead before installing an application can keep software running for years, according to another user/9-10

CW at Comdex/Fall '84: Sperry Corp. chose Comdex as a stage to unwrap, among other products, its 7000/40 32-bit superminicomputer . . . Apple Computer, Inc.'s chief sees innovation as the only way the microcomputer industry can escape its present rut . . . Micro managers looked to Comdex as a way of staying a step ahead of the continuing technology explosion/11-13

CW at Computer Security Conference: Only a concerned coalition of government, industry, users and consumers can stem the tidal wave of computer crime, according to GTE Telenet Communications Corp.'s chief . . . While they give security product vendors an 'A' for effort, most visitors here did not think technology is keeping pace with the threats to computer systems . . . When designing computer system security, users had better consider their security's security, one expert said/14-16

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CW at Data Training: Sensitizing employees to the importance of data security is essential to preventing computer crime/24

CW at Fose: One speaker gave tips on buying and installing local-area networks . . . Electronic mail and electronic funds transfer pose a security threat, experts warned/26-27

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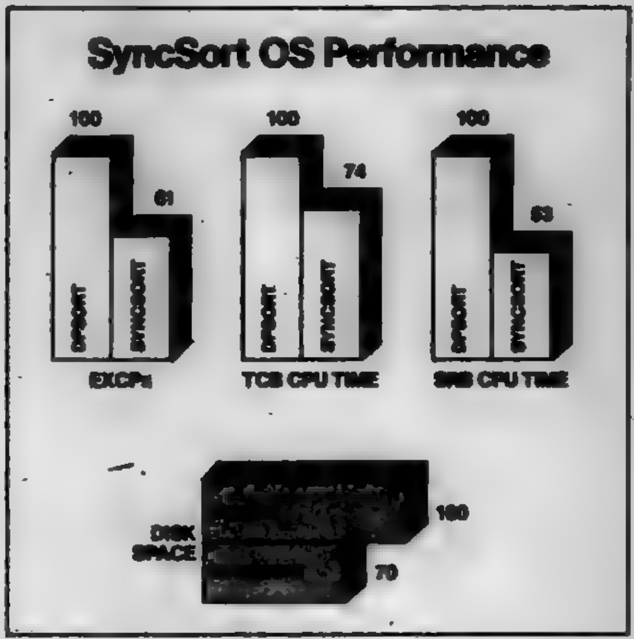

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Early user harbors ambitious plans for IBM's DB 2

FIRST USER

By Paul Gillin
CW Staff

The Buick Motor Division of General Motors Corp. is plunging headfirst into relational data base management, and its product of choice is IBM's DB 2.

With more than 20 months of DB 2 experience under its belt, Buick is ready to start using the data base management system (DBMS) on some ambitious applications (see story below)."I think DB 2 will get a serious look from now on for every application," said Lowell Watson, administrator of new technology studies at Buick.

The first release of IBM's long-awaited relational DBMS has some shortcomings, Watson said, but he is largely pleased with both its performance and features. "We're happy with it. The code is clean, and it's very good for such a young system and a large system," he said.

DB 2 has the greatest potential for prototype development of end-user-type applications that require frequent query and report writing. "Programming productivity is definitely up," he said. "You have more interaction with the customer, and at the end, you're much more likely to have something he's happy with than in the traditional life cycle approach. It's much more forgiving [than IBM's IMS] in the way you put the data base together."

However, he said, Buick is not planning to move any major applications to DB 2 from IMS in the foreseeable future.

The focus of DB 2 usage at Buick is a large production program used by the personnel department to handle sickness and accident claims. The system tracks claims and actions taken on those claims and maintains a six-month history file of time and attendance data. It also has extensive query facilities using the Query Management Facility utility of DB 2 and includes a tickler file for claims analysts. Written largely in PL/1, the program uses files extracted from three IBM Vsam data bases loaded into a fourth production file that is maintained solely on DB 2.

Currently, the time and attendance data base consists of 1.5 million records. When the history file is complete, it will comprise about 2.5 million records. "So far, we're confident it can handle this application up to 2.5 million rows. We are getting 3 to 5 second response times," Watson said. However, he stressed, "You have to remember we're not updating that table. It's just being queried by the applications program or by the user."

Examining DB 2 limits

Buick is bound by a nondisclosure agreement not to discuss specifics of DB 2 performance, but Watson said, "We are working heavily in that area. We're trying to figure out how far we can push [DB 2]," he said.

"Performance has to be worked on and IBM knows that," he said. "IBM will tell you that in the first release they did not work on performance. The main thing was to make the code clean and make it do what they advertised. They're saying the next release is going to concentrate on performance."

The biggest area of concern is in updating. Watson said Buick has not tried updates on tables larger than 100,000 records. However, "It's clear we can handle all that stuff down in the hundreds of thousands," he said.

So far, extracts have come primarily from Vsam files using IBM's DXT data extract facility. "DXT is a pretty good extracting tool for getting data out of Vsam or IMS or other kinds of data collections if the data is laid out flat," Watson said. "The language you use is a Sequel-like language. It picks data up with great selection. However, when it lays it down, there are no choices you can make about how the updates are done. So in some cases, we have to write some PL/I programs where we have to do some more selective kinds of updates."

Buick had considered several fourth-generation languages in its initial foray into relational processing. But Watson said the relative weakness of the data base handling was a factor against them. "We were looking for something more fundamentally different and structured, not the best report writer on the market," he said.

DB 2's use of SQL was a major factor. "I've been trying to convince other people that it's best for the whole industry to standardize on a language," Watson said. "[SQL] looks like a reasonable standard, and IBM will make it a standard anyway. Why go off on one of these tangents for a while and then come back?"

Once inside DB 2, Sequel Processing Using File Input (Spufi) can be used by programmers in application development to insert data base queries. "If you're writing a program in PL/I and you're editing the file, you can split-screen to your Spufi session and then write the query that you think is appropriate to be included in your program," he said. Buick uses Spufi in an IBM Interactive System Productivity Facility environment for DB 2 development.

Watson said DB 2 has imposed no limits on the variety of record types that programs can use. "You cannot support a one-bit kind of record type that you could in PL/I," he said. "But you have fixed-length character, variable-length character, packed, small integer and float. Most of the data types you have in PL/I you have in DB 2."

Watson said DB 2 is a good first release but needs some enhancements. Buick presented a large document of proposed additions and modifications to IBM at a customer roundtable last year. Watson said IBM appears to be tackling most of the significant needs that were expressed.

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Want to stay competitive? Add chief information officer

CHICAGO, Ill. — Chief executive officers and chief operating officers who want to remain competitive will have to incorporate a new title into their management system, according to Arthur Andersen & Co.

In a handbook for executives entitled "Trends in Information Technology: 1985," the accounting firm predicts that the emergence of the chief information officer at the top executive level is essential to survival.

"The corporate role in establishing an information infrastructure and in setting policies and standards for its use must increase," said P. Declan O'Riordan, a senior partner who directed the preparation of the executive handbook.

"With the decentralization of the traditional MIS group, new systems development methods and the rapid convergence and overlapping of technologies, one senior official should be able to correlate information technology and business strategy for the organization's advancement," O'Riordan said.

Along with the emergence of the information executive, the firm predicts an increase in the use of information systems as marketing tools.

Arthur Andersen plans a monthly update of the free handbook which can be obtained at any local Arthur Andersen office.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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Lotus offers software for Apple's Macintosh

Jazz package targets corporate users; functions resemble Symphony's for IBM's micro

NEW YORK — Lotus Development Corp. introduced last week its Jazz five-function integrated software package for the Apple Computer, Inc. Macintosh in a move designed to entice corporate users to embrace Macintosh.

Jazz reportedly offers functions found in Lotus' Symphony package for the IBM Personal Computer, including word processing, spreadsheet, data base management, communications and business graphics, but Lotus Chairman Mitchell D. Kapor stressed that Jazz is "in no sense a rework or expansion of [Lotus'] 1-2-3 or Symphony."

Priced at $595, Jazz will reportedly be available in March 1985. It will run only on the 512K-byte version of the Macintosh, introduced in September, and requires a second disk drive, priced at $495.

Jazz reportedly allows users to execute functions using the pull-down menus common to Macintosh software in conjunction with either the machine's keyboard or the Macintosh mouse. Each application is said to function either as a stand-alone program or as an integrated, and even windowed, program within other applications in the package.

For that reason, Kapor refused to specify how much internal memory the program occupies, saying "how much room you have is a function of what [application] you're doing with it."

Jazz's communications program reportedly supports Digital Equipment Corp. VT100 and VT52 terminal emulation and can also convert Multiplan, 1-2-3 or Symphony files, transmitted from the IBM Personal Computer to the Macintosh, into a format that Jazz can use.

> *'Macintosh has had zero momentum in the corporate marketplace, but Jazz will make [the Macintosh] a more attractive offering without a doubt.'*
>
> — Tony Morris, Morris Decision Systems, Inc.

Calling Jazz a product "for the forgotten managers of business, for those users who are not spreadsheet junkies," Apple Computer President John Sculley told the 300 or so who attended the introductory press conference that Jazz will come to have the same impact as Software Arts, Inc.'s Visicalc and Lotus' 1-2-3.

Financial analyst Scott Smith of the Gartner Group, a market research firm in Stamford, Conn., meanwhile, acknowledged that Lotus is "positioning [Jazz] very strongly for the corporate world," but wondered if corporate users really want integrated packages at all.

The cafeteria approach

His firm's research, he said, shows they prefer what he called "the cafeteria approach" of chosing selected software applications that can share data, particularly in a windowed environment.

"The [Macintosh] is out of the woods," as far as sales to corporations go, said retailer Tony Morris in reaction to the announcement.

Morris, whose New York-based Morris Decision Systems, Inc. sells personal computer hardware and software solely to corporate clients, said that, so far, "Macintosh has had zero momentum in the corporate marketplace," but that Jazz "will make [the Macintosh] a more attractive offering without a doubt."

COBOL

from page 1

"When I had a choice in the past, I have always gone toward a scientific language like Fortran or Algol. I developed a strong anti-Cobol bias. But I'm surprised and satisfied with Cobol-80. We've been able to do everything we wanted to do."

Users said Cobol-80's new EVALUATE verb, which allows for testing of multiple conditions and specification of multiple control branches, has been one of the most helpful features of the new implementation.

"We've found that after you get past three levels of IF statements, nobody can keep up with where you are," Sprawls said. "EVALUATE eliminates having to write a lot of IF statements."

O'Connor said the EVALUATE statement has enhanced readability and maintainability of Cobol code. "It's also very economical of characters," he said. "Because of built-in control, I can use selection alternatives and not have to bury them in a bunch of IFs and GOTOs."

The new procedure cuts down on the complexity of debugging programs containing many IF statements, Sprawls said. Previously, a single period could end a series of nested IF statements. In Cobol-80, internal IFs can be ended with an END statement without affecting external IFs. "If it's [3 a.m.] and your payroll's down, it can drive you crazy looking for that little period," he said. "That's been eliminated in Cobol-80."

Users said EVALUATE and in-line PERFORM are so useful that they rewrite Cobol-74 programs whenever possible to take advantage of the new statements. "When you PERFORM a section, it executes a whole section of code," said Nancy Torok, a programmer/analyst at Amax Copper, Inc., a metals trading company in Carteret, N.J. "That makes it easier to document."

A particularly useful new feature for Amax's shop has been the advance ACCEPT and DISPLAY commands. The DISPLAY statement now can be used to display a message and add a new phrase at the end with no advancing.

Control over prompts

"The old system was a prompt and response mode that proceeded line-by-line," Torok said. "In this new way, you can choose how you want the prompt to be displayed, specifying lines and columns. That's useful for prompting on data input screens. Now you can do that in a full-screen mode."

Sprawls has found the new PERFORM WITH TEST AFTER statement to be useful in eliminating problems caused by unfinished subroutines. If any subroutines are accidentally left open, they are closed when the program is exited. "That was a real 'gotcha' in Cobol-74," he said. "I'd say 20% of the bugs I've run into have related to a flag that hadn't been cleared."

Two users found the new REFERENCE MODIFICATION statement useful because it allows individual characters within a string to be accessed from the procedure division without having to be defined in the data division. "This feature is invaluable to us," O'Connor said. "In effect, it allows us to treat substrings of long fields just as if they were part of a standard reference definition. The reference-modified fields are indistinguishable from regular fields."

Nesting whole programs

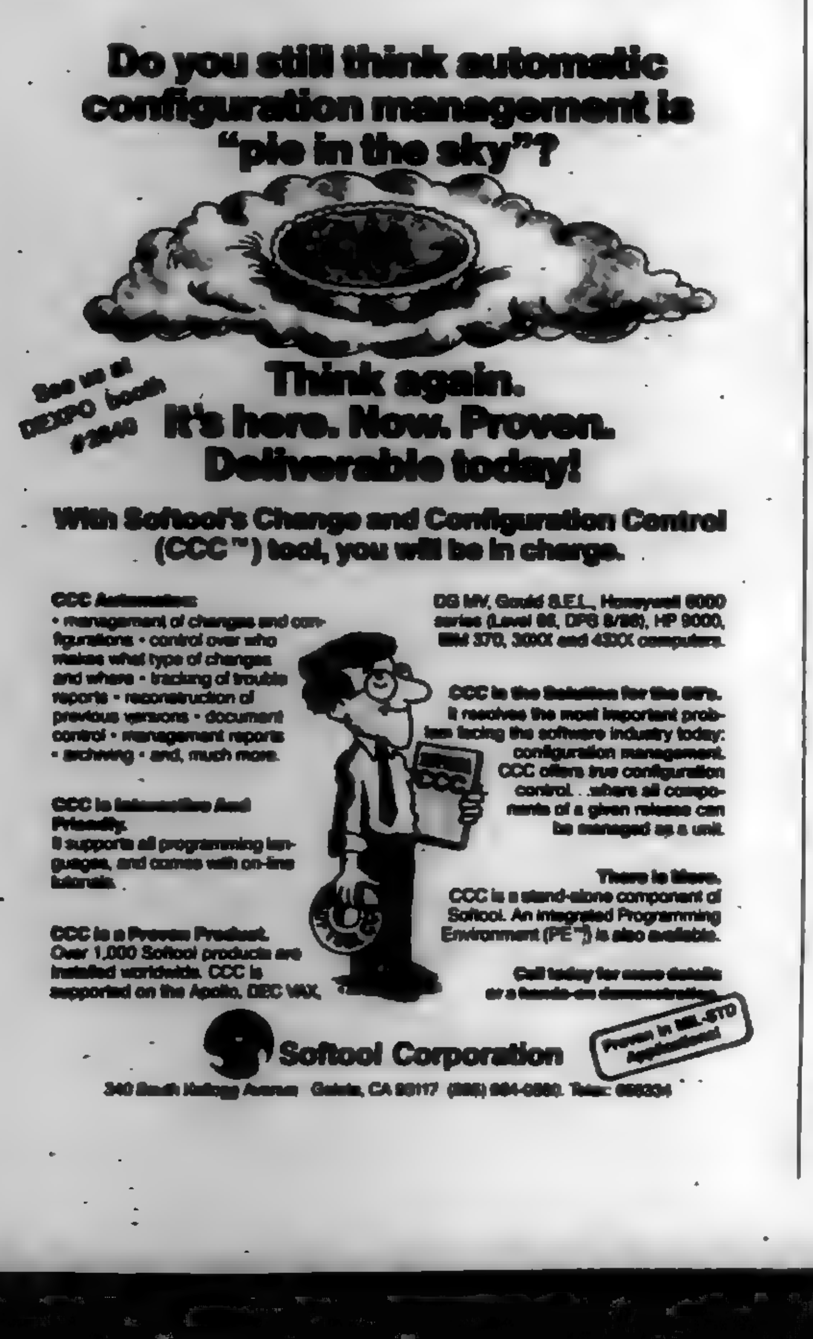
Cobol-80 also contains new procedures for nesting whole programs, a feature that can be used to construct more modular and maintainable applications, users said. When this is combined with VAX VMS features, "you can write a large system with a lot of program modules that call each other and bind on the fly into one image," Sprawls said. "It makes it possible to write applications in a very modular form."

O'Connor said the capability provides the means to share data and pass parameters between calling and called programs.

"Complete programs can be contained in other programs and also executed as separate programs," he said. "They behave as independently compiled programs although you keep and maintain them as a single unit."

Users unanimously said they had experienced few problems in running existing Cobol-74 programs on the new compiler.

"If you want to write Cobol-74 using the Cobol-80 compiler, you can do it. There's even a flagger that will show you where you're departing from it," Sprawls said. "But if you do so, there are a lot of new and great things available now that you will be missing."



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WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

VA program identifies benefits overpayments

WASHINGTON, D.C. — The Veterans Administration (VA) this month began a computer matching program to detect overpayments of veterans, benefits, such as pensions and educational aid.

The VA Inspector General's Office said it will match its benefit records with vital statistics records kept by 47 states (three states lack automated records) to "identify recipients who may be ineligible or not fully entitled to such benefits." For example, the VA noted that the spouse of a disabled or deceased veteran is not entitled to full benefits in the event of a divorce or remarriage.

In other recent announcements required by the Privacy Act of 1974, the government said:

- The Federal Bureau of Investigation's National Crime Information Center will routinely disclose information about missing children to the National Center for Missing and Exploited Children.
- The U.S. Department of Energy will routinely disclose health information about employees handling radioactive materials to the National Institute of Occupational Safety and Health for studies on radiation exposure.

Florida residents to test OMR 1990 census forms

WASHINGTON, D.C. — The U.S. Bureau of the Census plans next year to test census forms that can be read by optical mark recognition (OMR) scanning equipment in an effort to evaluate automated processing methods for the 1990 census, according to Census Bureau documents.

The bureau said it will test the OMR census forms in March 1985 in Tampa, Fla., as part of a pretest for the nationwide census in 1990. Eighty percent of the Tampa households sampled will fill out the OMR form, while 20% will use the regular census form that requires clerical data entry for computer tabulation.

The OMR form requires respondents to use a No. 2 lead pencil to blacken circles corresponding to the correct answer.

Air Force plans AI system to diagnose aircraft ills

WASHINGTON, D.C. — The U.S. Air Force plans to develop a prototype artificial intelligence system for aircraft maintenance that is expected not only to assist with repair diagnosis, but also to help train new mechanics, officials announced recently.

The announcement from the Training Systems Division of the Air Force Human Resources Laboratory at Lowry Air Force Base in Colorado said the research project will develop a diagnostic expert system with features that would help apprentice mechanics learn the problem-solving techniques of master mechanics.

The Air Force plans to award an R&D contract next summer. "The goal of this research is to design, develop, demonstrate and [make the transition to] artificial intelligence technology, which integrates automated diagnostics, maintenance technician expertise and maintenance information data bases," the statement said.

The system would draw on data bases generated by a computer-aided design and manufacturing system as well as the heuristic knowledge of expert technicians, according to the announcement.

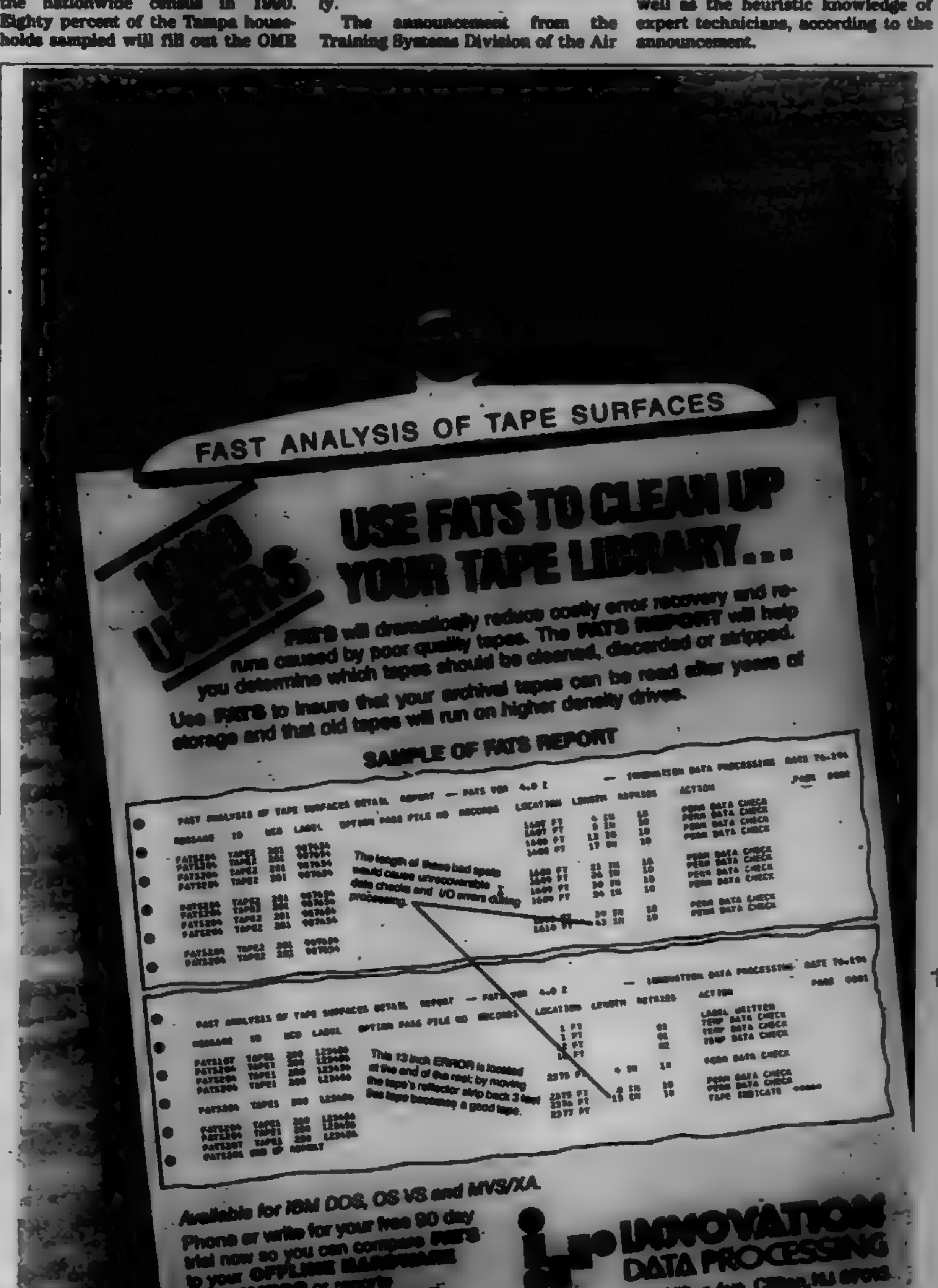
AT&T exec to address conference

BALTIMORE, Md. — Donald Procknow, vice-chairman of AT&T Technologies, Inc., will deliver the keynote address — entitled "Doing Business Electronically" — when the World of Electronic Data Interchange — 1984 Forum and Exhibit convenes at the Convention Center here Nov. [redacted]

The conference, sponsored by the Transportation Data Coordinating Committee (TDCC), will focus on the latest developments in computer and communications applications that use the Electronic Data Interchange standards for computer-to-computer transmission of intercompany business transaction data. The sponsor said industry standards and the transmission and receipt of purchase orders, invoices, bills of lading, freight bills, warehouse instructions, shipment status and payment claims [redacted]

Other scheduled speakers will include R. W. DeSio, director of IBM's Corporate Technical Institutes, and Dr. James Boren, president of the International Association of Profes- [redacted] covering topics on planning, programming and the implementation of modern electronic data interchange systems.

Conference registration is $295. TDCC headquarters is at Suite 606, 1101 17th St., N.W., Washington, [redacted]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DP operations managers lead in salary gains

GARDEN GROVE, Calif. — Data processing operations managers are experiencing an increased salary differential this year over other operations managers, indicating "a much higher level within the management hierarchy than previously," according to a forthcoming survey by the Association for Computer Operations Managers (Afcom).

The 1984/1985 Data Processing Salary Survey, based on data from about 180 computer installations nationally, reveals that the salary gap between the DP operations manager, a relatively new but emerging position, and the computer operations manager increased from 16.7% last year to 22.8% this year.

One reason for the increase, according to Afcom President Leonard Eckhaus, "is that a number of data centers across the country are reorganizing their operations, incorporating the position of data processing operations manager."

While DP operations shops were traditionally run by the computer operations manager, the newer position indicates the top DP operations person is now at a much higher level in the DP management hierarchy and is beginning to find salary compensation on a par with programming managers in many companies, according to Afcom.

Salaries for data entry managers and data control managers closed the gap somewhat with the traditionally higher salaries for computer operations managers, a spokesman for Afcom said, indicating "a movement towards more of an equalization of the salaries" for managers grouped under the DP operations manager. The total spread between salaries for data entry, data control and computer operations managers dropped to 21.9% in the most recent survey, from 31.5% a year earlier. Afcom cautioned that "one year's data does not in itself represent a trend."

The top DP operations person is at a much higher level in the DP management hierarchy and is beginning to find salary compensation on a par with programming managers.

Nationally, the monthly salaries for DP operations managers ranged from a low of $1,680 to a high of $7,663. The average monthly salary was $3,301 and the median monthly salary was [illegible].

Regionally, DP operations managers earned a higher average monthly salary in the Northeast, $3,433; followed by the West, $3,310; South, $3,183; and Midwest, $3,128.

Computer operations managers nationally earned from a low of $1,358 per month to a high of $6,256, with an average of $2,547 and a median of $2,434. Regionally, average monthly salaries were highest in the West, $2,747; followed by the Northeast, $2,609; South, $2,367; and Midwest, $2,217. Median salaries were essentially equal in the Northeast and the West.

Data control managers salaries nationally ranged from a low of $1,284 per month to a high of $3,800; the average salary was $2,229 and the median salary was $2,277. Regionally, the average salary was higher in the West, $2,402, than the Northeast, $2,210, but the median salary was higher in the Northeast at $2,385 compared with $2,264 in the West. Average salaries for the other areas were $2,268 in the Midwest and $2,193 in the South.

Monthly salaries for data entry managers ranged nationally from a low of $1,000 to a high of $3,600; the average was $1,989 and the median salary was $1,900. Regionally, the average salary was highest in the Northeast, $2,021; followed by the West, $2,014; South, $1,978; and Midwest, $1,838. The median salary was slightly higher in the Midwest than the South.

Projected salary increases for 1985 averaged 7.5% for DP operations managers, 7.0% for computer operations managers, 6.9% for data control managers and 6.4% for data entry managers.

Data entry staff largest gain

Overall salary increases for all employees in the DP shops rose 7.8% over the previous year, according to Afcom, with the largest increase among data entry employees, 9.2%, followed by data control employees, 8.7%, and computer operations employees, 6.0%.

Of 19 job classifications included in the survey, DP shops reported some difficulty in recruiting for 11 of those classifications. The greatest difficulty was filling the position of scheduler, which was cited by 89.9% of the survey respondents. Other positions were: DP operations analysts, cited by 80%; DP operations manager, 75%; senior computer operator, 68%; data control manager, 66.7%; and data control shift supervisor, [illegible].

The survey, which also breaks down salaries by installation size and for all 19 job classifications, is available for $40 from Afcom, Suite 201, 11601 Brookhurst, Garden Grove, Calif. 92640.

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SAVE

from page 1

releases of the applications in much less time.

Ary's group administers the company's Software International Corp. applications, including general ledger, fixed assets and accounts payable. Other groups within North American Philips perform similar functions for a Uccel Corp. Carms accounts receivable system and Insci Corp.'s payroll and human resources software.

The arrangement works like this: North American Philips maintains two IBM 3081 mainframes running IBM's VM operating system at its New York data center. The data center also runs 14 copies of IBM's DOS operating system under VM, as well as a copy of IBM's OS operating system. The widely scattered divisions of North American Philips each maintain their own IBM mainframes, but without any copies of the applications running locally.

Instead, the New York data center maintains core image, source statement and relocatable libraries of the applications at the New York site. When a division wants to update its financial files, it downloads a runtime module of the application over leased or dedicated lines to its mainframe for on-line data entry.

When the update is completed, the data goes through a monitor that Philips wrote in Cobol. The monitor is basically a data collection utility that takes the update data and creates the IBM JCL for batch update. "The user doesn't have to figure out what to run and in what order," Ary said. "The conversion program takes that over for him."

The batch updates are done directly into the user's data base, which is maintained locally. In this way, the users own their data, but not the applications needed to use it. Users do run some of their own applications locally, but the "bread and butter" financial data is all handled through the remote linkup.

Ary explained that the procedures ease the process of converting to new versions of the applications software. But because 19 divisions will use the package, the new releases must be tested much more thoroughly. "If something isn't tested very well, it can bring everyone down," Ary said.

North American Philips uses an internal beta site approach. When a new release comes in, it is tested using a copy of production data extracted from the chosen beta site. The software is then retested against a file of errors that have been found in the past.

Then the beta test site is brought up on the production system under the administration of the application support staff and runs for 30 to 60 days. A duplicate global library containing the new version of the software is kept and run parallel with the previous version. Moving a division over to the new release is as simple as switching pointers, Ary said.

The divisions are notified well in advance of conversion to a new release, Ary said. Staff members from the application support group travel to the divisional locations to train users in the new features of the software. "The easier we can make the system for the users, the happier they'll be," Ary said. "We want the users to know something about data processing, but as little about the complexities of the system as necessary."

User, DP cooperation key to package's productivity

CW AT SI
USERS GROUP

By Paul Gillin
CW Staff

SAN DIEGO — When installing a new financial application package, "the real concerns are not the big heavy technical ones. They have to do with people working together."

That was the essence of a presentation by Carl Coulter, a systems planning consultant in corporate business systems development at McGraw-Hill, Inc. in New York, at the 16th Software International Users Group Conference held here last week.

Coulter, who has been involved in several installations of packaged software, said a financial software installation project differs markedly from that of standard DP applications. "General ledger is very much an accounting system, and the goals of those people in accounting often don't coincide with the goals of DP," he said.

'My system,' not 'your system'

A major goal of the DP staff should be to have the user referring to the application as "my system" rather than "your system" by the time development is well under way, Coulter said. For that reason, the user should drive the process throughout the life of the development cycle.

Perhaps the most important commitment corporate management must make is in the area of personnel. "Accounting people tend to think all you have to do is push buttons and things happen in DP," he said. "It's hard to believe people think you can make a conversion without increasing the people commitment. Your management has to understand the resources you need to install or convert."

Coulter said that when he was at Home Box Office (HBO), a division of Time, Inc., the manager of accounting held weekly meetings to check on the progress of an accounts payable and general ledger installation effort.

"If we needed people, he made sure they were available," he said. In return, DP was expected to meet the accounting department's ambitious deadlines.

Both the user and the DP sides of the project management team must define their roles and stick to them without attempting to do the other department's job, Coulter said.

■ DP should develop the conversion plan, identifying interfaces from other financial systems and setting realistic time frames.

■ It should interact with the user decision-makers. "This is key," Coulter said. "It's very important to know who makes the decisions, who pays the tab and who expects results."

■ It is also up to DP to maintain a relationship with the software vendor that enables the user company to take advantage of the vendor's services when needed.

■ DP must install and test the software, making sure all documentation and instructions are present and that the software is installable.

■ DP must bring the system to operational status.

To make the last two steps easier, do some up-front planning, Coulter said. Set standards for job control language (JCL) and do not modify JCL at first. "You want to make sure the package is installable," he added. Retain identification codes for programs and job streams that are similar to those used by the vendor. That makes error tracking easier than if entirely different identifiers are used, he explained.

One should also bring the system into operation in line with the needs of the user, Coulter indicated. The user may want to build a history file by converting existing data or simply by starting fresh, he added. Building interfaces to existing systems and methods is important in order to bring data over that is in line with the user's expectations.

Coulter

Users, for their part, should be responsible for training their own people, according to Coulter. They should create their own report formats. At HBO, users hired two consultants strictly to build reports. Users will want to define their own control and security systems and should plan for conversions so that it coincides with the expectations of DP, he said.

In addition, users must be solely responsible for defining their own chart of accounts and relationships and for deciding how data should be captured and maintained, Coulter added. All these steps should be taken without extensive DP involvement. The user will not feel he owns the system unless he has defined in detail how it will work, he explained.

According to Coulter, the end result of coordination between DP and user departments is reduced personnel costs, which are by far the most expensive aspects of installation or conversion.

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Planning keeps package running problem-free for years

CW AT SI USERS GROUP

By Paul Gillin
CW Staff

SAN DIEGO — Donald Willis has never had to grapple with the "make or buy" decision of application software during his 13 years at the Capital Group, Inc. in Los Angeles. Willis, who is manager of corporate accounting, joined the Capital Group in 1971 when the company was in the middle of the process of installing a general ledger package from Software International Corp. (SI).

Thirteen years and four major releases later, Willis is still an advocate of packaged software. The choice seemed natural for the Capital Group in 1971 as it entered a period of aggressive growth. The packaged solution offered faster installation than an in-house-developed system and greater flexibility than any alternative, he said in an interview at the 15th Software International Users Group Conference held here last week.

The Capital Group is an investment management and research company that owns several other subsidiaries worldwide. Subsidiaries include Capital Research and Management Co., Capital Management Services, Inc., Capital Guardian Trust Co. and international affiliates in Europe. An IBM 4381 computer at the company's Brea, Calif. headquarters processes virtually all corporate financial accounts. Individual customer accounts are maintained by a service bureau.

The packaged application has operated so smoothly that Willis said it ran virtually maintenance-free between 1972 and 1981, when the Capital Group converted from Version 3 to Version 4 of the general ledger package.

The secret lies in the fact that 13 years ago some very astute accountants did some very careful planning, he said. "If you think it out on the front end, [the package] should serve you for years and years," he said.

Unfortunately, a common problem of package installations that many DP departments must fight is the unwillingness of corporate management to acknowledge the difficulties involved. "Management often thinks of a package as if it [were] a lamp," he said. "You should be able to just plug it in and have it work."

The truth is quite the opposite, he said. Installing a software package does not offer much leeway for changes during development. As a result, the package has to be selected and implemented with an eye toward the long haul.

Estimate growth paths

A critical planning element is estimating growth paths, he said. If your company is planning to double in size over the next 10 years, you need a package that allows you to add many new relationships, and logic that will let you customise the software to handle the accounts the way your business handles them.

That effort can also pay off in case of installing new releases. The Capital Group has been able to bring up new versions of the general ledger over the years with few visible changes, he said. "In some cases the users don't even know the conversion has been made," he said. A key element is knowing the new release before trying to install it.

When implementing a new release, the Capital Group does not use the only copy of its live data. Production data is backed up prior to the change. Conversions should be made during the off-season or during holidays when work is likely to be slow, he said.

Steady contact with the vendor is critical both during conversion and in day-to-day operations, Willis said. "User conferences are one of the best ways I know to meet the vendor," he said.

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Sperry launches 7000/40 32-bit superminicomputer

Machine supports up to 128 users, targeted to compete against DEC VAX-11 superminis

By Edward Warner
CW Staff

LAS VEGAS — Sperry Corp. last week chose the world's largest microcomputer show as a stage to unwrap a 32-bit superminicomputer supporting up to 128 users and designed to run AT&T's Unix operating system and the C language.

The Sperry 7000/40, announced at Comdex/Fall '84 here, will be manufactured by Computer Consoles, Inc. and will reportedly feature an AT&T Unix operating system and main memory capacity of between 4M and 8M bytes.

Priced between $160,000 and $900,000, depending on configuration, the 7000/40 will also reportedly offer independent processing for instruction decoding, address generation and instruction execution, allowing the system to process three instructions simultaneously. First shipments are slated to begin Feb. 2.

The 7000/40, Sperry officials said, is targeted to compete with, among others, the Digital Equipment Corp. VAX-11 superminis, including the recently introduced 8600 series.

"VAX users who are looking either to upgrade their system or standardize on a VAX Unix product can now have the option of migrating to the Sperry family," according to Dewaine Osman of Sperry's Americas Division.

Initially, the 7000/40 will support the University of California at Berkeley Unix 4.2 operating system, but Sperry's director of microsystems and commodities marketing, Neal Waddington, said that by mid-1985, AT&T's Unix System V will also be available.

The former operating systeh will make the machine attractive to the scientific market, while the latter — which provides IBM interconnect ability — will enhance its appeal to commercial users, Waddington observed. Berkeley Unix 4.2 for the 7000/40 will be priced from $10,000 to $22,500, depending on the number of users.

Other features of the 7000/40 are a separate subsystem for the CPU, main memory and I/O and four-way interleaving of its memory capacity, said to permit several controllers to access memory simultaneously.

Sperry Corp. can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Apple's Sculley: Innovation will shake micro doldrums

CW AT COMDEX/FALL '84

By Edward Warner
CW Staff

LAS VEGAS — Abandoned by investors and shaken by the shakeout, the personal computer industry is trapped in a giant rut that it can escape only through innovation, said Apple Computer, Inc. President John Sculley in his keynote address opening the Comdex/Fall '84 show here.

Sculley

That innovation, Sculley indicated, will come from the software world because the personal computer has "begun the transition from a hardware machine to a software appliance."

Contributing to the industry's rut, the Apple chief said, is the fact that the shakeout of microcomputer hardware makers has now expanded to include software publishers and makers of computer peripherals. To get the industry back on track, he added, innovation will be needed, and "innovation must be market-driven to be successful."

Sculley, who joined Apple a year and a half ago, also had some thoughts to share about innovation as it pertains to his firm's continuing battle with its Big Blue nemesis. When told shortly after his arrival that Apple should seek IBM compatibility or a non-IBM dominated market niche, Sculley said he responded, "I get my satisfaction from being a dreamer, a builder and a leader."

He later remarked that IBM compatibility will become harder and harder to achieve, citing as evidence the arrival of the IBM Personal Computer AT and the announcement of IBM's upcoming Topview windowing environment.

Sculley argued, however, that size is not enough to ensure success, pointing to the minicomputer makers and AT&T, which he said are not providing the leadership needed in the industry.

While not mentioning his firm by name, he said the leaders of the personal computer industry "will not resort to mass merchandising, but will work with their dealers as partners."

In his speech, Sculley blasted the venture capital investment community, which he said "has turned away from the biggest growth industry."

SPERRY

from page 1

access memory and a 10M-byte hard-disk storage unit and will cost $395.

Also introduced were versions of Unix for the Series 5000 supermicros and the firm's new Series 7000/40 superminicomputers (see story above).

Until now, "You haven't seen a mainframe-to-micro company making such a financial commitment to Unix," claimed Dewaine Osman of Sperry's Americas Division.

Four models offered

The Series 5000 supermicros, meanwhile, will be offered in four models, reportedly supporting from eight to 64 users and offering processing at a rate ranging from .7 millions to 3.2 millions of instructions per second.

The machines, based on the Motorola, Inc. 68000 CPU, will reportedly offer dual bus design and a separate processor/memory technique that provides error checking and correction.

Series 5000 supermicros will be priced from $15,000 to $50,000 for the low-end 5000/20 and 5000/40 models and from $62,000 to $150,000 for the high-end Models 5000/60 and 5000/80. Shipments of Models 5000/20 and 5000/40, being manufactured for Sperry by NCR Corp. and two other firms, will reportedly begin at the end of January 1985, while shipments of the Models 5000/60 and 5000/80, being manufactured by Arete Systems Corp., are not scheduled to begin until March 8, 1985.

Unix System V for the Series 5000 machines will be priced from $1,250 to $22,500, depending on the number of users.

Sperry's Series 5000 announcement was accompanied by the unveiling of office automation and factory automation software packages for the line.

The integrated office automation package, Q Office, is said to offer word processing, spreadsheet capabilities, data base manipulation and graphics. It is priced from $3,500, for the 5000/20, to $20,000, for the 5000/80 64-user system.

Sperry's Manufacturing Business Solution (MBS) factory automation package runs under Unix on both the Series 5000 and on the 7000/40 supermini.

MBS is said to be an on-line MRP-II manufacturing control system with integrated financial applications, including transaction history, actual-cost to standard-cost variance reporting, year-end material and financial rollover functions and password security.

Terminals announced

Also announced at its Comdex press conference were two terminals that the firm said would be most appropriate in a Unix environment — the SVT 1210 and SVT 1220. The SVT 1210, priced at $696, reportedly provides green-screen display and Digital Equipment Corp. VT52 and VT100 terminal emulation. The SVT 1220, priced at $796, reportedly emulates the DEC VT220.

Citing one projection that estimated sales in excess of [illegible] million Unix systems by 1988, Sperry's Osman said his firm "is positioned exceptionally well to take advantage of this Unix growth potential" and that such emphasis would help the firm move away from relying on its mainframe line as its primary source of revenue.

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Comdex/Fall '84:

Setting the stage

Photos by David L. Waite

Managers go to Comdex for micro news

CW AT COMDEX/FALL '84

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — For microcomputer managers, the Comdex/Fall '84 conference, held here last week, represented the opportunity to stay a step ahead of the continuing explosion of technology and products in the personal computer industry.

"Generally, we're here because we're trying to stay a little bit ahead of the curve," said Roger G. Neaves, vice-president and general manager of data center planning for San Francisco-based Wells Fargo Bank. Neaves was one of several micro managers interviewed by *Computerworld* at the start of the show.

"We are trying to avoid getting buried," Neaves added. Neaves said he and Raymond E. Potts, who serves as his assistant in the data center planning division, planned to walk through the entire show, which this year included 1,400 exhibitors spread out among six major facilities.

"If anything catches our eye, we'll stop and look at it," Neaves said. Neaves and Potts, who oversee the purchase of computer equipment for Wells Fargo — from personal computers to mainframe systems — said Comdex gives them the chance to accomplish several tasks at once.

The two planned to check out new products at the request of their end users who had asked about software programs that had been announced. Neaves, who pointed out that some companies in the personal computer industry have had problems delivering a product after announcing it, said Comdex would give him the chance to confirm whether new products "were alive and well" or were simply "vaporware."

In addition, Neaves and Potts said they would be investigating current offerings in the local-area net market for Wells Fargo, which has installed close to 900 personal computers in its offices throughout California.

For large organizations that have made a commitment to personal computers, local-area networks represent the "obvious next step" in making the machines more productive and more useful, Neaves said.

Neaves and Potts cited other interests as well, saying they would be looking for dumb terminals to hook up to IBM's recently announced Personal Computer AT, as well as multifunction boards for the machine.

In addition, the two said, they are now wrestling with the issue of data security and would be paying attention to exhibitors who offered products in that market.

Steven Hochberg, vice-president of Complete Technology Corp., a Flint, Mich.-based firm that acts as a microcomputer consultant to Fortune 1,000 firms, said Comdex would give him the chance to stay "one step ahead of users."

While most users help micro managers decide which products will be used within an organization, the microcomputer manager must stay on top of the changing technology, new products and new buzzwords, Hochberg explained.

Hochberg, who said Complete Technology has installed approximately 60 personal computers in its own offices, said he would be looking at a variety of products at Comdex, including printers, micro-to-mainframe link packages and project management software.

Unlike Neaves and Potts, Hochberg said he would not be focusing on developments in the network market while attending Comdex. Although Hochberg said he was interested in the technology, he did not expect any significant announcements in local-area nets at this year's show.

Hochberg said most of his firm's users were satisfied with their basic applications software packages, so he would not be looking at new programs. Instead, he said, he was interested in software productivity tools, such as Topview, IBM's recently announced operating environment.

"Management is crying out for some type of system where users can get on a computer and hunt and peck their way through several software packages under their own menu system," he said.

Hochberg said he planned to take a look at Topview, which is said to provide a windowing and multitasking environment for applications software.

COMDEX

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software offerings and dozens of personal computer and multiuser micro system debuts. It also placed a considerable emphasis on communications links.

Among major Comdex developments, Sperry Corp.'s Information Systems Group unveiled plans to put AT&T's Unix on a broad line of products (see story page 1). Texas Instruments, Inc.'s Pro-Lite laptop computer (see story page 57) and Lotus Development Corp.'s Jazz software for the Apple Computer, Inc. Macintosh (see story page 6), also gathered crowds.

In other software moves, Ashton-Tate introduced upgrades of its Framework, Dbase II and Dbase III application programs that are fully supported by the IBM Personal Computer AT. Updates for current licensees range from $25 to $35 (depending on shipping costs), except for licensees of Dbase II version 2.3 and earlier, who will be charged from $75 to $90. Ashton-Tate is located at 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

Microsoft Corp. showed two new applications for the Macintosh, the Microsoft File data management package and the Microsoft Word word processing program. Each will be available by the year's end and will cost $195. Microsoft is headquartered at 10700 Northup Way, Bellevue, Wash. 98009.

Apple itself introduced a 10M-byte hard disk drive for its Lisa, Apple II and Apple III. The Profile system will be available this month for $1,995. Apple is located at 20525 Mariani Ave., Cupertino, Calif. 95014.

Third-party developers also showered the Macintosh with hardware and software products, including a hardware accessory kit that hooks the system to the NEC Information Systems, Inc. Spinwriter letter-quality printer. The kit costs $100 and is available from NEC at 1414 Massachusetts Ave., Boxboro, Mass. 01719.

In networking, the first diskless workstation from a leading vendor of IBM Personal Computer-compatible systems appeared. The diskless version of the Zenith Data Systems Corp. Z-150 is shipping now with a $1,599 price tag, according to Zenith, which is based at 1000 Milwaukee Ave. in Glenview, Ill. 60025.

The show also featured many recent network offerings, including enhancements of 3Com Corp.'s Etherseries software. Etherseries 2.4 products reportedly support the Personal Computer AT and provide a new menu system that boosts security and enables users to custom-design application menus. 3Com also cut prices on software and hardware products from 18% to 70%. 3Com is located at 1365 Shorebird Road, Mountain View, Calif. 94039.

Many multiuser microcomputers running some version of Unix were introduced at Comdex/Fall, along with several other multiuser systems designed to connect to personal computers. In the second category, Televideo Systems, Inc. showed the PM/16T, an enhanced version of its Personal Mini/16 that adds an integral 20M-byte streaming tape drive, 512K bytes of random-access memory, a multiuser version of the vendor's Infoshare operating system and an electronic mail package. The PM/16T will be available in February for $9,996, according to Televideo, which can be reached at 550 E. Brokaw Road, San Jose, Calif. 95112.

Among the host of add-on products for the Personal Computer AT appearing at Comdex, Sysgen, Inc. displayed a 45M-byte cartridge tape backup subsystem. The Qic-File subsystem costs $1,395 for an internal version and $1,495 for an external model, according to Sysgen, which is headquartered at 47853 Warm Springs Blvd., Fremont, Calif. 94539.

Comdex also produced several 2,400 bit/sec modems targeted for personal computers. One leading contender is the Hayes Microcomputer Products, Inc. Smartmodem 2400, which is said to provide intelligent transmission controls, voice/data switching and the ability to set communications instructions with keyboard commands. The modem is available for $899 from Hayes, which is located at 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

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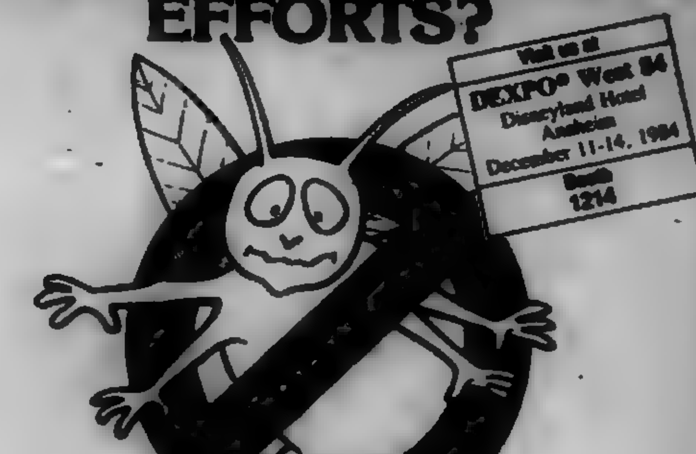

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Coalition needed to stem computer crime

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — Only a concerned coalition of government, industry, users and consumers can stem the tidal wave of computer crime that threatens to engulf the U.S., according to the head of one of the nation's largest public data networks.

J. David Hann, president of GTE Telenet Communications Corp. told visitors at last week's 11th Annual Computer Security Conference here that the responsibility for halting the growing danger of computer crime and computer security violations is a shared one.

Hann said the task of stopping the computer crime wave must be taken up not only by legislators and industry officials, but also by all computer users and "every consumer whose tax and credit records — even medical records — are kept in computers."

"Over the past year and a half," Hann said, "we have seen a lot of media hype and stridency on the part of public lawmakers concerning computer security. But this already enormous problem is still growing. What can we do to stem the computer crime wave?" he asked.

"I believe the problem is solvable," he continued. "I am very optimistic about our future progress in stopping computer crime. A solution is within reach — a solution based on a new level of commitment and cooperation that is growing today. Industry must band together with users and government to find an effective and just solution to the problem of computer crime."

Hann said the current generation of computer criminals — so-called hackers — has been portrayed as bright, adventurous "kids" who utilize public networks to illegally access unguarded systems. But he warned of a far more serious security issue, the rise of a sinister class of criminals who use computers to perpetrate their crimes.

According to Hann's statistics, an armed robbery, on the average, nets the criminal $3,000, and the average embezzlement yields between $19,000 and $25,000. But the average computer crime earns the perpetrator a staggering $100,000 to $500,000, he said.

Hann quoted a June 1984 report released by the American Bar Association's Task Force on Computer Crime [CW, June 18], which showed that fully one quarter of the nation's largest corporations reported verifiable losses due to computer crime. The total value of those losses was reported to be between $145 million and $730 million, which represents an average loss of $2 million to $10 million per respondee.

Billions of dollars lost annually

"If we take this as a representative sampling of other businesses and government," Hann said, "computer theft and abuse costs North American businesses billions of dollars annually."

And, according to Hann, the hackers who pester public networks add to that costly toll — even if they do nothing more than illegally access computer systems. "An alert, determined operations staff is needed to find the very small clues left behind by professional criminals. But the crowds of hackers provide a steady distraction." The youthful hackers prove to be such a distraction, Hann said, that the attention of the operations staff is diverted from tracking down the professional criminals. "So the whiz kids are contributing to the proliferation of serious crime and abuse. Computer trespassing is not child's play even if no harm is done," he said.

GTE Telenet's own Telenet communications network was used by hackers in August 1983 to break into computers in the Nuclear Research Facility at the National Laboratory in Los Alamos, N.M. [CW, Aug. 22, 1983].

What is Hann's system for ensuring computer security in a public data network environment? First, consumers, computer owners, public network operators and government officials must work together to promote legislation that matches penalties to the seriousness of the crimes. In addition, industry officials must take a firm stand on pressing charges against suspected offenders.

As a third step, Hann said public network operators should begin to educate customers on potential security risks and on methods for improving the integrity of their systems. Finally, those operators must enhance the security of the networks by providing security products and services to their customers.

Computer crime bill inadequate

What has GTE Telenet done along those lines? "We have pressed for strong legislation, and we have worked with the [House of Representatives] to draft such a law," Hann said. "The bill that was finally passed this year [CW, Oct. 15], is not adequate to cover the full problem, and it should be reviewed and strengthened in the next legislative session," he added.

Hann said GTE Telenet had also contacted the governors of all 50 states to promote stronger state legislation and has practiced a policy of cooperating with law enforcement officials to prosecute violators. He said the firm has been successful to date in obtaining both indictments and guilty pleas under federal wire fraud statutes.

In addition, he said, GTE Telenet has worked to provide customers with new security products and services, such as public key encryption methods for electronic mail and personal identification number systems to prevent unauthorized access.

Equitable workers win VDT safety clause in contract

SYRACUSE, N.Y. — Clerical workers at a major insurance company here agreed to a labor contract earlier this month that included groundbreaking provisions involving VDT health and safety.

A spokeswoman for District 925 of the Service Employees International Union of the AFL-CIO, said the agreement with the Equitable Life Assurance Society of the U.S. could serve as a future model for protecting employees who work with VDTs.

"What's important here is the breadth of concerns covered in the contract," said Karen Nussbaum, president of District 925 and head of 9-to-5, the National Association of Working Women.

The agreement covers 54 members of District 925 — insurance claims processors and support personnel — who work at Equitable's group benefits office here. Nussbaum said the contract is especially significant in that it involves a private company in an industry that has been difficult to unionize.

Provisions of agreement

The accord includes provisions for installation of glare reduction devices, adjustable chairs, detachable keyboards and regular machine maintenance.

The contract provides for extra work breaks away from VDTs, and it also gives female workers the right to ask for transfers to non-VDT work during pregnancy.

Gilbert M. Reich, an Equitable vice-president, said the company "is pleased that the terms of the agreement fall within the framework of our long-term business plans."

Workers and unions have long been seeking protections related to health and safety issues involving VDT use. Various scientific studies have provided inconclusive and sometimes contradictory evidence about the hazards posed by VDTs.

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Threats to systems outpacing security technology

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — While they give security products vendors an "A" for effort, most visitors to last week's 11th Annual Computer Security Conference here said they don't think security technology is keeping pace with the threats to computer systems.

In a random survey conducted on the exhibition floor attendees told *Computerworld* that they were encouraged by the awakening of interest and the growing level of research and development demonstrated by vendors. Security personnel interviewed expressed considerable interest in the increasingly sophisticated access-control and data encryption devices and microcomputer security products only now becoming available.

But those same executives lamented the lack of a comprehensive approach to security — one product or vendor that handles all aspects of a company's security requirements — and the narrowly focused, task-specific nature of many of the products demonstrated here.

"It is very clear that the technology is not keeping pace. We haven't even quantified the threats yet. The risk possibilities have not been explored fully," David Moore said. Moore is second vice-president of Jefferson-Pilot Information Services, Inc., located in Greensboro, N.C.

Risks in data communications

According to Moore, the real security issues do not involve in-house, hard-wired systems, but the increasing risks involved in data communications. "Outside communications concerns me," he said. "We have a responsibility to our customers to protect their information. Some of the products here are years ahead of any need we might have, but none solves all our problems."

Alfred Foster, data security administrator with Englewood, Colo.-based U.S. West, also applauded vendor efforts. "They are making a very good attempt to meet our needs. The increase in R&D in security in the past year is phenomenal. Suddenly, everyone is interested in security it seems."

Foster said the greatest worry he faces with U.S. West, one of the holding companies created by the breakup of the Bell system, is authorized users remotely accessing corporate information. "Once that data is outside the mainframe," he said, "you have lost all control over it. There is really nothing you can do except try to maintain accurate audit trails. As far as I know, there are no products available today that address that concern."

With between 400 and 600 mainframe terminals under his security control, John Schneider complained about the limited scope of the security products available. "The kind of security I am looking for transcends the equipment I have seen here," said Schneider, who is security control administrator for ITT Communication and Information Services, Inc. in Secaucus, N.J. "Some of these systems require you to have one access control box per terminal. I do not need something like that. I want one box that can handle all our terminals. Otherwise, it just is not cost-effective."

Philip Suitkey, assistant vice-president of the Cedar Rapids, Iowa-based Banks of Iowa Computer Services, said he would like to see advances in text encryption technology.

"The variety of products today is incredible compared [with] just a couple of years ago," he said. "I am responsible for security within my organization. We have physical security devices and access controls in place, but we need more in the way of encryption. The way that communications is growing, including the use of satellites, that is vital."

Though he believes the technology is just now starting to catch up with the threats to computer systems, Michael McNamee said that something more than products is needed to ensure the integrity of information. "Users must be made aware of the threats to security," he said. "The information they are using and distributing is valuable, and they just do not realize the importance of integrity."

"I would like to see better education on security in our colleges," said McNamee, who is information asset security administrator with IBM in Westchester, N.Y. "I would like to see a curriculum for data security professionals. My background is in finance, and I only got into this field in my role as an auditor."

But in the end, according to Robyn Strang, the race between technology and threats may prove to be a vicious cycle. Strang is security officer with Menlo Park, Calif.-based Saga Corp. "I think we are making some advances, but someone will always counter them. Some of the products seem incredibly advanced, but it is only a matter of time before someone catches up to them. No matter what controls you develop, someone will always find a vulnerability."

The Digital VT220 is in stock at Continental. Before you settle for an emulator, consider the total cost.

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Safeguarding security plan integral to overall strategy

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — There are many different kinds of security. There is the security of being surrounded by loving family and friends. There is the security that comes from knowing you have enough life insurance. There is also data and computer systems security.

And then there is the security of security.

Redundant? Donn Parker doesn't think so. Important? Probably more than you can imagine, according to Parker.

Parker is a senior management systems consultant with Menlo Park, Calif.-based SRI International, Inc. and an expert in computer systems security. The author of three books on computer crime, Parker is also currently directing a computer abuse research project funded by the National Science Foundation.

Last week, at the 11th Annual Computer Security Conference here, he related to attendees the vital importance of protecting and safeguarding information about their security systems and practices. "An organization's security information about controls, practices, vulnerabilities and plans is the most sensitive of all," Parker said, "because it is the key to unlocking all other information. Secure security practices are needed. I may sound a bit paranoid, but you would do well to listen."

According to Parker, the security of security is plagued by two major classes of problems. The so-called active problems involve the voluntary, though perhaps not intentional, disclosure of secrets. The active problems include casual meetings and conversations in which a security administrator may unwittingly reveal his firm's security secrets — what Parker labeled a "loose lips sink ships" situation.

In addition, third-party questionnaires and inquiries as well as vendor and outsider visits pose the potential for active disclosure. And, while they are touted as one approach to designing companywide security systems, in-house task forces often present another threat of overly wide security data dissemination. Parker also listed among the active problems in-house publications, training programs and overly informative terminal prompts to users who have not even logged on.

"I am amazed at the amount of information you will tell a total stranger at a conference like this," Parker said. "You will willingly reveal your security mechanisms, your safeguards — even your weaknesses. You are giving away the keys to the kingdom."

The second class of problems is what Parker labeled passive ones, involving involuntary disclosure of systems and practices. Among these are theft of security information, industrial espionage, the loss of such data and "spoofing," in which an unauthorized person poses as a legitimate insider to gain knowledge.

Parker outlined a number of steps an organization can take to offset both the active and passive threats to the security of security.

■ First, a company must establish strict security policies and provide notice of them to every employee.

■ A company must also promulgate a code of security conduct that establishes rewards for compliance and penalties for violations, such as disclosing a password.

■ Firms should obtain confidentiality agreements with all vendors and consultants and provide for safe practices for the hiring and firing of all personnel, especially security employees.

■ Parker urged corporations to avoid detailed disclosures of security data and to minimize screen prompts to prospective system users.

■ Finally, he warned security personnel to keep them secret.

Parker urged the careful control and discarding of security documents and the undertaking of an in-depth inventory of such information. In addition, he warned security administrators and all other executives to travel safely, carefully securing company information in their personal possession.

"Assume the enemy knows what you are doing, but keep everything as secret as possible. Employ the military's need-to-know concept for all security information. With everything you say, consider that your listener may be your worst enemy. The job you save may be your own," Parker said.

FBI head urges preventive action to protect sensitive data

By John Gallant
CW Staff

ROSEMONT, Ill. — In rapidly evolving industries such as the computer field, both law enforcement agencies and the private sector must work to keep abreast of potential problems, or the "twisted mind" will get ahead, the director of the Federal Bureau of Investigation said last week.

Speaking at the 11th Annual Computer Security Conference here, Judge William H. Webster assessed the "big three" problems — technology transfer, industrial espionage and computer-related crime — that he said threaten both corporate and national security today. Webster also outlined the steps the FBI has taken internally to beef up the security of its own computer systems.

Webster said the responsibility for countering the transfer of vital military and industrial technology rests squarely with his agency, assisted by the departments of State and Commerce and the U.S. Customs Service. He said that since the 1930s the Soviet Union has spent vast sums of money and manpower in an attempt to acquire such technology.

Webster said that in the past year there has been a spate of cases involving classified documents and other data being turned over to foreign intelligence officers and agents. Those cases have involved all types of people, Webster said, even an FBI agent arrested for allegedly supplying secrets to two Soviet agents.

"Our goal in foreign counterintelligence work is to identify and neutralize foreign intelligence operations, not just to arrest and prosecute the individuals involved," Webster said.

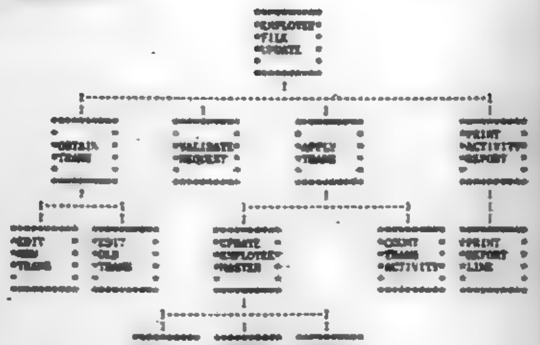
After touching only briefly on industrial espionage, Webster said that the investigation of computer-related crime has become an important facet of the agency's white-collar crime program.

He said that the FBI has begun to track crimes that fit the agency's definition of computer-related crime. He estimated the average dollar loss as around $500,000 per incident. Webster said it does not require genius to perpetrate a computer crime, only know-how.

"Since the investigation of computer-related crime is relatively new," Webster said, "we have had to develop new training methods. Since 1976 we have trained more than 300 agents and other law enforcement officials through our Computer-Related Crime school. It provides the basic skills needed to unravel the tangled trail of computer crime."

Webster said the agency had improved its own internal computer security by eliminating dependence on leased communications lines through the use of only dedicated lines, relying on transmission of only encrypted data, using access control devices and security software, employing the technique of periodic password changes and following strict policies for the acquisition and training of employees.

Webster characterized the federal computer crime legislation passed this year [CW, Oct. 15] as a beginning and said it would bring a measure of consistency to the state legislation in place or under consideration.



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Computer leasing expands, lessors optimistic

Financing, mart niches viewed as key factors in current leasing boom

INDUSTRY SPOTLIGHT

By Peter Bartolik
CW Staff

Coming out of the national recession two years ago, the computer leasing industry was troubled with uncertainty over the impact of IBM's leap into the third-party computer financing industry. Today business is booming, seemingly for everybody, and the industry is attracting new players; but nobody in the business is breathing any easier.

"There has always been a pall over the third-party leasing business, especially in the computer area," said Kenneth Pontikes, chairman of Comdisco, Inc., in an interview earlier this year. The industry, according to Jon J. Prager, chairman of Finalco Group, Inc: "has been through its ups and downs."

The industry right now is undoubtedly going through an up cycle. Market research firm International Data Corp. of Framingham, Mass., recently projected that the computer-related leasing industry as a whole will grow to revenues of $7.6 billion this year, a 30% increase over 1983 — about double the growth rate of the computer industry in general — and will grow 30% each year through 1987. IDC's figures include the market for used computer equipment, an area intertwined with leasing.

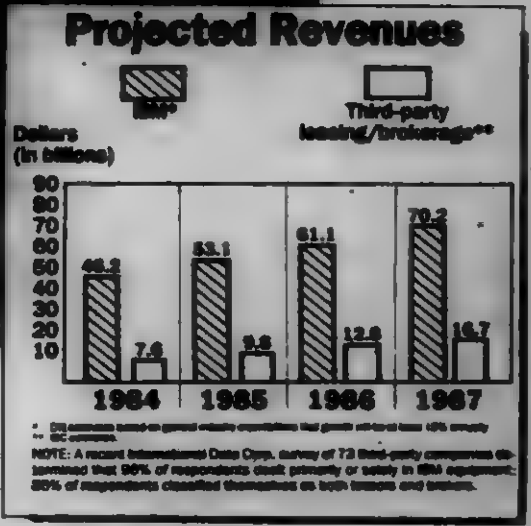
During the October meeting of the Computer Dealers and Lessors Association (CDLA), which numbers more than 200 companies as members, outgoing CDLA President Richard A. Forsythe, head of Chicago-based Forsythe/McArthur Associates, Inc., noted that "40% of the attendees [at the meeting] were not members two years ago. There is a lot of growth in this area."

In a recent IDC survey of 73 third-party leasing companies, 91% of the respondents rated business this year as good or excellent, and 94% said next year will be good or excellent. Despite that optimism, 62% of the respondents said they need to be more creative in order to stay competitive, and 41% said they need to diversify.

One does not have to look far to understand why today's optimism is tinged with caution about the future. IBM Credit Corp., the leasing subsidiary of IBM, has mushroomed into one of the largest companies in the business; IDC pegs IBM Credit as the leader in the field, putting $100 million of equipment out on lease each month through the first half of the year; others still give that distinction to Comdisco, with IBM Credit coming on strong in second place.

Formed in mid-1981, IBM Credit is now in high gear, estimated by IDC to be increasing its lease values by 92% this year and 50% next year.

The impact of IBM Credit on the third-party industry is a subject of debate within the industry. Some, like Comdisco's Pontikes, assert that IBM has legitimized an industry that has suffered from more than its fair share of scandals and IBM has thereby increased the size of the potential market; others, like Finalco's Prager, say IBM Credit has substantially limited growth opportunities in the IBM CPU and peripherals market (see story page 22). Even less clear is the impact that IBM Credit will have on the used computer market. The used market and the leasing market are inextricably tied together and, at some point, the equipment IBM Credit has put out on lease will begin to enter the used equipment market (see story page 23). Although there are many used equipment dealers not involved in leases, companies involved in leases are always involved in used equipment.



CW CHART

* [illegible]
** IDC estimate.
NOTE: A recent International Data Corp. survey of 73 third-party companies determined that 96% of respondents dealt primarily or solely in IBM equipment; 80% of respondents classified themselves as both lessors and brokers.

IBM is not the only computer manufacturer with a captive credit corporation; most of the large vendors have such subsidiaries or allied ventures formed with existing financing companies. The latest to jump into the fray is AT&T Credit Corp., which hopes to do for telecommunications equipment what the third-party market did for computer equipment. According to Charles Greco, director of financial services at IDC, "AT&T is trying to do in one year what it took IBM 20 years to do."

The leasing of telecommunications equipment, spurred by the deregulation of AT&T's equipment resources, is seen by many in the leasing industry as a potentially explosive new market. Edward Cherney, president of CMI Corp., is working with AT&T to develop distribution channels for used AT&T equipment, and he said that the key to success in that area lies in AT&T's commitment to make used telecommunications equipment a commodity in the same manner that IBM equipment has evolved. Cherney said AT&T has made that commitment through a willingness to provide maintenance of used equipment. AT&T Credit, while focusing initially on telecommunications gear, has made it clear it also intends to function in the computer market.

Finalco's Prager noted that "competition has been a way of life for us," and he expects to see IBM's and AT&T's credit subsidiaries, along with

See EXPANDS page 18

IBM Credit Corp. ascends to top of leasing firm arena

By Peter Bartolik
CW Staff

INDUSTRY SPOTLIGHT

In recent years IBM has taken aggressive steps to eliminate rental and leasing of its equipment. Realizing that many customers still do not want to purchase equipment, however, IBM established a subsidiary to provide that rental option while still recording the equipment on its own books as an outright sale.

From its start three years ago as a five-man operation, IBM Credit Corp. has grown to replace Comdisco, Inc. as the premier leasing company in terms of volume, according to Charles Greco, manager of financial services with market research firm International Data Corp. (IDC) of Framingham, Mass.

IDC estimates that IBM Credit was writing leases in the first half of this year at the rate of $100 million worth each month, and because the second half of the year is traditionally busiest, IBM is estimated to achieve $1.7 billion by the end of the year. "IBM Credit Corp. will win any deal it wants to win," Greco declared.

James Benton, executive director of the Computer Dealers and Lessors Association (CDLA), an industry group composed of more than 220 third-party companies, conceded that IBM Credit Corp. will likely displace Comdisco as the No. 1 lessor by the end of the year, but argued that IBM does not want all of the third-party business. Third-party companies collectively have historically been IBM's biggest customer.

"The reason for IBM Credit's existence is that IBM wanted to get out of the leasing business and needed cash flow. But IBM was not going to give all of that business to the third-party companies," Benton said. With some 2,000 salesmen employed by CDLA members primarily in the business of leasing IBM equipment, he added, "We're an integral part of [IBM's] marketing strategy."

Kenneth N. Pontikes, chairman, president and founder of Comdisco, went as far as to question IBM Credit's viability in the area of financing leases. "If you look at IBM Credit in competition with the third-party industry, can they make the kinds of returns in that business that the rest of their businesses have the opportunity of making? No, they can't," he declared, predicting that IBM Credit will shift away from the financing of leases.

Pontikes and Benton both argued that the third-party industry is growing at twice the annual rate of growth of DP equipment sales; the third-party market is expected to grow as much as 34% this year to between $7 billion and $8 billion. "It's almost as if there is a realization that these [third-party] services are required as well as the additional hardware and the financing. I think that bodes very well for the industry as a whole," Pontikes said.

Jon J. Prager, chairman and chief executive officer of Finalco Group, Inc., readily conceded that the impact of IBM Credit's growth has "substantially limited growth for companies like Finalco over the next couple of years."

But Prager noted that competition has always been fierce in the leasing area and his company has prevailed "while big institutions have come and gone."

Greco believes IBM's subsidiary will attempt to duplicate the growth patterns of the other segments of its parent's business, and he argued that third-party companies must become more flexible in structuring their leases and will have to diversify into other areas such as communications equipment and software leasing.

Indeed, the larger companies appear to be making efforts to enter other market areas. Comdisco is marketing a disaster recovery service and has established a risk arbitrage subsidiary, among others; Finalco, which used to lease only DP equipment, in fiscal year 1984 wrote 53% of its leasing volume in non-DP equipment, including aircraft, telecommunications equipment, computer-aided design and manufacturing equipment and other types.

The leasing companies are also shying away from a dependence on leasing CPUs, a reliance that caused the collapse of Itel Corp., and are instead devoting more resources to peripheral equipment, which has a longer life span and greater residual values. Finalco, for instance, reported that in the fiscal year ended in July, mainframe leases represented only 5% of its total leasing volume.

EXPANDS

from page 17

them of other vendors and financial institutions, competing in many areas with the independent companies.

The growth in the leasing industry is so great and expected to continue over a long term, that one of the greatest concerns facing the industry, according to Forsythe, is "how to finance that growth." He said the industry could grow to $20 billion by 1990, based on current projections, and outside financing is a key to growth of third-party companies that cannot afford to tie up their assets in leases.

The fastest growing source of outside financing has also been the most controversial. There are many types of leases and many labels, but one type that has generated great profits and great problems is that known as tax-advantaged. A simplified explanation of this lease is that the leasing company, in exchange for various tax benefits and a portion of resale values, obtains the financing for equipment from outside investors, and the leasing company administers the lease for those investors.

A key to this type of lease is the tax shelter it provides to the investors, who see practically no profits from the actual lease until after the lease expires and the equipment is resold. It serves to provide users with relatively low-cost equipment; leasing companies can avoid tying up their own cash in leases; and investors gain short-term tax write-offs and long-term profits. Everybody is happy except for the IRS, which is currently on a crusade to halt all tax shelters that it deems are created merely for the purpose of sheltering income.

James F. Benton, executive director of the CDLA, concedes that the IRS does not appear to be singling out the computer leasing industry, but in fact is going after many industries involved in shelters. Nevertheless, he added, the scrutiny of what he calls "essentially plain vanilla wrap leases," along with a negative business journal article last year critiquing Comdisco's financial practices, has served to deter a number of leasing companies from going public.

According to IDC's Greco, the key for the future of the third-party industry, buffeted on one side by IBM and on the other by ever-changing tax laws, lies in its ability to remain flexible and to diversify. "Third-party companies have to continue to look for creativity; they must become more flexible in structuring their leases in order to compete with IBM Credit," he said. The independent companies must also quickly move into new areas where IBM and others have yet to focus, he added.

For smaller companies, the key to long-term growth may not be new markets, but rather identifying existing markets niches that are overlooked or neglected by IBM Credit and the bigger independent firms.

According to Robert Miller, chief executive officer of Minneapolis-based Centron DPL, "nichemanship" is the key to success. Relatively small, with revenues last year of $16.6 million, Centron DPL has focused primarily on leasing IBM front-end controllers, products that have a long product life compared to CPUs.

Robert Irish, vice-president of technical sales with Centron DPL, put the company's relationship with IBM in perspective: "Sometimes you're the good guy and sometimes you're the bad guy; and sometimes you're tolerated."

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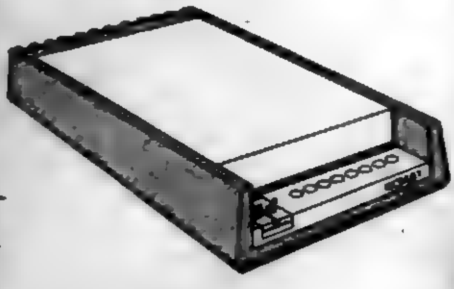

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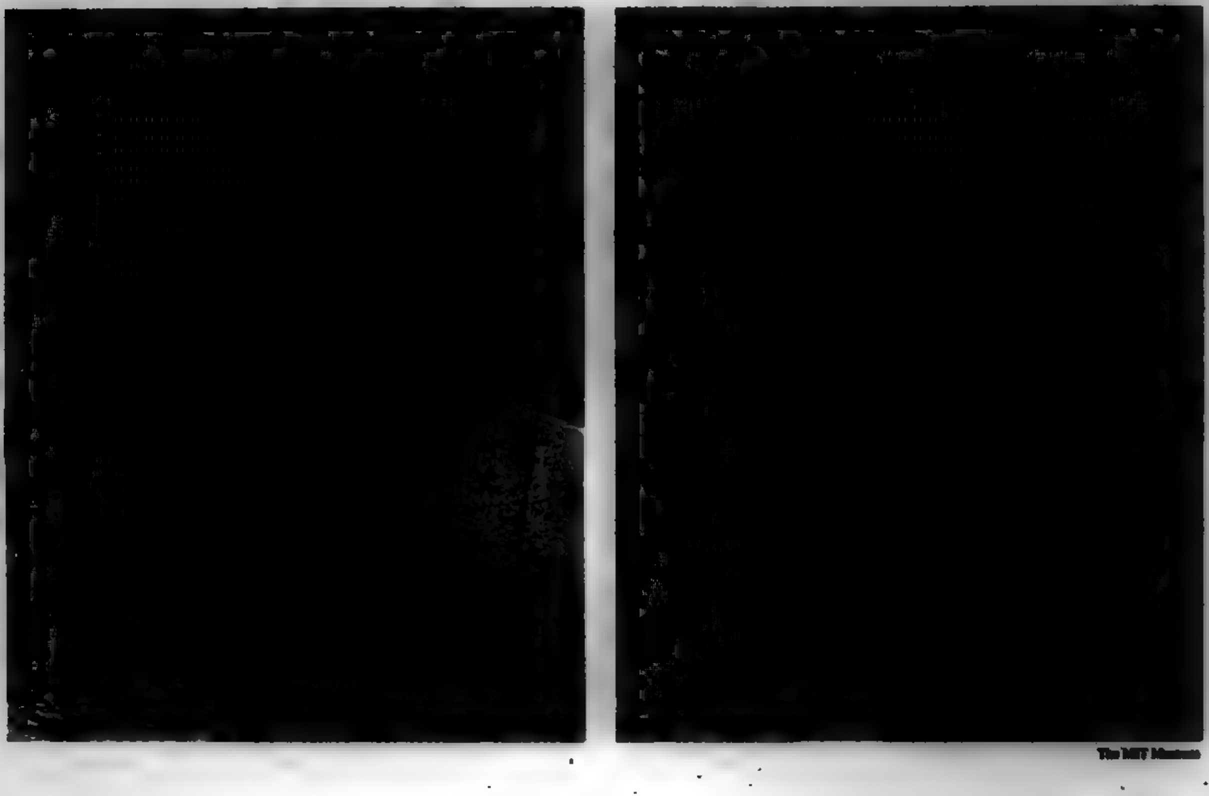

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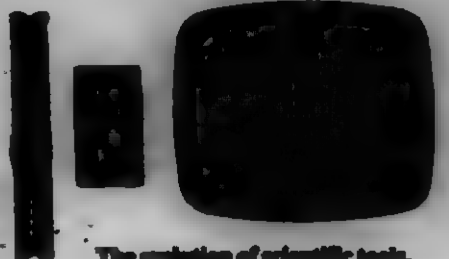

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Second-hand computers make more for lessors

By Peter Bartolik
CW Staff

Not all used computer dealers deal with leases, but all computer lessors deal in some manner with used computers.

The leasing of new equipment and used equipment is inextricably tied to the selling of used equipment. That is so because leases are structured around the expected resale or residual value of equipment when those leases expire.

In all leases other than those structured outright to provide ownership of equipment to a lessee upon termination of the lease, the residual value is probably the key component.

When a leasing company provides a user with a piece of equipment for a three-year period for lease payments that will add up to, say, 60% of the purchase price paid by the leasing company, it does so based on the assumption that it will be able to recover the balance plus a profit from the sale of the used equipment after the lease has terminated.

According to the manager of financial services for Framingham, Mass.-based International Data Corp., Charles Greco, who is involved in determining residual values of IBM equipment, the golden rule in determining those values is: "Be accurate or be conservative." According to Greco, when a leasing company writes a lease based on residual values, accuracy will ensure a profit, conservatism will bring greater profit and inaccuracy on the side of overestimating residual values leads to disaster. The most famous case in point, according to Greco, was the bankruptcy of Itel Corp., which saw its overvalued inventory of IBM 370 mainframes devalued overnight with the introduction of the IBM 4300 line.

INDUSTRY SPOTLIGHT

IDC said it bases its determination of residual values on a model developed through the analysis of historic information. IDC has identified four major life cycle phases through which all computer equipment passes, albeit at various rates of speed:

- The active marketing life starting from first delivery of prod-

See RESIDUAL page 23

LESSOR from page 17

ever greater amounts of equipment, they, like the users, do not want to tie up their assets in equipment inventory. In essence, the lessor, with purchased equipment on his hands, looks around for somebody else to buy the equipment, providing the lessor with additional cash to make more deals.

Historically, the traditional vehicle for the lessor has been the nonrecourse or leveraged lease. In this scenario, the lessor, after arranging a lease, puts up 20% or more of the purchase price and obtains the balance from a financial institution in exchange for assigning lease payments to that institution. The lessor makes a commission from assignment of the lease and retains the tax benefits of ownership. The financial institution provides the money based on the collateral value of the equipment and in the event of nonpayment can repossess the equipment, but it has no recourse to seek repayment from the leasing companies.

The newest wrinkle to leasing, and the most profitable and controversial, is the tax-advantage lease, or wrap lease. In this scenario, the lessor merely arranges a lease for a user; the equipment is then sold for a small portion of its actual value to one or more third-party investors who actually lease the equipment back to the user and arrange for the leasing company to administer the lease. Lease payments generally are assigned by the investors to the leasing company for the first few years of the lease. The investors gain tax shelters in that their investments are generating little or no return in those first few years, and various tax credits can be divided a number of ways.

While extremely profitable for leasing companies, the tax-advantaged lease is under constant scrutiny from the Internal Revenue Service, which terms as abusive — and therefore nondeductible — any shelter that provides an investor with no benefit other than the sheltering of income. Both Comdisco, Inc. and Finalco Group, Inc. suffered financial setbacks when it was revealed that the IRS was investigating their use of such lease instruments; investors were scared off by the possibility that the IRS would turn around and disallow the tax deductions at the heart of the lease. Both were effectively given clean bills of health when those investigations were terminated.

However, according to Jon Prager, chairman and chief executive officer of Finalco, the IRS, both before and since the investigation, has assigned an agent to monitor the company's tax-advantage activities. Prager said such scrutiny "is a way of life."

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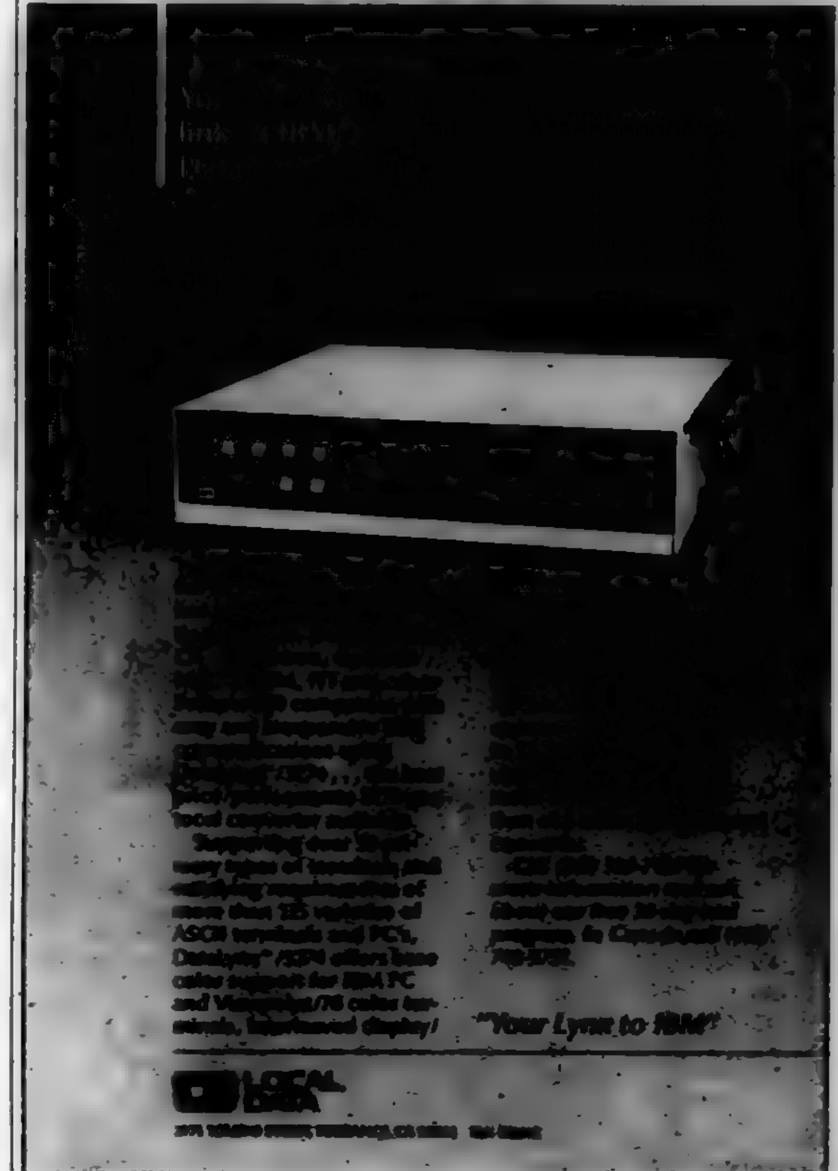

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LOCAL DATA

IBM Credit in the resale arena: Estimating its impact

INDUSTRY SPOTLIGHT

By Peter Bartolik
CW Staff

The biggest question facing participants in the third-party market — including lessors and also dealers of used equipment — is the impact that IBM Credit Corp. will have on the resale market.

IBM Credit is writing leases at a phenomenal rate for a three-year-old company. Beginning with a trickle this year, and exploding in following years, IBM Credit leases will begin to expire, and the equipment currently out on lease will become available for resale and on a lesser scale for re-lease.

The Computer Dealers and Lessors Association (CDLA), a trade association representing more than 200 companies in the industry, recently pondered the question of dealing with IBM Credit in the used market. At its fall meeting in New York last month, the CDLA voted in principle to allow IBM Credit to tap into the CDLA's electronic trading network.

A minority of attendees at the CDLA meeting were in favor of banning IBM Credit participation in the network, arguing, according to those present at the closed meeting, that IBM Credit would contribute little equipment for resale by CDLA members and would instead use the access to gain strategic information about its competitors.

The majority view, however, was expressed by Edward Cherney, president of CMI Corp. of Minnesota, who said, "Either we play ball with [IBM Credit] or they will go and play in their own ballfield." Thomas Martin of New Jersey-based Computer Financial, Inc., added that third-party companies have the choice of working with IBM Credit or watching Big Blue's subsidiary develop an alternate distribution channel for used equipment that will freeze out the independent companies.

Charles Greco, a leasing specialist with Framingham, Mass.-based International Data Corp., takes the view that "IBM Credit is in for a big surprise" when it attempts to remarket used equipment. Greco said IBM Credit will be competing in the used market with established firms, such as Comdisco, Inc., that have been successful for 15 to 20 years and that have established distribution channels. "IBM has never marketed used equipment for anything less than list price to users who didn't know any better," Greco said.

But, Greco acknowledged, should IBM Credit attain success in keeping with its dominant parent, "used prices will collapse." If IBM Credit is able to flood the market with used equipment, supply will drive down prices, and residual values will prove to have been inflated for third-party companies and IBM Credit itself.

Even if IBM Credit were to establish ties with the Comdiscos of the third-party market, Greco said, these independent companies will still push their own equipment first, based on fiduciary responsibility to their own third-party investors and on plain business sense.

RESIDUAL from page 22

uct and ending just prior to announcement of a replacement model.

■ Critical replacement period when shipments are at a peak just prior to replacement model announcement and when residuals may experience the first sharp decline.

■ Late life, when shipments of the replacement model are declining and a new model is expected.

■ Residual life, the final stage when the system has twice been superceded and residuals are low.

Key factors affecting residual values during those cycles, IDC said, are availability of replacement systems, IBM price actions and policies, major price actions that may be paving the way for new product announcements and processor capabilities.

In the past, Greco asserted, appraisers of computer equipment residuals were often way off in their estimates, with equipment devaluing at a more rapid rate than anticipated. The problems have generally been with determining residual values of CPU equipment, which have suffered from rapid introductions of replacement products, he said. On the other hand, Greco said, most appraisers generally have underestimated the residual value of peripheral equipment, which generally has a long life span.

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Preventive measures essential to data security

CW AT DATA TRAINING

By Maura McEnaney
CW Staff

PHILADELPHIA — Sensitizing employees to the importance of data security is essential to preventing computer crime, data education personnel were told recently.

August Bequai, a Washington, D.C.-based attorney specializing in white-collar crime, told attendees of Warren/Weingarten Publications' Data Training Conference & Exposition at the Adam's Mark Hotel here recently that unless companies educate employees about the importance of security, they may be a likely target for abuse.

"You've got to sensitize your people to the fact that you do have a [security] problem," he said. "Teach them the value of security."

Companies should establish a computer security program that suits their needs, but, the attorney warned, "Don't go overboard — [the computer] is not a safe."

Computer crime is in its "formative years" Bequai said. However, there are several steps that managers can take and signals they can look for to help ward off computer crime, the attorney said. Among them, companies should take note of employee unrest in order to tighten up DP security. Employees unhappy about a particular company could turn to the computer for revenge, the lawyer said.

Companies should also make sure that DP equipment is properly controlled and that only authorized persons have access to the system. Firms cognizant of employee alcohol, gambling or drug problems should also be particularly careful of their computer systems, especially if abuse of the system could result in a funds transfer.

But even with this type of protection, "I bet there isn't a company here today that isn't a victim of white-collar crime," he said, adding that many of those companies have probably not detected those crimes.

Many of the companies that have been victimized by computer crime are often hesitant to bring the case to prosecution for fear of possible ridicule, higher insurance rates or alienating creditors, Bequai said.

In addition, law enforcement officials are hesitant to take on cases of computer and white-collar crime.

For law enforcement officials, the cost of following up on a white-collar crime case is almost prohibitive. "The [district attorney's] office has a $2 million budget and to prosecute a white-collar crime; you can easily expend about a half a million dollars," he said. There are also no federal and only a handful of state statutes that deal with computer crime.

One of the problems associated with computer crime is that "it is difficult to distinguish crime from noncrime," especially in the case of hackers.

OAC '85 scheduled

ATLANTA — The 1985 Office Automation Conference (OAC '85) will be held Feb. 4-6 at the Georgia World Congress Center here.

Sponsored by the American Federation of Information Processing Societies, Inc. (Afips), OAC '85 will offer more than 45 sessions on topics such as organizational impacts, office workstations, ergonomics of the workplace, communications, technologies and issues and productivity.

The registration fee is $125 in advance, $150 on-site. The one-day registration fee is $50.

More information is available from Afips, 1899 Preston White Drive, Reston, Va. 22091.

SCIENCE/SCOPE

Radar and sonar video signals can now be displayed without fading, thanks to a newly developed video image processor. The device converts analog images into digital format so those images can be stored and displayed continuously on a standard television monitor. In addition, images can be shown on remote monitors and be recorded on videotape. The Hughes Aircraft Company processor, using digital storage, offers greater versatility and a wider range of information than analog circuitry. Digital storage allows considerably more flexibility in retaining and updating tight images than previously available using analog circuitry. The processed digital image resembles a conventional TV picture and can be seen in ambient light, eliminating the need for a darkened room.

Weather satellites help airlines save $700 million in fuel bills, thanks to timely pictures and other data. Meteorologists who plan trips for airlines use satellite information to find efficient travel routes. For example, normally the route between Los Angeles and Hawaii is about 2,300 miles. In case of a headwind, the airline will select an alternate route. Even though the new route may be 2,500 miles long, better flying conditions could save the airline $1,500 in fuel. The latest three spacecraft in the Geostationary Operational Environmental Satellite (GOES) system were built by Hughes. The sensing devices, which provide the daytime and nighttime pictures shown on TV and printed in newspapers, were built by a Hughes subsidiary, the Santa Barbara Research Center.

Thermoelectric cooling has made a hand-held infrared viewer more convenient and more economical. The Hughes Probeye™ infrared viewer, originally equipped with argon gas cooling, now comes in an all-electric model. The new version weighs 1.2 pounds less and makes sustained use easier and less tiring. The Probeye viewer sees heat the way a camera sees light, converting it instantly into an image seen through an eyepiece. The viewer is used to spot heat maintenance problems and energy losses in industrial and commercial applications.

The first attempt to sample the atmosphere of an outer planet, NASA's Project Galileo will journey 750 million miles to Jupiter this decade. The mission will consist of two spacecraft, an orbiter and a Hughes-built probe. Six instruments inside the probe's descent module will assess the structure and composition of the atmosphere, determine the location and structure of clouds, calibrate a precise ratio of hydrogen and helium, and measure lightning, radio emission, and energy absorption. The probe will transmit data to the orbiter for relay to Earth. Project Galileo will be the first interplanetary vehicle launched from the space shuttle. The launch is set for May 1986 and arrival for August 1988. Four Hughes-built probes explored the atmosphere of Venus in 1978.

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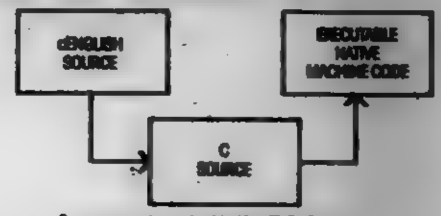

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SAMPLE cENGLISH PROGRAM

```
IDENTIFICATIONS
  MODULE:  Mininame
  AUTHOR:  bcs
  DATE:    8/29/84
  REMARKS: Sample cENGLISH program that adds first
           names to a file
END IDENTIFICATIONS


GLOBALS
  FIXED LENGTH 1 ans
  FIXED LENGTH 15 Fname
END GLOBALS


MAIN PROGRAM

  BEGIN
    CLEAR SCREEN
    SET ECHO OFF

    USE "NAMES"
    VIEW BY "ID...FNAME" ASCENDING

    AT 23,1 SAY "Add a record? Y or N"
    AT 23,28 ENTER ans USING "!"

    WHILE ans EQ "Y"
      CLEAR GETS
      AT 6,1 SAY "Enter first name"
      AT 6,20 GET Fname
      READ SCREEN

      INSERT
        Fname := Fname
      END INSERT

      AT 12,10 SAY "Welcome to cENGLISH," & Fname
      WAIT
      AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
      STORE "                    " TO Fname
      STORE "  " TO ans
      AT 23,1 SAY "Add another record? Y or N"
      AT 23,30 ENTER ans USING "!"
      CLEAR ROW 1 THRU 23

    END WHILE

    AT 12,10 SAY "That's all for now!"
    UNUSE "NAMES"
    SET ECHO ON

END PROGRAM
```

I'd like to know more about cENGLISH. Please send further information.

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Company ____________________ Telephone ____________
Address ________________________________
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Speaker gives tips on buying, installing local nets

CW AT POAC

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Organizations looking to install a local-area network should steer clear of vendors likely to fall victim to the forthcoming shakeout and should recognize that network vendors generally provide no support after the sale, according to Connie Zuckerman, a senior consultant with Arthur Andersen & Co. here.

In a comprehensive presentation at the recent Federal Office Automation Conference here, Zuckerman provided attendees with tips on selecting and installing local-area networks based on her experience in OA projects.

She asserted that OA managers frequently underestimate the amount of time and effort required to implement a local-area network. A successful project, she said, will require a careful OA systems development methodology that includes planning, design, installation and systems management phases.

Zuckerman made the following suggestions for avoiding pitfalls in each stage:

- In the planning phase, create a steering committee with members from the data processing, communications, office automation and user staffs. Determine user requirements for applications software, security and outside data bases, as well as the technical requirements and size of the system.
- Do not let the technology — or the vendor's sales pitch — drive the decisions; make decisions based on user requirements.
- Evaluate the vendors, keeping in mind the coming shakeout.
- Design, install and test a prototype network, especially for large networks.
- Do not neglect systems administration once the network is installed. It is a time-consuming job that requires assigning responsibility for network planning and security; providing user-friendly documentation; establishing procedures, such as for backup and recovery; and user training.

Another speaker, Walter H. Mackie of the U.S. Navy, agreed, saying the network vendors are motivated only to make more sales, not to provide user support.

Mackie, who is deputy director of the Navy Secretariat's office automation and communications system, described his efforts to develop a local-area network to serve the Navy and Marine Corps headquarters commands in the Washington, D.C., area. A multivendor pilot version of the network is expected to be implemented in fiscal years 1985 and 1986, he said.

Zuckerman CW Photo by M. Betts

In addition, Mackie said his office has developed a Document Interchange Format (DIF) standard to permit the exchange of text between systems supplied by different vendors.

He described the DIF as a "software filter programmed by each vendor to allow conversion to and from the agreed-upon standard."

Datapoint Corp., Wang Laboratories, Inc. and Xerox Corp. were recently validated as complying with the DIF, Mackie said.

ICCA lists firms on-line

ST. LOUIS — The Independent Computer Consultant's Association (ICCA) has put the national directory of its 1,500 member firms on-line with the Compuserv Corp. videotex service.

The action will permit Compuserv users to seek out ICCA consultants on the basis of the consultant's specialization, location, personal or company name or other criteria.

ICCA members are all full-time consultants, the association said, adding that 60% of the membership specializes in commercial consulting and 40% specializes in scientific consulting.

More information is available from ICCA through Box 27412, St. Louis, Mo. 63141.

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Electronic mail, EFT demand tighter security controls

CW AT FOAC

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Security experts told attendees at the recent Federal Office Automation Conference (Foac) here that the emergence of electronic mail, local-area networks and electronic funds transfer (EFT) have all heightened the need for hardware and software security controls.

"A lot of corporations would like to use electronic mail . . . but they're afraid to. They are concerned about who has access to it, so they are willing to use electronic mail for routine matters, but not for sensitive matters," observed Stephen T. Walker, president of Trusted Information Systems, Inc. of Glenwood, Md.

Walker, a former Department of Defense official, urged OA managers to establish classifications for the sensitivity of business information much as the military does, and then obtain computer operating systems that control each person's access to each category of data.

He pointed out that the Department of Defense Computer Security Center at the National Security Agency in Fort Meade, Md., has an evaluation and rating system for security software products [CW, Sept. 17].

These trusted computer systems should be part of an overall program that includes physical, procedural and personnel security, he stressed.

Another important security area is the encryption of data communications, Walker said, noting that the U.S. Department of the Treasury recently established a new policy to assure the integrity of the department's EFT data.

Walker

Treasury Secretary Donald T. Regan, in an Aug. 16 directive, said that by June 1988 all Treasury Department EFT transactions must be authenticated, conforming to the Ansi Standard X9.9 for Financial Institution Message Authentication and the National Bureau of Standards (NBS) Data Encryption Standard. Dennis Branstad, manager of computer integrity and security technology at the NBS, said that this requires the EFT message to be sealed so that any replacement, reordering, deletion or repetition of the message or characters can be detected.

Dennis Steinauer, a computer scientist at NBS, discussed the security implications of the proliferation of desktop personal computers, each one equipped with user-friendly features that make security difficult.

Steinauer emphasized that personal computers typically lack the built-in security features that mainframe computers have, such as multiple processor states, privileged instructions and memory protection. "Without such hardware features, it is virtually impossible to prevent users from accessing or modifying parts of the operating system. Therefore, users can circumvent any software controls," he said.

Steinauer said there are products on the market that can mitigate security concerns about personal computers. He noted that next year NBS will issue federal guidelines for the security of small computer systems, and it is working on standards for password usage, data integrity and local-area network security.

Choice of micro vs. workstation

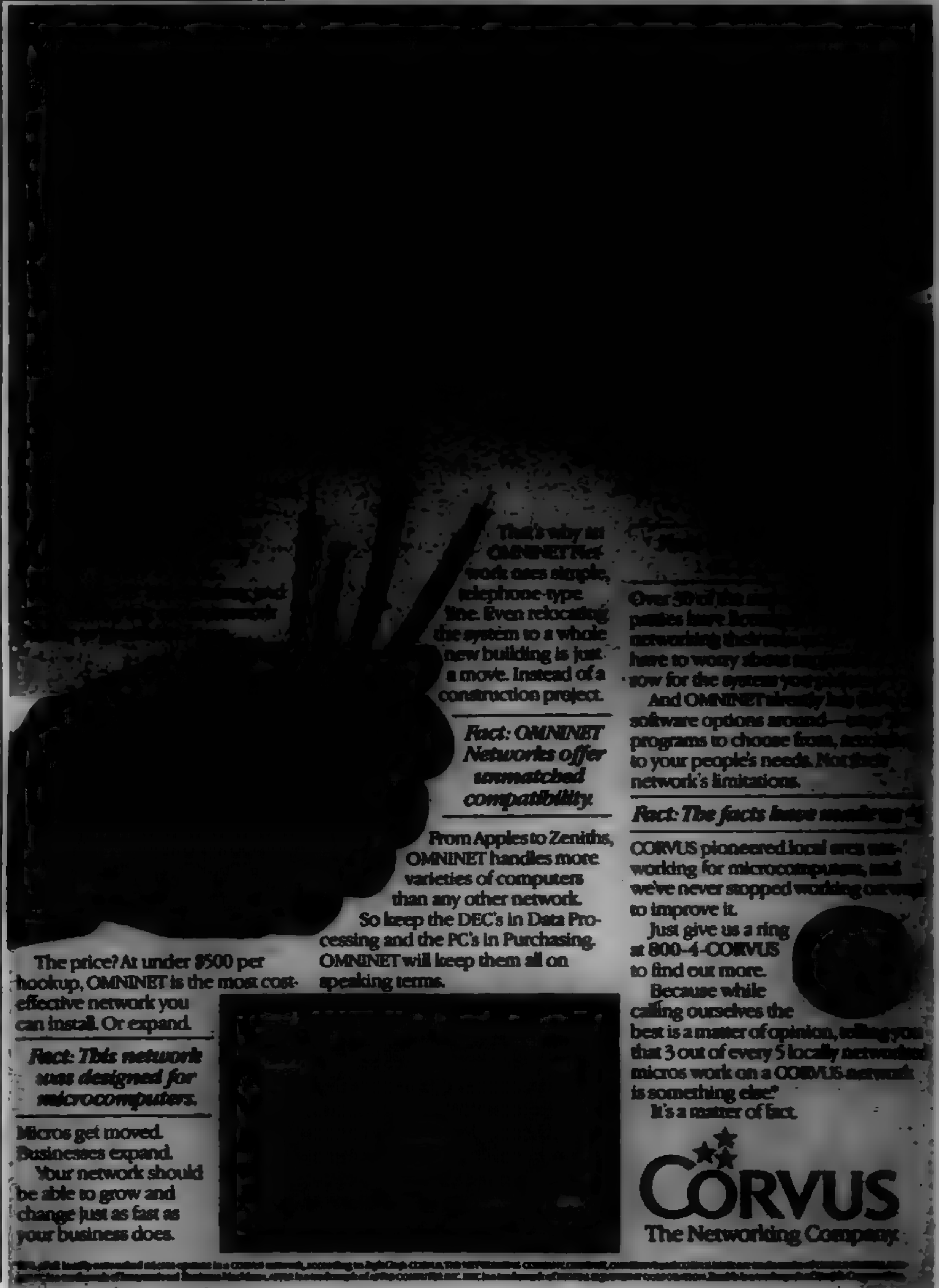
By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The office automation market has evolved to the point where personal computers and advanced workstations can both find niches in large organizations, according to speakers at the recent Federal Office Automation Conference here.

Deborah L. Fain, vice-president of Samna Corp., an Atlanta-based vendor of office software for microcomputers, stressed that a personal computer is a flexible, generic product, while a workstation is designed to be part of a total system aimed at a specific type of user.

Evaluating both forms of end-user computing, Fain said that the flexibility of the personal computer's open architecture makes it a more versatile tool than the workstation.

The personal computer's open architecture encourages the use of innovative software and peripherals. "The advanced workstation integrates all the hardware and software that the job function demands" in a closed architecture that does not easily accept enhancements, she said.



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NEWS

INTERNATIONAL REPORT

CW International News Network

JAPAN

TOKYO — Japan's Big Six computer makers have reported glowing financial results for fiscal year 1984. Leading the pack was Mitsubishi Electric Corp., which showed a 53% growth in computer-related sales from the same period in 1983. All six companies increased office automation sales in Japan as well as computer sales abroad. Fujitsu Ltd. has grown 28%; NEC Corp. has increased 28%; sales at Hitachi, Ltd. are up 25%; Toshiba Corp. is up 25%; and Oki Electric Industry Co. showed an increase of 20%.

■

TOKYO — The recent Fifth-Generation Computer System International Conference here focused on the programming language Prolog, along with the development of a parallel processing machine, artificial intelligence and future international cooperation. Progress on Japan's own fifth-generation project at the Institute for New Generation Computer Technology (Icot) was discussed. The Icot AI machine is said to feature a conversation function and an inference function.

■

TOKYO — Fujitsu, Ltd. has introduced a net environment called Fujitsu Network Architecture 4 (FNA4) that is said to provide integrated information systems with the following five communications capabilities: wide-area networking, large-scale networking, access to corporate information net systems, local-area networking and standardization. FNA4 can support satellite communications, videotex communications, digital transmission services and facsimile services. The net is reportedly capable of supporting up to 10,000 terminals.

KOREA

ICHON — Hyundai Semiconductor and Western Design Center, Inc. (WDC) have entered a technology exchange agreement involving WDC's 8- and 16-bit Cmos versions of the 6502 microprocessor. Under the terms of the agreement, Hyundai will manufacture and market the WDC devices here and also in its new Santa Clara, Calif. facility.

THE NETHERLANDS

AMSTERDAM — The European market for professional micros will see a tenfold growth in a six-year period, according to a recent report from International Data Corp. here. The study also revealed that the relative market shares of 8- and 16-bit systems will be reversed by 1989. The Netherlands had an installed micro base totaling 18,500 in 1983 and an average annual growth rate of 54%, which will result in an installed base of 250,000 by 1989. It is estimated that the nearby Belgian market will grow annually by 47%.

■

AMSTERDAM — The Dutch group Philips Information Systems, Inc. and the German group Siemens AG will cooperate in the joint research and development of high-density memory chips. The vendors' five-year project will focus on the production of 1M- and 4M-bit memory chips at facilities in Nijmegen, Netherlands, and in Hamburg, West Germany. Both companies are expected to invest roughly $150 million, with additional funding coming from the two countries' governments.

■

THE HAGUE — Deregulation of the Dutch telecommunications industry has become a hot topic here, sources said. An investigative committee contacted the research group McKinsey, Inc. to complete a future-status report before mid-1985. The Postal Telephone and Telegraph (PTT) agency will retain its monopoly on telecommunications, telex and data infrastructures, but will lose control of peripheral equipment.

Furthermore, the financial relationship between the PTT and the government will be loosened. The future structure of communications here will be built around three entities: a public entity, an entrepreneurial entity and the ruling entity modeled after Oftel in the UK.

CALENDAR

WEEK OF NOV. 25

NOVEMBER 26-27, INDIANAPOLIS — **Expanding Lotus 1-2-3 Applications.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

NOVEMBER 26-28, CHICAGO — **Cellular Communications '84: The Industry Conference.** Contact: Online Conferences, Inc., Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

NOVEMBER 26-28, SAN FRANCISCO — **Computer Graphics for Business.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 26-28, PINE MOUNTAIN, GA. — **Data Communications: Bringing You Up To Date.** Contact: Institute for Communications and Information Management, P.O. Box 8, Pine Mountain, Ga. 31822.

NOVEMBER 26-28, WASHINGTON, D.C — **Integrating Microcomputers into Corporate Environments.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

NOVEMBER 26-28, TEANECK, N.J. — **Project Management Control.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 26-29, COLUMBIA, MD. — **Data Base Machines: In-Depth.** Contact: Continuing Education Institute, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

NOVEMBER 26-29, LOS ANGELES — **Data Communications: Components, Systems and Networks.** Contact: Institute for Advanced Technology, 65 W. 55th St., New York, N.Y. 10019.

NOVEMBER 26-29, COLUMBUS, OHIO — **DOS/VSE with Explore/XP.** Contact: Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

NOVEMBER 26-30, BOSTON — **Systems Analysis.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

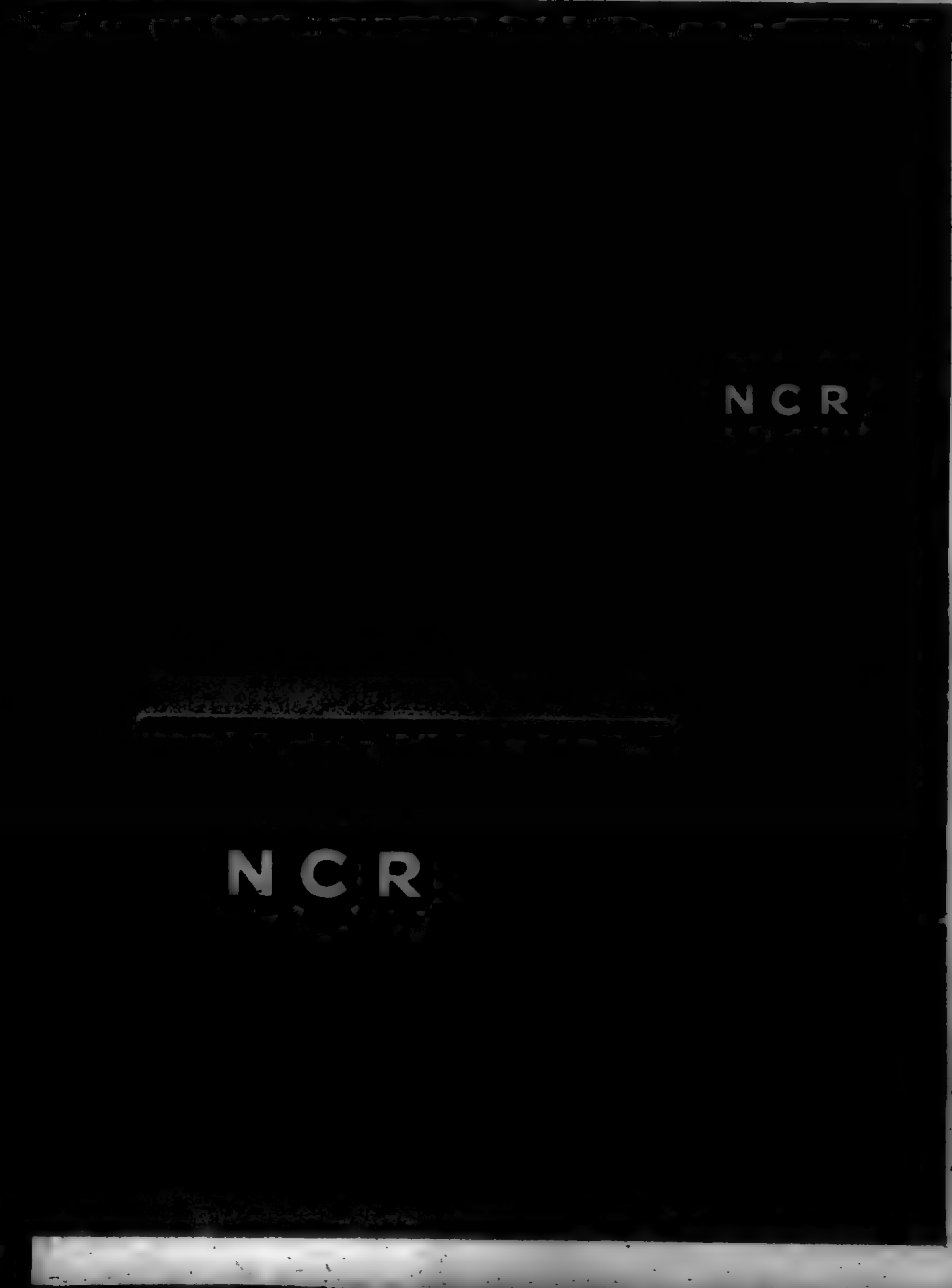
NOVEMBER 26-30, NEW YORK — **IMS Data Base Design.** Contact: Sysed, Inc., 25 W. 35th St., New York, N.Y. 10001.

NOVEMBER 27-28, TAMPA, FLA. — **Realistic Applications of Personal Computers in Business.** Contact: Lucy Bell Burton, Peat, Marwick, Mitchell & Co., 810 Seventh Ave., New York, N.Y. 10019.

NOVEMBER 27-28, CHICAGO — **IBM vs. AT&T: Round One.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

NOVEMBER 27-29, FT. LAUDERDALE, FLA. — **Telephone Systems: Their Selection, Operation and Management.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

NOVEMBER 27-29, CAMBRIDGE, MASS. — **The 1984 Hammer Information Systems Conference.** Contact: Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.



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EDITORIAL

Comdex: pacing micro evolution

Perhaps the only part of the computer business that has evolved faster than the business itself over the past few years is the annual fall Computer Dealers Exposition, also known as Comdex. This harvest home of the microcomputer season started last Wednesday and ended just yesterday, and show sponsors were expecting some 100,000 attendees to converge on the miles of aisles lined with some 7,000 (yes, seven thousand) display booths.

Comdex has come to serve as a compass from which readings of the direction of the microcomputer business can be accurately taken. True to this form, the show's beginnings six years ago were marked by negligible interest on the part of serious business users, as the micro was more a toy of the hobbyist than anything else. Last week, the eyes of corporate DP management were focused on the networking achievements that vendors brought to Las Vegas, as managers continue to grapple with the increasingly complicated issues of integrating into mainframe environments the millions of micros now installed in major companies everywhere.

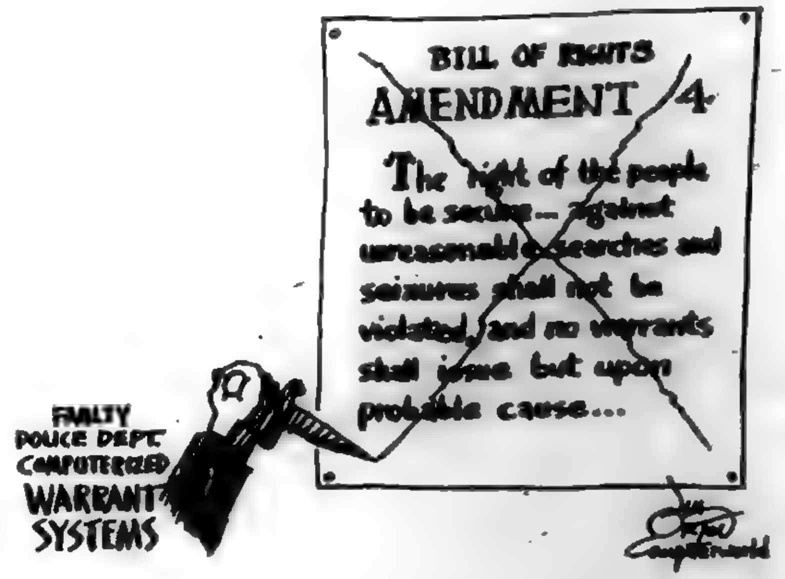
Comdex has also borne out the cyclical nature of the micro business, where a rash of hardware announcements one year has been followed by an onslaught of software operating system and application software debuts, which, in turn, are followed by the next generation of hardware. For example, in 1982, Comdex was predominantly a hardware extravaganza, where dozens of vendors dragged their IBM Personal Computer look-alikes out of the laboratories and onto the show floor.

In 1983, software to run on the Personal Computer and compatibles highlighted the show, while IBM and others were preparing the next round of more powerful 16- and 32-bit micros, with IBM continuing to pull the micro business in its wake. In fact, according to one report, there were approximately 10,000 IBM Personal Computers on the Comdex floor last year, demonstrating the pride of the software vendors.

In 1984, Comdex featured not only the much more sophisticated integrated packages supported by these high-powered machines, but also the communications software that micro managers are demanding. The hardware featured at the show was not computers, but elegant laser printers, which today can be had for under $6,000, compared with $30,000-plus just a couple years ago.

And now, of course, the traditional mainframe software and hardware vendors are the ones that stand out in the Comdex crowd, as the show has taken on more the appearance of the National Computer Conference than a dealers' confab. For those attending the show, this proves more a nightmare than a blessing.

Finally, it is worthy of mention that, despite an actively ongoing shakeout in the microcomputer business, more vendors (1,400) than ever were exhibiting at Comdex.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Computerworld

LETTER

Avoiding memory loss in 4381 upgrade

The article, "IBM DOS/VSE users lose memory in 4381 conversion" [CW, Oct. 29] failed to mention methods for resolution of the problem. Converting E mode VSE to 370 mode is the least desirable aspect of installing a 4381 computer (due to the memory loss) and is probably the most difficult approach.

The easiest solution is to install the VM/SP that will support the VSE E mode processing on the 4381. While additional cost and processing overhead is incurred, the simplicity of a straight hardware installation is possible, without major concern given to extensive operating system conversion and testing. In addition, for the users that are under severe virtual storage constraints, the VM/SP offers another avenue for memory expansion without converting to an operating system with extended addressing capability or waiting for the new VSE/SP release that supports the Extended Architecture.

I suspect, however, the whole idea of the article was not to warn future 4381 users of virtual storage loss as much as it was intended to take a shot at IBM and their marketing practices. I would be the last person to say that IBM support offers complete satisfaction, but for the user who knows how to ask the appropriate questions, timely guidance and advice can be obtained. The key to asking the right questions is full and complete information from a variety of sources.

David J. Ballard
Jackson, Mich.

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VIEWPOINT

Software escrow not a guarantee for protection

READER'S PLATFORM
L.J. Kutten

The article "Firm utilizes software escrow for access control" [CW, Oct. 29] gives the unwarranted impression that software escrow can be a panacea that will protect a software developer's proprietary information while at the same time guaranteeing "access by interested parties in case of product discontinuance, bankruptcy, theft and copyright and trade secret infringement."

Based on my research, this just is not always true. As an analysis of each issue could easily take 70 pages, I will explain the ramifications of a software developer's bankruptcy on a software escrow agreement.

For the purpose of further discussion, the three following assumptions are required:

- The software developer (the escrower) has filed for bankruptcy, either voluntary or involuntary, or for corporate reorganization.
- A bankruptcy trustee has been appointed, and the escrow agreement calls for delivery.
- The agreement calls for delivery of the escrowed material upon the escrower's filing for bankruptcy.

Unless the escrow company has been formally authorized to take charge of the debtor's property for the general benefit of the debtor's creditors (usually by contract or court order), it is deemed a noncustodian of the debtor's property. Typical noncustodians include bailees, pledgees, a co-owner and an escrow holder.

As long as the debtor retains any title to the property at the time of the bankruptcy filing, the property belongs to the debtor's estate. This property includes all property in which the debtor has any legal or equitable interest, including any interests in copyrights, patent rights, trademarks and trade secrets.

Accordingly, the bankruptcy trustee can require a noncustodian to turn over to it all property of the estate, including any software held in escrow.

If the escrow company is a custodian and has knowledge of the bankruptcy, then under 11 U.S.C. 543, it must take appropriate steps to preserve and protect the property (for example, refuse to turn it over to the software consumer), and it must turn the property over to the trustee.

> *So long as the debtor retains any title to the property at the time of the filing, the property belongs to the debtor's estate. This property includes any interests in copyrights, patent rights, trademarks and trade secrets. Accordingly, the bankruptcy trustee can require a noncustodian to turn over to it all property of the estate, including any software held in escrow.*

The fact that the escrow beneficiary has a contract with the debtor/escrower is unimportant. Under 11 U.S.C. 365 (a), a bankruptcy trustee may assume or reject an executory contract (that is, a contract in which both sides have a future obligation).

For example, Select-A-Seat Corp. developed and marketed a software package that allowed for remote sales of athletic and entertainment tickets (625 F2d 290, 9th Cir. 1980). In November 1975, Select-A-Seat sold exclusive rights to Fenix to use and license others to use Select-A-Seat's software. This right was contingent upon Fenix paying Select-A-Seat $140,000 plus a promise to pay 5% of the income generated for 10 years. In addition, Select-A-Seat promised not to provide the program to any other party.

On Dec. 3, 1976, Select-A-Seat filed for bankruptcy. On May 19, 1977, the trustee rejected the licensing agreement as executory. Fenix appealed, claiming it was not executory because it had paid and received an exclusive license to the program. The appeals court reject this and said the contract was executory because Fenix had a continuing duty to pay a royality, and Select-A-Seat had a duty not to license others to use the program.

As a result, the trustee was allowed to sell and/or license the program to others. As a general rule, if the software is usually updated, and the updating is required by contract, that contract is executory. If it is executory, the software license agreement can be rejected. If it is rejected, the license cannot protect the nondelivery of the escrowed material.

Trustee may sell debtor's assets to third party

The trustee can also sell the assets of the debtor to a third party, notwithstanding any provision in the original escrow agreement or licensee agreement to the contrary.

The only caveat is that where the debtor only holds legal title to the property and it is being held for the benefit of another, the trustee may not sell the property if the sale will be detrimental to the beneficial owner [see 11 U.S.C. 541(b)].

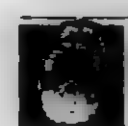
It should be noted that bankruptcy law 11 U.S.C. 541(c) specifically prohibits any contract language that purports to transfer the property of the debtor to any other party that is "conditioned on the insolvency or financial conditions of the debtor . . . or on taking possession [of the assets] by a trustee."

Finally, an escrow beneficiary cannot immediately sue the escrow service or the supplier in a local court to compel delivery of the source code and documentation.

The bankruptcy court has exclusive jurisdiction over all property of the debtor and all issues and cases that affect or concern the property of the debtor. If the user wants to sue, he must do so in a bankruptcy court. ‡

Kutten is a computer law consultant and a member of the Illinois and Missouri Bars. He is the author of the Computer Buyer's Protection Guide.

DP center must gird for challenge of OA implementation



HUMAN CONNECTION
Jack Stone

Automating the office has become a mighty challenge for the best of today's technical minds. The issue of dealing with the convergence of word processing and data processing technologies, which have dominated the industry for so long, has been compounded by the necessary consideration of multiple technologies that have either reached a reasonable level of maturation or will do so soon.

These days, it does not make sense to initiate office automation planning without taking into account the many cost-beneficial alternatives (and the following list is not intended to be all-inclusive):

- Electronic mail systems configured with facsimile devices and optical character scanners to transmit combined typewritten and handwritten text plus graphics material.
- Devices of various levels of intelligence for remote access to office-level computer facilities, including notebook computers and cellular radiotelephones.
- Powerful personal computers with integrated applications software and a broad range of communications add-ons.
- Combined voice, data and video workstations and switching devices for a variety of applications within local-area networks.

Rapid-fire OA developments

In spite of these rapid-fire developments, many leaders of large organizations do not appreciate that, nowadays, the complexities of systems planning for office automation projects are approaching those of large-scale mainframe projects. This should not come as a great surprise because of the growing processing power of office systems.

Therefore, to do the OA planning job right, the organization requires much the same kind of talent that is found in the DP center systems analysis department. And that's where the executives figure they will go to pry loose the OA analysis capability. If your DP center has not yet felt the pressure to divert preciously guarded systems people to OA, then take heed — they soon will.

Not surprisingly, OA analysts have difficult tasks ahead because, as is the case for mainframe systems analysts, their attention is directed as much to management, personnel and organizational matters as to issues dealing with the technology. The first need in this situation is to identify realignments in the current flow of information processing to take full advantage of the new OA connection. This effort is, of course, well established in the mainframe systems planning cycle. Such changes may require as little as a few minor modifications in existing manual procedures or as much as a divisional reorganization.

But as we have all come to learn, mostly the hard way, getting office users to change the ways they have done business, however slightly, is not accomplished overnight and may take years, particularly when manual procedures have been operative for decades.

To implement such changes, OA analysts must be unusually gifted in dealing with people. They should be able to relate easily to office users during the entire systems development process and be available to offer assistance to make users' jobs easier and their time more productive. OA analysts ought to be capable of convincing managers and supervisors of the value of an OA project by relating the prospective implementation of new technologies to one of the following:

- Improvements in operations.
- Decreases in operating expenses.
- Expansions in services to customers or constituencies.

Finally, the OA analyst should be experienced in training and possessed of the patience and sensitivity necessary to deal with non-DP-oriented professionals in an effective way during OA implementation. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User ____________

Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor ____________

2. **OCCUPATION/FUNCTION (Circle One)**
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31 Manager/Supervisor Programming
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35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
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Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

SOFTWARE & SERVICES

Hobbyist makes program development look easy

By Paul Gillin
CW Staff

TULSA, Okla. — At Clyde Petroleum, Inc. here, petroleum engineer Jack Coursey is bringing new meaning to the words "end-user computing." Coursey, a longtime computer hobbyist with no formal DP training, has replaced a data base application originally written on an IBM System/34 with a similar one he developed on an IBM Personal Computer XT using a high-level programming language and data base management system.

Coursey's application is a storage and retrieval program for production data for oil and gas wells. The data base encompasses information about oil, gas and water production data, test data, lease background information and information about division of interests. It will eventually encompass about 700 wells. Coursey used Information Builders, Inc.'s PC/Focus to build the data base.

The application uses three data bases that can be dynamically linked for reporting, Coursey said. The data bases include lease data, production and test data associated with leases and an inventory data base of field equipment. "If I want the total history of a well sorted by county, for example, I have to pull more than one data base to do it," he said. "I've got well over 200 leases on the data base right now."

To handle the size of the data base, Coursey added a Tallgrass Technologies Corp. 45M-byte hard disk to the Personal Computer XT. The engineer relied largely on past experiences and common sense to design the application. "You basically draw a flow chart of how you want to look at data, and that's how you want to store it," he said.

To test for accuracy, Coursey wrote programs on PC/Focus that generated reports similar to those already employed on

With no experience in formal development, Coursey basically used the prototyping capabilities of PC/Focus to make changes.

See FOCUS page 38

SOFTLINE
T. Capers Jones III

Productivity gauge changing

Since 1981, a new kind of software productivity benchmark called "function points" has started to replace "lines of source code" as a standard measure for software productivity. The reasons for this, and what is likely to result from the switch, are turning out to be very significant.

From the time that software production began more than 30 years ago, measuring the productivity of software projects has been a major problem. During the early years of professional programming, measurements based on lines of

See MEASURE page 36

Jones is a consultant for Nolan, Norton & Co. in Lexington, Mass., and the author of two books and more than 30 articles and reports on software quality and productivity. He is a regular contributor to Softline.

■ Computer Associates International, Inc. has announced Release 2.1 of the CA-Universe relational data base management system/34

INSIDE

Systems Software/34

Micro Tempus revamps micro-mainframe link

MONTREAL — Micro Tempus, Inc. has announced what the company labeled a totally redesigned version of its Tempus-Link microcomputer-to-mainframe link that features improved performance and additional functions.

According to a spokesman, Version 3.1 of Tempus-Link offers performance capabilities that include more efficient use of terminal buffers, shorter path lengths between modules and improved translation and compression algorithms. The performance features are said to increase mainframe capacity and capability. Tempus-Link supports a variety of mainframe operating environments, including IBM's CICS, TSO and CMS and the entire line of IBM and IBM-compatible micros.

The spokesman said other additions to Tempus-Link include a translation table, a conversational tutorial and full screen presentation and windowing capabilities that make the link easier for end users to operate. Version 3.1 also comes with the Tempus-Link Application Program Interface (API) and Host Application Program Interface (Hapi).

Permit integration of environments

The two interfaces permit integration of the micro and mainframe environments. They allow the user, for example, to write micro programs that call mainframe applications as subroutines, which are then reportedly transferred to the micro program transparently to the user.

The spokesman said Version 3.1 also allows users to configure programs according to a variety of options. Beginners are guided through a series of tutorial menu choices when they access the system, and experienced users can move more quickly through Tempus-Link by bypassing familiar options, the spokesman said. An additional enhancement to the system, which the spokesman described as a statistics capability, enables users to generate information about the transmission of data, including speed and efficiency of data transfer, number of errors and other information.

Version 3.1 of Tempus-Link is priced incrementally on the basis of maximum concurrent users. A basic five-user version is priced at $6,175. A 100-user version costs $39,000. The next increment of 100 users is priced at $11,700. Users of the complete Tempus-Link 2.0 product, including Hapi and API, can upgrade to Tempus-Link 3.1 at no charge. Other Tempus-Link users can upgrade to Version 3.1 for a 30% charge as long as their minimum configuration is five users.

Micro Tempus is located at Suite 300, 440 Dorchester Blvd. W., Montreal, Quebec, Canada H2Z 1V7.

AT&T compiles Unix definitions for software developers

NEW YORK — AT&T Information Systems has announced that it will publish a definition document for its Unix System V. The document is intended to serve as a guide for software developers who want to write applications that are portable across the various System V implementations.

The "System V Interface Definition" will define a minimum set of system calls and library routines that should be common to all operating systems based on Unix System V. The initial document will be released in January at a nominal charge, according to an AT&T spokesman. It will be followed by further papers defining optional extensions to the basic definition.

The communications giant also said it will offer a service to help system developers conform to the System V Interface Definition. The service will be made available to System V licensees during 1985. It will test implementation of Unix System V for conformance to the definition.

Boosting a solid commitment

"It is letting the entire computer community know that [AT&T is] solidly committing [itself] to a standardized System V Unix," said Harry Layton, software systems product verification manager for AT&T Technologies.

Unix observers and software developers said the announcement should not be taken as a significant statement about Unix. "I think it's a nonevent," said David Fiedler, editor of "Unique," a Unix newsletter. "I don't think it's anything new because it's stuff that's been available all along."

However, Fiedler said the specifications should provide some reassurance to developers. "Before, they could just copy the system calls. This gives them an added reassurance that what AT&T says is going to be the actual interface."

Jeff Stives, marketing communications manager at Plexus Computer, Inc. said the usefulness of the standard will depend upon AT&T's commitment to adherence. "For the moment, issuing a spec and adhering to it are two different things," he said. But he added, "Each time AT&T ups the ante on Unix, it benefits our market."

CA-Universe upgrade released

JERICHO, N.Y. — Locking algorithms, IBM Vsam transparency and support in IBM's VM/CMS for multiple minidisks are among the enhancements included in Computer Associates International, Inc.'s Release 2.1 of CA-Universe relational data base management system.

According to the company, users of IBM's DOS/VSE do not have to modify programs using Vsam files while CA-Universe's transparency feature is being used.

All security and recovery systems, such as IBM CICS journaling and CICS automatic transaction backout, reportedly continue to run while the system's transparency capabilities are utilized. In addition, the release is said to require no modification to CICS or C... functions.

Supports multiple disks

The enhanced release is said to support multiple minidisks within VM/CMS or the CA-Universe data base. A multiextent data set has been implemented so that one data base table can now span multiple minidisks, the company said.

CA-Universe is priced at $140,000 for IBM's OS/VS, MVS and VM/CMS operating systems. The product costs $110,000 for the DOS/VSE environment.

Computer Associates International is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

SYSTEMS SOFTWARE

CALIFORNIA SOFTWARE, INC.
Netman 3.0

California Software, Inc. has released a version of its on-line data communications and data center management system.

Netman 3.0 is said to include more than 50 enhancements, including reverse paging, faster mass updating capabilities and a faster response time. The new version also includes an optional On-line Customization Facility. The product supports IBM's MVS/TSO, MVS/CICS, VS1/CICS, VM/CMS and DOS/VS/CICS.

The software update is available to Netman users free of charge. The On-line Customization Facility will be offered to existing users until Dec. 31 at $15,000 for a perpetual license. After that date, the price of the option to existing and new users will be $20,000. A perpetual license for the Netman 3.0 for the MVS operating system remains at $37,500.

California Software, 3232 Nebraska Ave., Santa Monica, Calif. 90404.

UNIQUE AUTOMATION PRODUCTS, INC.
UAP-Link enhancement

Unique Automation Products, Inc. has announced that its UAP-Link micro-to-mainframe communications software now runs with Digital Equipment Corp. VAX-11 systems under DEC's VMS operating system.

According to the vendor, UAP-Link now permits VAX systems to transfer files to another VAX or to control groups of micros or interconnect with other vendors. The link is said to work on IBM Personal Computers and compatibles, DEC Rainbow microcomputers running under Microsoft Corp.'s MS-DOS operating system and Digital Research, Inc.'s CP/M 86 operating system.

It also runs with DEC's PDP-11 minicomputer, as well as under Unix operating systems, IBM's VM/CMS operating system and Data General Corp.'s AOS/VS operating system, the company said.

The new release includes both control and host modules and is priced at $1,250.

Unique Automation Products, Suite G, 15401 Red Hill, Tustin, Calif. 92680.

NETWORK APPLICATIONS, INC.
Transnet enhancement

Network Applications, Inc. has announced that its communications software now runs with office systems from Digital Equipment Corp. and Data General Corp.

According to Network Applications, through the use of IBM's Document Interchange Architecture and Document Content Architecture, Transnet allows multiple-vendor office systems to communicate through the host's IBM Systems Network Architecture Distribution Services. Transnet permits office systems from IBM, Wang Laboratories, Inc. and Xerox Corp. to exchange text documents, which can then be edited by any of the systems.

In addition to DG's CEO office system and DEC's All-In-One office system, electronic mail systems from the two companies will also be usable with any Transnet-supported systems from DEC, DG, IBM or Wang Laboratories.

Transnet has a base price of $35,000.

Network Applications, 9020 Capital of Texas Highway N., Austin, Texas 78759.

WHITESMITHS, LTD.
Enhancements to Pascal and C compilers

Whitesmiths, Ltd. has announced that its Pascal and C compilers for IBM 370 mainframes have been enhanced to provide optional cross-compiler support. The company also announced that the compilers are now available for IBM's VM/CMS.

According to the company, the optional cross-compilers support the Intel Corp. 8080 and 8086 microprocessors and Motorola, Inc.'s 68000 microprocessor.

Each cross-compiler reportedly can generate free-standing programs. The 8086 option can also generate programs executable under IBM's PC-DOS operating system, the company said. The 8080 processor supports Digital Research, Inc.'s CP/M 80, and the 68000 option supports Digital Research's CP/M 68K-byte operating system, according to Whitesmiths.

The VM/CMS option is standard with the C/370, priced at $5,000. Each of the cross-compilers is priced at an additional $5,000.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

ADVANCED SYSTEMS CONCEPTS, INC.
Status/38

Advanced Systems Concepts, Inc. has announced a resource accounting product said to be compatible with the IBM System/38 under Release 6.0 of the CPF operating system.

The accounting features of Status/38 reportedly track all facets of system use. Total job execution time, CPU use time, response time, printer and paper use and disk space utilization are included, the company said. The product reportedly allows jobs to be grouped for departmental reporting.

Status has a one-time license fee of $1,500, the vendor said.

Advanced Systems Concepts, Suite S, 1350 Remington Road, Schaumburg, Ill. 60195.

See SYSTEMS page 37

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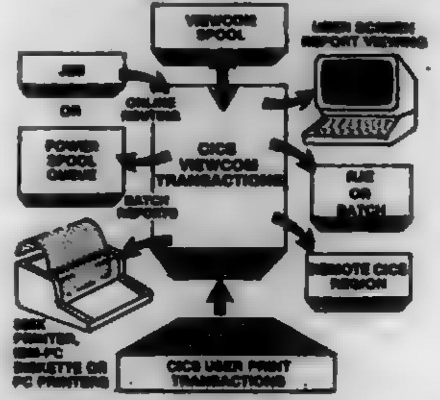
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Figure 1

Figure 2

MEASURE

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source code worked relatively well. In those days, when assembler languages were the only ones available, the phrase "a line of source code" had a fairly clear definition: It was in fact a single source code statement, and it occupied a single line on a coding sheet.

However, with the arrival of Cobol, Fortran and the other compiler-based languages, a set of major problems arose that caused ambiguity about lines of source code.

While the unit of measure "lines of source code" continued to be the standard measure of productivity, it no longer had a precise definition, and the same program could vary by more than 10:1 in apparent size simply by changing the rules of line counting.

The real problem

Ambiguities in line counting are only a superficial problem and could be resolved by adopting standards. However, there is a much more serious problem with benchmarks based on lines of source code than a simple lack of standard definitions. The real problem is that such a benchmark does not work across different source languages and indeed penalizes high-level languages in direct proportion to the level of the language.

The reason for the penalty is analogous to a classic industrial phenomenon: If a manufacturing process has a high percentage of fixed costs and there is a decline in the number of units produced, then the cost per unit goes up. In software development, there are a great many activities that are not exactly fixed costs, but are not directly related to coding either: requirements, design, user documentation and so forth.

For example, assume that two identical programs are to be written — one in assembler language and the second in Pascal (see Figure 1).

Paradox occurs

Note the paradox that occurs: While the high-level language reduced the total development effort by 50% and improved true economic productivity by 50%, if productivity is measured in terms of lines of source code per month, then the improvement disappears, and the assembler language version looks twice as productive.

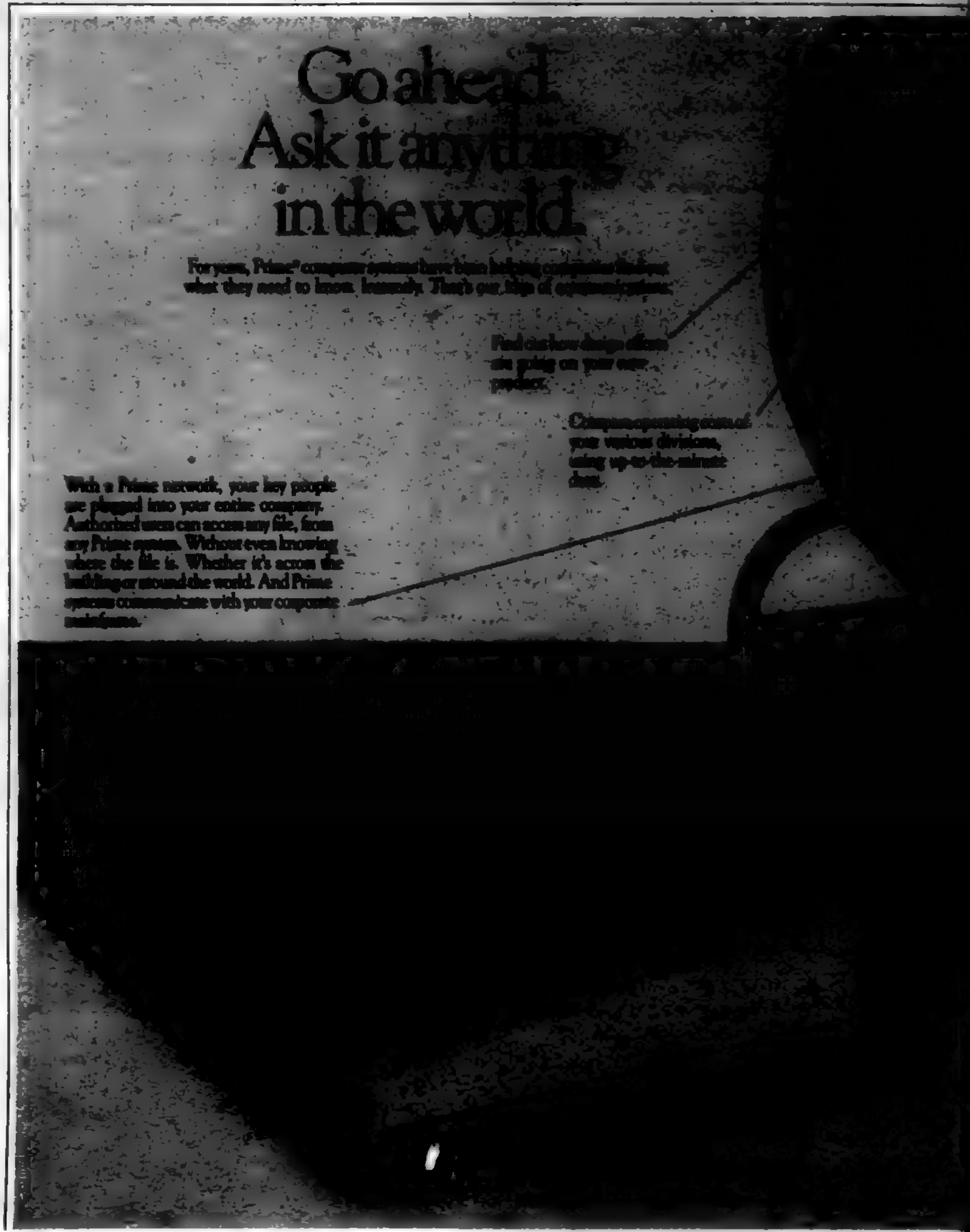
In the late 1970s, Allen Albrecht of IBM had to confront this productivity paradox. As a manager within IBM's Data Processing Services group, he was looking for a way to measure productivity that would work across multiple languages: assembler, Cobol, RPG, IBM's DMS/VS and many others.

What he came up with has come to be called "function points," the weighted sum of five major external attributes of a software program (see Figure 2).

There are some other attributes of the function point method that deal with adjustments for complexity, but they are not needed to understand the fundamental concept. Essentially, function points are like the Dow Jones market indicators — a composite number that can indicate useful trends.

Look at the previous assembler and Pascal examples in terms of function points. For both versions, the function point total will be the same. In this case, assume one of everything (see Figure 3).

Considering the previous assembler and Pascal examples, the 100 months it took for the assembler lan-



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guage version can now be expressed as 0.3 function points per month. The 50 months it took to do the Pascal version yields a function point rate of 0.6 function points per month, or twice the function point rating of assembler.

For the first time in the history of computing, software productivity has a benchmark that reflects economic productivity without the mathematical paradoxes associated with measurements based on lines of source code.

Reason for significance

This is the reason why the function point method is becoming so significant: It can show the value of high-level languages in a way that is relatively free from distortion.

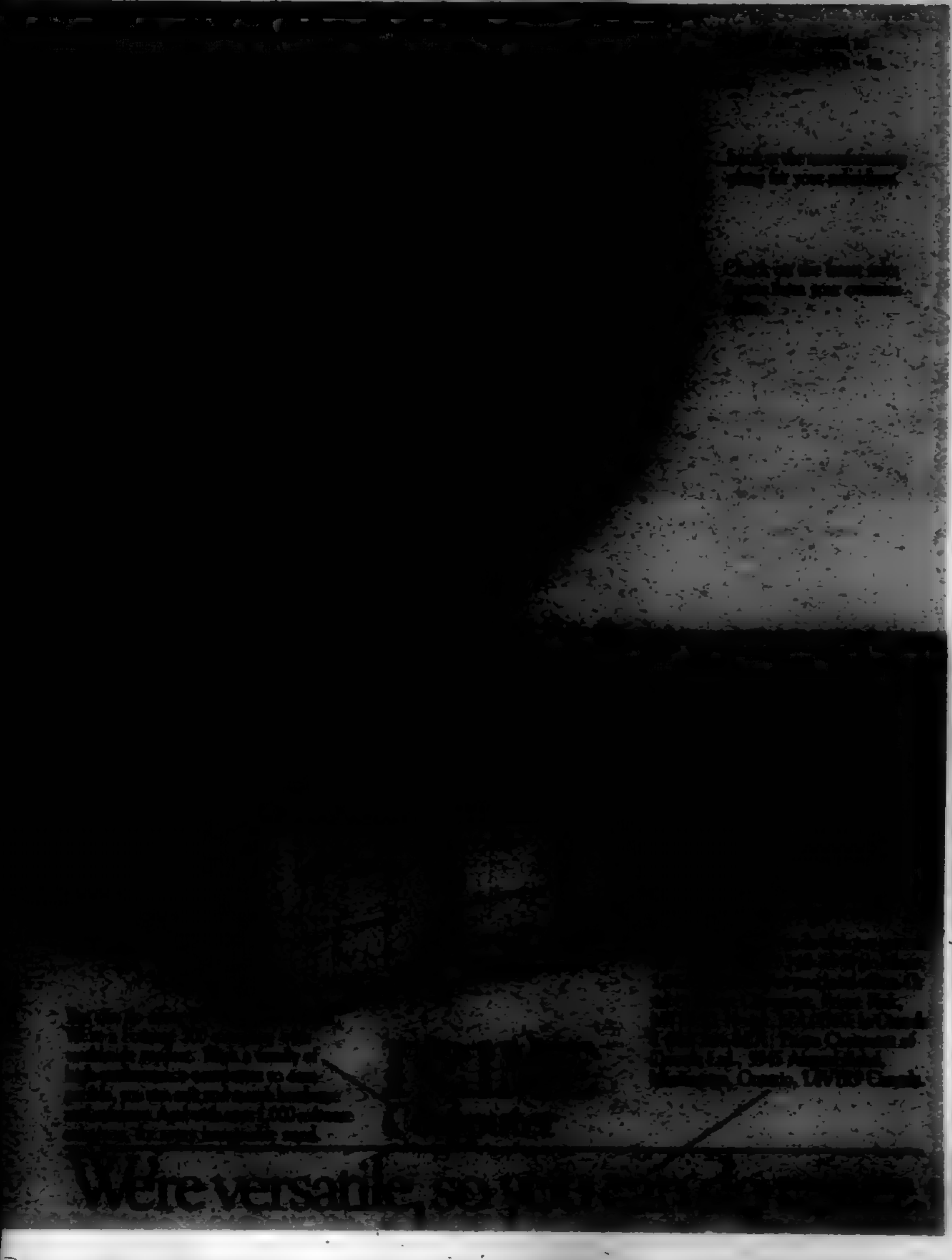
Not only can the function point method demonstrate the value of high-level languages, it can be used to predict the size of a program as well, in any language. For example, the approximate number of source code statements per function point for a few common languages are shown in Figure 4.

Although the current margin of error of the source code-to-function-point ratio is high, even the possibility of an accurate measure that can be used early in development is a very exciting occurrence.

The function point method is still evolving. Not only that, but the function point method has its own sources of ambiguity, and the exact definition of some of its terms, such as "inputs" and "outputs," has required a great deal of effort. Even so, the potential value of the method makes it worthy of serious exploration.

Figure 3

Figure 4



SYSTEMS from page 34

VIRTUAL MICROSYSTEMS, INC.

Bridge enhancement

Virtual Microsystems, Inc. has announced that its Bridge development system now permits Intel Corp. development languages to run on Digital Equipment Corp. VAX-11 computers.

By using the Bridge, users reportedly can compile and run Intel PL/M-86 programs from any terminal attached to a VAX-11 or other DEC minicomputer system. The program is said to allow user to work at exiting terminals and exchange programs and data via the DEC VMS operating system utilities.

Price per system is $9,900.

Virtual Microsystems, Suite 200, 2150 Shattuck Ave., Berkeley, Calif. 94704.

BUSINESS COMPUTER DESIGN, INC.

Telex-Mint

Business Computer Design, Inc. has announced a software package that reportedly gives telex processing capabilities to IBM System/34, 36 and 38 minicomputers.

The Telex-Mint communications package reportedly allows users to create telexes, cables and mailgrams from any workstation using full on-line text editing. Communications characters are said to be generated by Telex-Mint and carried over the ITT Databridge communications network. According to the company, users can send to any telex acceptance machine at rates of 2,400 bit/sec to 4,800 bit/sec with an AT&T-compatible modem.

The introductory fee for the Telex-Mint system is $1,950 for the System/34 and System/36 and $2,850 for the System/38.

Business Computer Design, 9000 Jorie Blvd., Oak Brook, Ill. 60521.

MT XINU, INC.

Enhanced 4.2BSD

Mt Xinu, Inc. has released source code software for the University of California at Berkeley 4.2 version of the Unix operating system, 4.2BSD, that adds a debugger, performance enhancements, utilities and device support. Dubbed Enhanced 4.2BSD, the system runs on Digital Equipment Corp.'s VAX-11 computers and

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SOFTWARE & SERVICES

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various 32-bit microcomputers, including systems developed by Sun Microsystems, Inc. and Masscomp Co.

The company offers ongoing source maintenance and binary redistribution rights to purchasers of its Enhanced 4.2BSD source software.

The price of the Enhanced 4.2BSD system is $10,000.

Mt Xinu, 739 Allston Way, Berkeley, Calif. 94710.

PRECISION VISUALS, INC.

HP 7550 device driver

Precision Visuals, Inc. has announced a device driver coded in Fortran that permits users of the device-independent Precision Visuals DI-3000 and GK-2000 graphics tools packages to utilize the Hewlett-Packard Co. HP 7550 plotter.

Capabilities supported by the driver include 40 character fonts, nine markers, 14 line styles and the plotter's automatic paper load feature. To access the hardware functions of the HP 7550, the driver converts all DI-3000 or GK-2000 subroutine calls into the appropriate HP graphics language commands.

The HP 7550 device driver is priced at $500 and includes documentation and source code.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

STAFF COMPUTER TECHNOLOGY CORP.

The Key

Staff Computer Technology Corp. has introduced The Key, an access control and software security system that reportedly operates on any computer equipped with an RS-232 interface.

The Key achieves access control by using different inquiry/response pairs each time a terminal user requests access. The mainframe contains the master key, and each terminal requiring controlled access contains unit keys.

Software suppliers attain security by tailoring demonstration software to a specific key. The Key can be installed on any machine the demonstration works on. Users can copy the diskette and back it up, but the software and copies cannot be used without The Key.

An evaluation unit for access control includes master and unit keys and is priced at $399.

Staff Computer Technology, Suite J, 10457 Roselle St., San Diego, Calif. 92121.

DIGITAL INFORMATION SYSTEMS CORP.

DBL Version 4 on Unix

Digital Information Systems Corp. has announced that its DBL language now runs under AT&T's Unix operating system.

According to the company, Version 4 of DBL offers the ability to chain to non-DBL programs and to interface to subroutines written in other languages. Multikey IBM Isam files, full screen programming functions, a fixed-point decimal data type and a symbolic debugger are included with the system.

DBL Version 4 pricing starts at $449 for micros and ranges up to $3,549 for superminis.

Digital Information Systems, Suite 340, 3336 Bradshaw Road, Sacramento, Calif. 95827.

FOCUS

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the System/34. Before moving actual production data onto the Personal Computer XT, he ran reports from both machines using test data on the Personal Computer XT and compared the results.

Coursey has done no formal testing of the application. "Most of the data we use is pretty straightforward," he said. "If there's an inconsistency, it really jumps out at you."

Admitting that he has no experience in formal development, Coursey said he basically used the prototyping capabilities of PC/Focus to make changes as he went along. "I have an idea of the ultimate goal, and I work toward it," he said. "The program logic and code probably could be better, but it does what I want."

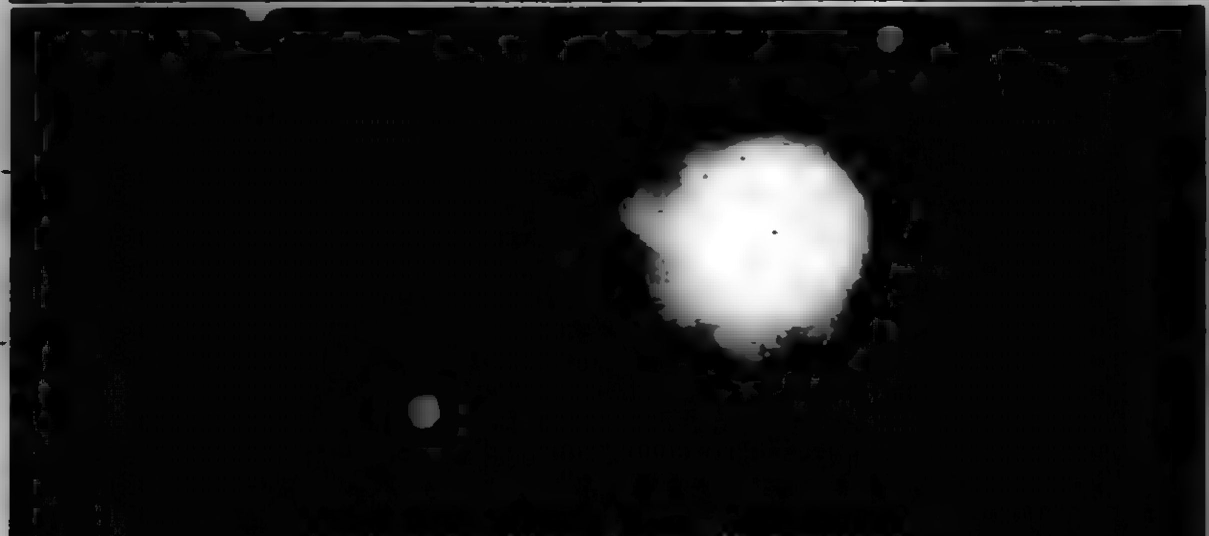
Accommodating changes

A relational data base structure was particularly helpful in accommodating frequent changes, he said. "One of the advantages of the relational data base is that I've made a lot of screwups in designing this," he said. "I've left out fields, and the relational data base has let me rebuild them easily. It grows with you."

The application is almost entirely menu-driven. "The user has no interface directly with PC/Focus," he said. He noted that he has not written any documentation for the program. "The documentation basically consists of turning the machine on," he said. While that does not present a problem as long as he works at Clyde Petroleum, Coursey admitted that "If I were to leave, and modifications needed to be made, it could be a problem. We would need a DP-type to take up where I left off."

Coursey chose PC/Focus from a list of four or five alternatives, including Ashton-Tate's Dbase II and Micro Data Base Systems, Inc.'s MDBS. "There are a lot of data bases, but I don't think [there are] any with as many bells and whistles as PC/Focus," he said. In addition, the product offered upward compatibility with mainframe Focus. "If the company grows by leaps and bounds and we have to transfer the application to the mainframe, we can do it," he said.

Coursey said PC/Focus was "difficult to learn from an end-user standpoint. It will do most of what I want [it] to do, but there are a lot of intermediate steps you have to take in order to make a program operate properly," he said.



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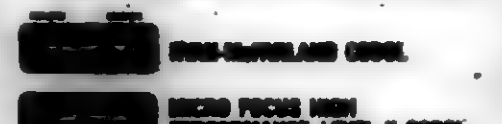

In a comparison of Ryan-McFarland COBOL 1.6A, Micro Focus COBOL 2.0 and PHILON FAST/COBOL 1.0 using the BYTE Magazine sieve benchmark the results are conclusive: PHILON FAST/COBOL executes the benchmark 34 times faster than Micro Focus and 47 times faster than RM/COBOL. (System configuration: 68000/UNIX/[illegible])

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

T1 users may elude 'leaky' PBX charge

Users of digital T1 communications facilities may be sidestepping the $25 surcharge now being levied on private-line facilities by local telephone companies.

This surcharge went into effect last month and is meant to compensate local telephone companies for the so-called "leaky" private branch exchange (PBX) problem. A PBX is considered to be leaky when it is tied to a remote PBX or telephone company central office with a leased line, circumventing local dial-up circuits and their associated customer access line charge.

The $25 surcharge is being applied to all private lines unless the user can prove that the circuit qualifies for exemption. Exemption is granted for circuits that are terminated by devices that are incapable of rerouting traffic into the telephone network. Generally, this means that point-to-point leased facilities that are used in data applications will not carry a surcharge, whereas the same line used to tie together remote PBXs will be subject to the charge.

While it is a relatively easy matter for telephone companies to verify circuits that should carry the surcharge, it will be more difficult for the local exchange carriers to police T1 carrier use. These digital facilities operate at 1.54M bit/sec and can be subdivided into a number of individual subchannels, typically 24 channels operating at 64K bit/sec.

Because the link is digital, data and digitized voice can be accommodated with equal ease. The data circuits, however, won't normally be subject to the $25 surcharge, and the voice circuits will, creating a potentially unmanageable situation. As one user quipped at a recent conference while discussing the digitized voice channels on a T1 link, "those aren't voice channels, they're 64K bit/sec data channels."

With the onus on the user to apply for surcharge exemption, most companies are

See CIRCUIT page 42

Interface extends boundaries of insurer's electronic mail

FORT WAYNE, Ind. — Electronic mail users at an insurance company here are now able to send messages outside of the company using an interface that is modeled after a developing standard.

Lincoln National Corp. tailored the interface for its private electronic mail network after MCI Mail Link, a specification developed by MCI Digital Information Services Corp. The insurance company has been using the interface specification — which was officially unveiled this month — since June, according to James Tunis, telecommunications director. Licensing rights for the interface will become commercially available on a license basis in April.

The specification is a forerunner of an electronic message network interface standard, known as X.400, now under development.

"It will be at least a couple of years, however, before the final version of X.400 is implemented by vendors of electronic mail systems," explained Bob Harcharik, president of the MCI Communications Corp. subsidiary. The Mail Link specification, he added, provides a way for private networks to communicate with each other during the interim.

Lincoln National is one of two beta test sites for the MCI Mail Link specification. The other is Citibank, N.A., in New York. In each case, the interface connects in-house users with MCI Mail, the international public electronic mail network operated by Harcharik's organization. MCI Mail, in turn, provides access to other private and public message networks, to TWX/telex terminals and to laser-driven printers that output hard-copy messages for delivery to those without terminals.

Without the interface it's technically possible for users to communicate with the outside world through MCI Mail. But setting up and terminating the call is cumbersome.

Without the new interface, explains Tunis, it's technically possible for users to communicate with the outside world through MCI Mail. But setting up and terminating the call is cumbersome, requiring special logon and logoff procedures. Also, the user generally is unable to get an acknowledgement that his message was received.

See MAIL page 42

International Zapmail agreement awaiting FCC stamp of approval

MEMPHIS — Fedex International Transmission Corp., a subsidiary of Federal Express Corp., has applied to the Federal Communications Commission for authority to provide international document transmission between the U.S. and Belgium and the U.S. and England.

A company spokesman said the applications include agreements with the communications governing bodies in Belgium and England to extend Federal Express' Zapmail service into those countries beginning in the spring of 1985.

The spokesman said that because of the time zone differences between the two continents, the international service would be a next-day service from the U.S. to Europe and a same-day service from Europe to the U.S., rather than the two-hour delivery that Zapmail promises for domestic document transmissions.

- Computime, Inc. has announced a data collection and software product for use on IBM minframes serving retail point-of-sale and banking terminals/40
- Micom Data Systems, Inc. has announced a 14.4K bit/sec full-duplex, leased-line modem capable of accelerating to 16.8K bit/sec/40
- Satellite Broadcast Network, Inc. has announced a satellite service for personal computer users/41

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AT&T to launch 21,000-mile cable project

BASKING RIDGE, N.J. — AT&T Communications recently announced plans to construct a lightwave communications backbone to interconnect most major U.S. cities and to traverse the Atlantic and Pacific oceans by 1990. In addition, the company said, it plans to expand its digital microwave radio network and convert 4,500 miles of its coaxial network to digital transmission.

A company spokesman said the project to add 21,000 miles of fiber-optic cable is made possible by the improved cost-effectiveness of the technology. He noted that while fiber-optic regenerators were once necessary every few miles, they can now be spaced 24 miles apart.

"AT&T will construct the world's largest fiber-optic telecommunications network by the end of this decade," said Robert W. Kleinert, president and chief operating officer of AT&T Communications.

AT&T said it will use single-mode lightwave systems on all new routes, and that by 1988 the systems will operate at 1.7G bit/sec and transmit up to 169,344 simultaneous conversations.

The lightwave systems will provide voice, data and video transmission between AT&T digital switching machines in major cities. The company already has lightwave systems connecting Boston to Washington, D.C. and San Francisco to Bakersfield, Calif. Other cities will be added to the network in phases through 1989.

The company said that by 1988 it will have installed the majority of the first transoceanic lightwave system. This project, known as the TAT-8 system, will link Tuckerton, N.J. with Widemouth, England, and Penmarch, France. AT&T said it plans to connect California with the western Pacific via Hawaii and Guam by late 1988 or early 1989.

Satellite net to relay financial information

NEW YORK — E.F. Hutton & Co. and Equatorial Communications Co. have announced an agreement for a private satellite-based communications network to be used to transmit customer account information and real-time securities information among 400 E.F. Hutton offices in the U.S.

The system, utilizing a 9.6K bit/sec satellite channel, will also allow E.F. Hutton to download software on a point-to-multipoint basis to its offices, which will be equipped with Data General Corp. MV4000 minicomputers.

Equatorial will supply the earth stations and services for the hybrid satellite/terrestrial net.

E.F. Hutton is located at 1 Battery Park Plaza, New York, N.Y. 10004; and Equatorial Communications is at 300 Ferguson Drive, Mountain View, Calif. 94040.

VOICE/DATA COMMUNICATIONS

MANUFACTURING TECHNOLOGIES, INC.
Matchmaker 2000

Manufacturing Technologies, Inc. has introduced a link enabling IBM 3270 terminal users to access non-IBM hosts, local-area networks and public data networks.

Matchmaker 2000 is said to allow users to toggle back and forth between IBM and non-IBM sessions. It reportedly allows access to minicomputers and mainframes such as those from Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co. and a variety of micros, private branch exchanges, public packet-switching networks, information services and electronic mail services.

The product is installed between the user's IBM 3178, 3179, 3180, 3278 or 3279 terminal and the IBM 3274 or 3276 cluster controller. The Ascii device can be connected directly with an RS-232C interface or through a modem, according to the vendor. It reportedly supports either 7- or 8-bit Ascii character modes at speeds up to 19.2K bit/sec.

It is based on an Intel Corp. control microprocessor with structured control programs and table-driven software for interface flexibility, according to Manufacturing Technologies.

Matchmaker 2000 costs $695.

Manufacturing Technologies, 6481 Global Drive, Cypress, Calif. 90630.

PROTOCOL CONVERTERS

THOMAS ENGINEERING CO.
Protocol Control Unit

Thomas Engineering Co. has announced an enhanced model of its MZ-80 MIU protocol converter.

The Protocol Control Unit reportedly gives asynchronous terminals access to IBM Bisynchronous and Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) nets, Honeywell, Inc. Visual Information Projection (VIP) nets and X.25 packet-switched nets.

It was designed to give a terminal access to all four environments and is said to support up to 60 asynchronous terminals and four hosts. The basic unit supports eight terminals.

The unit has a facility for file transfer, modem and printer sharing and access to dial-up modems and serial devices such as cash registers and energy management controllers, according to the vendor. The modular units with bisynchronous and VIP support will be available in January 1985, the SNA/SDLC support in the second quarter of 1985 and the X.25 support in the third quarter of 1985.

Prices start at $5,995 for the eight I/O port model. Host ports cost $750 each, except for SNA/SDLC, which costs $1,100.

Thomas Engineering, 2440 Stanwell Drive, Concord, Calif. 94520.

SOFTWARE

COMPUTIMES, INC.
Communications software package

Computimes, Inc. has announced a data collection and communications software product for use on IBM mainframes serving intelligent terminals such as retail point-of-sale and banking terminals.

The software, which is unnamed, is said to provide off-line polling of terminals to collect data for batch processing and to provide downloading of price changes and other information to the terminals.

The number of lines served is limited only by the host's physical limits. The product's modular design reportedly allows access to varied communications devices and use of various standard protocols.

It runs on IBM 4300 series, 370 series and 30 series mainframes under DOS/VSE and OS/MVS.

The basic version costs $65,000; additional modules that provide extra protocols and access to additional devices cost about $25,000 each.

Computimes, 401 N. 117th St., Omaha, Neb. 68154.

MULTIPLEXERS/ MODEMS

ASTROCOM CORP.
SH56S

Astrocom Corp. has introduced its SH56S modem, designed to transmit synchronous data at 28K bit/sec or 56K bit/sec over twisted-pair lines.

At the lower speed, the SH56S is said to be effective over distances up to 3 miles and 2¼ miles at 56K bit/sec. It reportedly can be configured for point-to-point or multipoint operation, is available in a stand-alone or nested circuit card design, has switch-selectable speeds and features an optional V.25 interface.

With an RS-232 interface, the stand-alone costs $730, and the circuit card costs $540. With the V.25 interface, it costs $822 as a stand-alone and [illegible] as a circuit card.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. [illegible]

MICOM SYSTEMS, INC.
Micro[illegible] Data Modem Model 40144

Micom Systems, Inc. has announced what it said is its fastest full-duplex, leased-line modem.

The Micro[illegible] Data Modem Model 40144 normally operates at 14.4K bit/sec, but is said to accelerate to 16.8K bit/sec in the absence of line noise.

This capability reportedly increases throughput, particularly on

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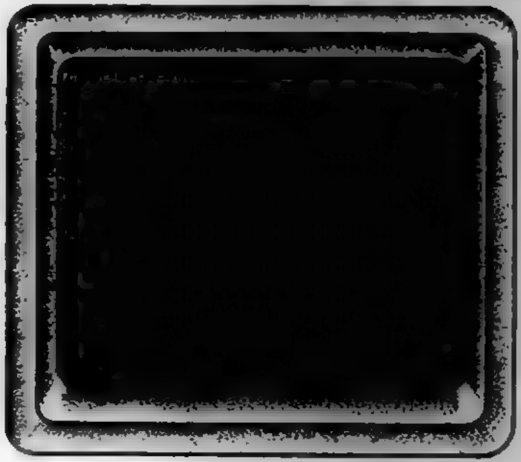

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if you order by December 31, 1984.

New INTELLECT/SX lets users define and maintain their own data.

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And between now and December 31, 1984, we're offering new INTELLECT/SX at a special introductory price of just $30,000.

New INTELLECT/FOCUS gets everyone in your organization into FOCUS.*

Until now, FOCUS has been a powerful productivity tool for Information Center and data processing professionals. But now there's a way for everyone in your organization to get the bene-

links supporting multiplexers or remote job-entry stations. The increase from 14.4K bit/sec to 16.8K bit/sec is automatic under optimal line conditions, and the speed can fall back automatically to 12K bit/sec or 9.6K bit/sec if line quality deteriorates below AT&T D1 conditioning standards. The modem costs $6,495.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 91311.

U.S. ROBOTICS, INC.
Modems and software

Modem manufacturer U.S. Robotics, Inc. has introduced two 2,400 bit/sec modems, the stand-alone Courier 2400 and integral Microlink 2400 for use in the IBM Personal Computer and compatibles.

The units reportedly provide dial-up, asynchronous communications and feature autodial and autoanswer, CCITT V.22 compatibility at 2,400 bit/sec, and compatibility with AT&T 212A at 1,200 bit/sec and AT&T 103 at 300 bit/sec.

Other features include call duration reporting, display of current settings for communications parameters and other operational controls, Help screens, repeat command, quote mode and call progress detection.

Each modem costs $895.

The company also announced Telpac 3.0, an enhanced version of its telecommunications package for the IBM Personal Computer and compatibles designed to work with U.S. Robotics and compatible modems. The package features windows to guide users through commands and costs $99.

U.S. Robotics, 1123 W. Washington Blvd., Chicago, Ill. 60607.

NETWORK SERVICES

SATELLITE BROADCAST NETWORK, INC.
Satellite receiver system

Satellite Broadcast Network, Inc. has announced a satellite service for personal computer users.

Users can purchase a 12-GHz compact satellite receive-only antenna, an amplifier, a solid-state receiver and a demodulator to access the service, which is available to users of the IBM Personal Computer and compatibles.

The company said that services will include financial data, news, weather, sports, software downloading and specialized information such as agricultural, scientific and medical data. The information services will be provided by various vendors.

The hardware for the 9.6K bit/sec service costs $960.

Satellite Broadcast Network, 30 E. Huron, Chicago, Ill. 60611.

AUXILIARY EQUIPMENT

LIGHTWAVE COMMUNICATIONS, INC.
FO-232E

Lightwave Communications, Inc. has announced the third product in its series of RS-232C fiber-optic data links.

The FO-232E was designed to transmit data asynchronously via plastic cable at distances up to 250 feet. It is intended to enable end users to interconnect terminals, printers and other peripherals to computer equipment at speeds up to 19.2K bit/sec and is compatible with existing RS-232C 25-pin connectors, according to the company.

It costs $90.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn. 06877.

KURZWEIL COMPUTER PRODUCTS, INC.
Penta Custom Interface

Kurzweil Computer Products, Inc. has announced a custom interface that is said to link its Kurzweil 4000 Intelligent Scanning systems and Penta Systems International, Inc.'s typesetting systems.

The Penta Custom Interface is said to insert Penta-specified composition commands automatically into the scanned text during the communications process from the Kurzweil 4000 to a Penta front-end system. It was designed to eliminate the need for inserting additional typesetting commands prior to phototypesetting.

Available now on 8-in. floppy disks, it costs $5,500.

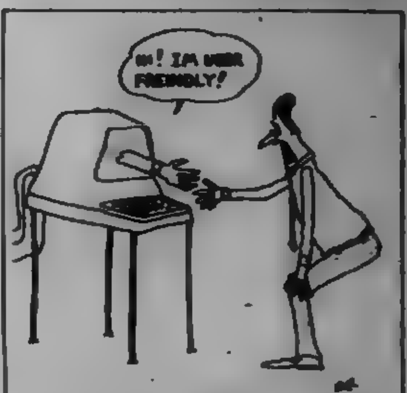
Kurzweil Computer Products, 185 [redacted]

DIGITAL EQUIPMENT CORP.
DHU11; DMZ32

Digital Equipment Corp. has introduced two asynchronous multiplexers to connect serial lines to DEC Unibus-based VAX-11 and PDP-11 computers.

According to the vendor, the DHU11 interfaces up to 16 asynchronous lines between any PDP-11 or VAX-11 computers with an integral Unibus operating under DEC VAX/VMS Version 4.0. The single hex-size circuit card is said to support medium- and high-speed serial communications requirements, connecting through RS-232C or RS-432A interfaces. It features direct

Continued on page 42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Call 617-890-8400

If you'd like, we'll send you a free demo diskette so you can get a look at new INTELLECT/SX and INTELLECT/FOCUS. But be sure to order new INTELLECT/SX or new INTELLECT/FOCUS before December 31, 1984 so you can get the special introductory price of $30,000. In plain English, it could be the smartest move you've made all year.

*FOCUS is a product of Information Builders, Inc.

INTELLECT/SX and INTELLECT/FOCUS run on IBM and IBM-compatible mainframes.

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

Continued from page 41

memory access (DMA) and first-in-first-out (Fifo) operations to minimize CPU overhead, according to DEC.

The DMZ32 multiplexer supports up to 24 asynchronous lines to Unibus-based VAX-11 computers. The vendor said the DMZ32 is a high-performance unit that can interface a variety of terminals to a VAX-11 system, allowing a terminal distribution panel to be located up to 5,000 feet from the Unibus connection. It also features RS-232C connectors and DMA and Fifo operation.

Both controllers provide half- or full-duplex communications, according to DEC.

The price of the DHU11 begins at $3,120, and the price of the DMZ32 begins at $3,215.

DEC, Maynard, Mass. 01754.

DIGITAL PRODUCTS, INC.
Digital Current Loop Switches

Digital Products, Inc. has announced a series of switches that allow Teletype and compatible equipment to communicate with any RS-232 device.

Digital Current Loop Switches reportedly allow Teletypes, early Digital Equipment Corp. equipment such as PDP-11 computers and LA 120 terminals, high-speed printing terminals and CRTs to be combined with computers and modems in a common system.

They are said to accommodate up to 9,600 bit/sec transmissions and to allow grouping to connect an unlimited number of devices.

They are priced from $395.

Digital Products, 600 Pleasant St., Watertown, Mass. 02172.

ALCYON CORP.
I/O processor

Alcyon Corp. has announced an intelligent I/O processor designed for Motorola, Inc. 68000 and AT&T Unix-based systems.

Each of the 16 full-duplex asynchronous serial data channels of the device can support data bursts up to 9.6K bit/sec from a 68000 processor. Synchronous data rates up to 1.5M bit/sec are possible on each of two programmable, on-board full-duplex channels. It includes a four-channel direct-memory access controller and buffer memory and occupies a dual-width Digital Equipment Corp. Q-bus circuit board. It costs $2,345. An eight-channel option costs $950 and a 16-channel multiplexer is $1,555.

Alcyon, 8716 Production Ave., San Diego, Calif. 92121.

Our multi-mode printers accelerate from 100 cps to 480 cps and have an impressive finish everytime.

In the Grand Prix of office automation, HERMES multi-mode printers always come in first. Both 400/480 cps data and 100/120 cps single pass near letter quality are possible with the same print-head.

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MAIL from page 39

"Our new interface eliminates these problems. It establishes and terminates the connection automatically between our network and the MCI Mail network. Their system then takes care of the other end. And we get an acknowledgement — when the message is received by the MCI Mail network as well as when it's delivered in hard-copy form to the recipient," Tunis said.

The interface also permits a delivery confirmation to be returned to the sender from any terminal connected to the MCI Mail network.

Tunis said it is still too early to detect a change in the outside message traffic flowing through Lincoln National's in-house network, largely because the company hasn't made a special effort to tell users about the interface.

The present version is being upgraded to conform with the version MCI announced this week. Tunis expects the upgrade to become operational within a few months. He believes that during the succeeding year or two, outside message traffic sent and delivered through the company's electronic mail network will increase gradually.

A prospective added benefit, Tunis said, is the ability to correspond with clients and suppliers on-line. Lincoln National communicates regularly, for example, with reinsurance companies that broker the company's policies and with organizations that have purchased group insurance coverage. Now, the postal service carries this correspondence.

A systems analyst and a programmer needed about two man-months to develop the present interface, Tunis said, and he estimates that implementing the upgrade will require approximately one more month. The only other cost — amounting to about $600 — was for an error-checking modem to connect Lincoln National's in-house network with the MCI Mail network.

CIRCUIT from page 39

expected to be upright about T1 use, but a spokesman for the Federal Communications Commission admitted that there will be "definite problems" monitoring its use.

These problems will be exacerbated as T1 use becomes more prevalent. The appeal is usually a simple, economic one. As an example, a user that wished to remain anonymous reported that he is saving more than $5,000/mo by replacing individual leased lines with a single T1 facility.

He replaced 20 tie lines connecting two PBXs and 11 individual 9.6K bit/sec leased lines for data communications with the T1 link. With a T1 multiplexer, the 1.54M bit/sec bandwidth of the T1 facility was divided into 20 32K bit/sec voice tie lines, one 19.2K bit/sec data channel, 10 9.6K bit/sec synchronous channels and four 9.6K bit/sec asychronous channels. Additionally, the user reported there is approximately 700K bit/sec of spare capacity on the link.

Before the T1 was cut over, the total cost of this user's voice and data lines, plus the necessary modem and multiplexing hardware, was nearly $9,500/mo. With the T1 link and the necessary multiplexing hardware his monthly bills dropped to roughly $3,800/mo.

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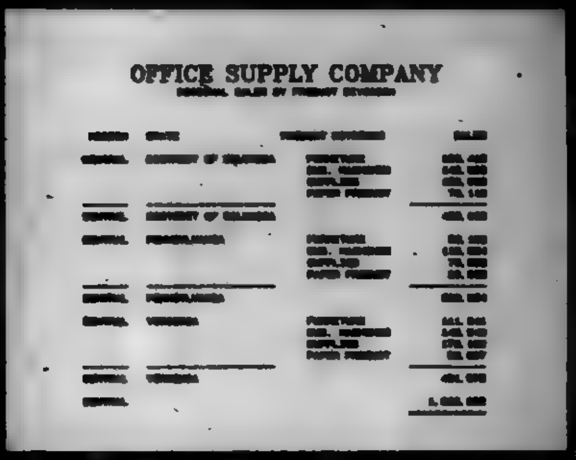
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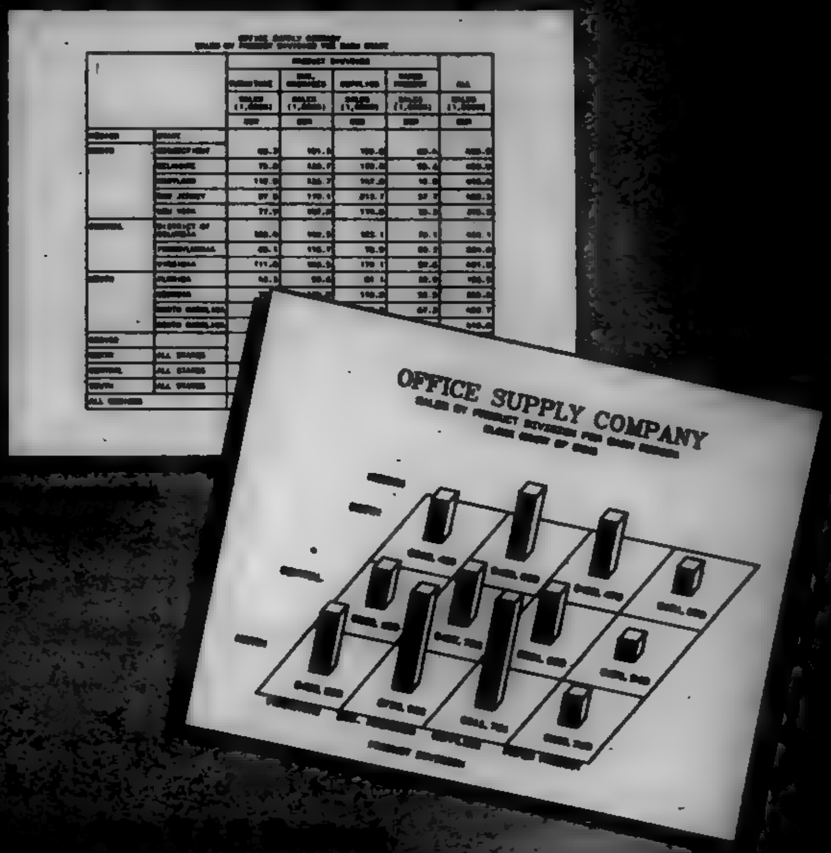

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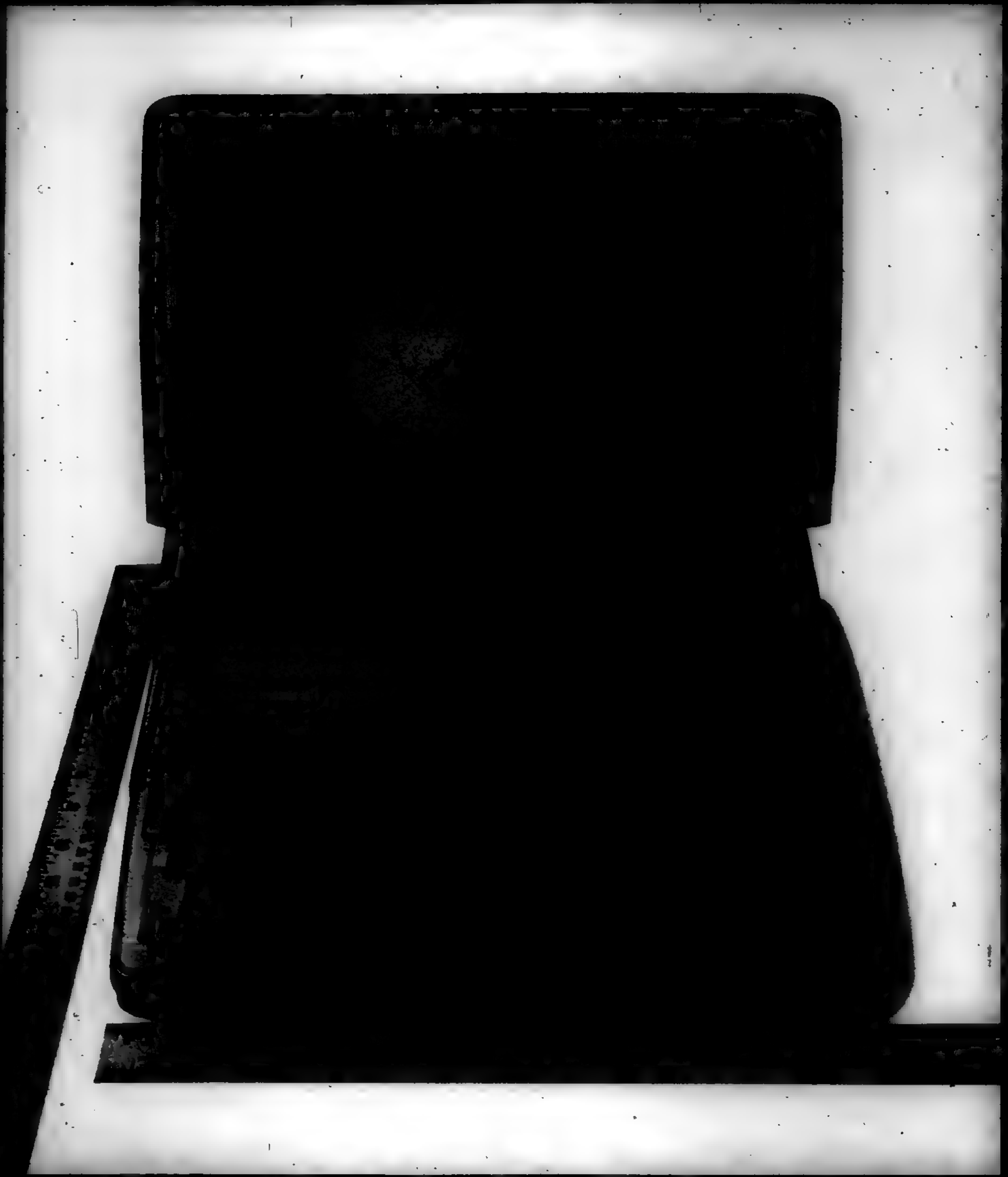

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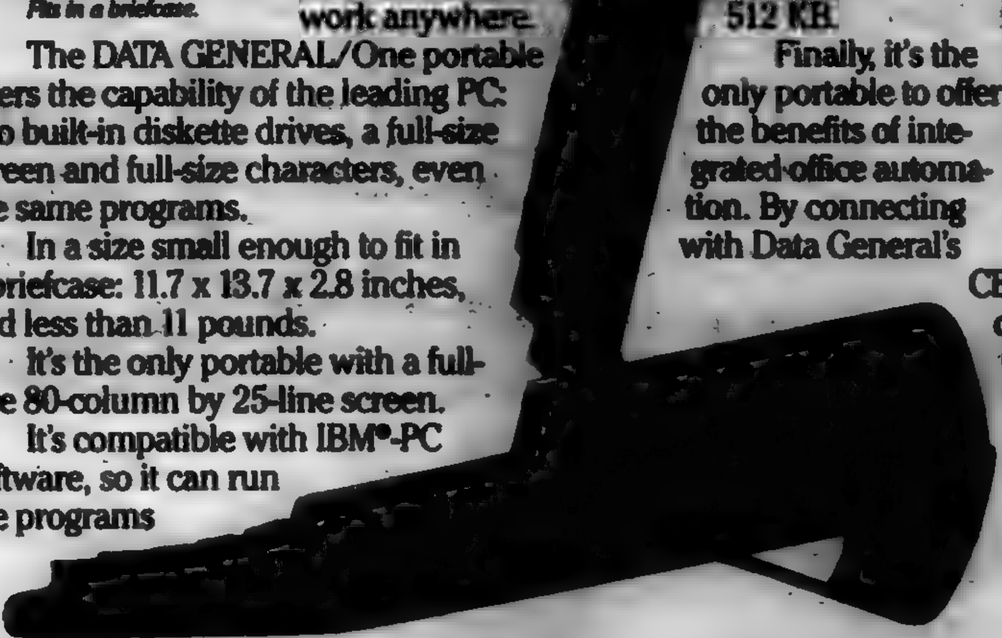

It has two built-in diskette drives and runs thousands of IBM-PC programs.

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COURIER

SYSTEMS & PERIPHERALS

HARD TALK
John Desmond
CW Staff

Can DEC software offerings live up to 8600's promise?

By announcing its most powerful CPU, the VAX 8600, Digital Equipment Corp. has caught up in hardware technology to competing supermini vendors Prime Computer, Inc. and Data General Corp. and even positioned itself well against small IBM mainframes in price/performance terms.

But several analysts interviewed by *Computerworld* question whether DEC's software can equal the power of its hardware.

Prime's 9950 and DG's MV/10000 high-end machines, each boasting performance ratings of 2.6 million instructions per second (Mips) [CW, Aug. 20] are more powerful than the machine that was formerly DEC's biggest box, the VAX-11/782, which has a Mips rating of 1.2. But the 8600 comes in with a Mips rating estimated at 4.4, just below IBM's recently announced 4381 Model Group 3.

"DEC has regained the leadership position it needed to maintain credibility in the industry," said Hank Janson of International Data Corp. (IDC), a market research and consulting firm based in Framingham, Mass. IDC analyst Dave Moschella said, "This system allows DEC to meet the demands of customers who may have been attracted to IBM," at a price considerably less than comparable IBM mainframes.

Frederic Withington, vice-president of information systems for Arthur D. Little, Inc. of Cambridge, Mass., said, "The 8600 makes a major change in DEC's competitive position. There is an outside chance DEC may get into [the manufacturing] machine rooms of large companies that are now primarily IBM." But, he qualified, "The 8600 hardware is good for this, but I'm not sure the software is powerful enough. The big, heavy-duty system programs like CICS I'm not sure DEC can match. Without them, DEC can't play."

Stephen Smith, security analyst with Paine Webber, Inc., does not believe the 8600 will allow penetration of IBM's market so much as it will make DEC more attractive to new users and existing users who may have been contemplating switching to IBM for more power. "I think the top-cover is significant," Smith said. "In the past, when the end user felt he needed a bigger machine, the only way to go was IBM because DEC offered less than 2 Mips. Now, [DEC] can offer their customers a greater range of performance. So I do think it helps their position in relation to IBM, but I don't think it's an attack on the IBM data center."

Like Withington, Smith said, "The real issue is software development." Smith likes version 4.0 of VMS for its clustering

See DEC page 52

Amdahl enhances 6880

Doubles channel, memory capacity; lowers fees

SUNNYVALE, Calif. — Amdahl Corp. last week doubled the channel and cache memory capacity of its 6880 disk control unit. At the same time, Amdahl cut the purchase price of the cache memory feature by as much as 52%. The company also lowered maintenance charges on all models of the 6880 by 20% to 25%.

The cache controller feature is said to boost CPU performance by storing frequently used data in cache memory, the company said. The 6880 is now available with 8M-, 16M-, 24M- or 32M bytes of cache memory. Previously, the maximum cache capacity was 16M bytes. A spokeswoman said the expanded memory will be accomplished with 256K-bit memory chips.

The 6880 can now support up to 16 channels, twice the previously available capacity. The spokeswoman noted that Amdahl has also added to the 6880 support for IBM's VM operating system using IBM's High Performance Option.

Purchase prices for the 6880 range from $119,970 to $315,480, depending on the memory configuration. Corresponding maintenance charges now range from $684/mo to $1,004/mo, according to the firm.

A sample configuration consisting of a 6880 G2 controller with 16M bytes of cache memory, one Amdahl 6380 AA4 string controller and three 6380 B4 disk drives costs $294,600. The same configuration used to cost $427,500; a spokeswoman noted that the lower price also reflects an earlier price cut on disk drives. Maintenance on the configuration costs $1,730/mo; the old maintenance price was $2,280/mo.

As an example of the cost of cache memory field upgrades, Amdahl said a user of a 6880 with a 16M-byte cache controller feature would have to pay $40,000 to upgrade the unit to accommodate 24M bytes of cache memory. Likewise, it would cost $80,000 to upgrade a 6880 with a 16M-byte cache controller feature to a 32M-byte configuration.

Amdahl is located at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

- NCR Corp. has released the 9100/System hardware and software for retail stores/48
- Redshaw, Inc. has announced the Series/2 automation system for insurance agencies, using Wang Laboratories, Inc. CPUs/48

INSIDE

Turnkey Systems/48
Terminals/52
Printers/Plotters/54

Honeywell announces mini-based hospital record management tool

MINNEAPOLIS — Honeywell, Inc. has announced a medical record management system for hospitals, the Transcription Recording and Chart Tracking System (Tracts), running on the company's DPS 6 line of minicomputers.

The system runs under the company's Gcos 6 MOD 400 software.

The system's medical record software is said to automate transcription, record analysis, record tracking, abstract production and report generation. The company's office automation software includes word/document processing, records processing, calendar and calculator facilities. DP options for Tracts include data base management systems, transaction processing packages and high-level language support. Communications software is available to support the exchange of data between Tracts and hospital billing, statistical and admissions computers, the company said.

The price of a 250-bed hospital configuration including DPS 6/45, four workstations, a printer, 1M byte of memory and two 20M-byte disk drives is $62,000.

More information is available from Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

Sytek releases PFX micro security system

MOUNTAIN VIEW, Calif. — Sytek, Inc.'s Data Security Division recently announced the PFX identity authentication system, a security system that uses an automated one-time password technology said to prevent unauthorized access to networked personal computers or multiuser systems.

Sytek said the PFX system includes a Passport, a portable, hand-held device with an LCD that is programmed for each individual user, and an Authentication Server, a Convergent Technologies, Inc. microcomputer that attaches to the host computer or network.

Under the PFX system, users enter a unique numerical password each time they wish to access the system, the firm said. In order to gain entry, the user must have a Passport, a personal identification number (PIN) and an Authentication Server and must respond correctly to a series of prompts.

'Challenge number'

When a user logs on to the system, the Authentication Server issues a seven-digit "challenge number," which appears on the user's computer screen, according to the company. The user enters his own PIN into the Passport and then enters the challenge number as well.

A one-time password (another seven-digit number) appears on the LCD on his Passport. To gain access to the system, the user then types the password into the terminal.

According to the company, the password sequence generated by each Passport is unique: Given the same challenge number, no two Passports will generate the same response.

In addition, no individual Passport responding to the Authentication Server's challenge will give the same response twice, the company said. An individual Passport is said to work only with the PIN for which it has been programmed, the firm said.

A single Authentication Server is said to be able to serve one or two host computers and up to 2,000 users. The PFX system, said to be compatible with most computer equipment, links to systems through one or more RS-232 serial ports.

The Passport is said to give users access from any terminal. According to the company, the device is virtually tamperproof because its microprocessor will erase itself if the device is taken apart.

The system's Authentication Server is said to

See SYTEK page 54

TURNKEY SYSTEMS

REDSHAW, INC.
Series/2

Redshaw, Inc. has announced the Series/2 automation system for insurance agencies, using a version of the Wang Laboratories, Inc. 2200 MVS CPU with 600-nsec processing speed and support for up to 240 Wang 2236 workstations or Professional Computers.

Storage capacity of the Series/2 exceeds 320M bytes or 250,000 policy files, the company said. Financial analysis, policy file management, word processing and a variety of personal computer software is available, including IBM Personal Computer-compatible types. The Redshaw P-400 printer, said to print over 400 line/min of letter-quality type, is also provided with the system.

The price for a system with the Wang 2200 and eight workstations is about $88,000, the vendor said.

Redshaw, 103 Yost Blvd., Pittsburgh, Pa. 15221.

DATA STORAGE

METHEUS-COMPUTERVISION, INC.
MS200 mass storage system

Metheus-Computervision, Inc. has released a mass storage system that provides up to 840M bytes of additional storage space formatted for Metheus-Computervision Design Systems. The MS200 has an average access time of 18 msec and a data transfer rate of 1.86M byte/sec.

The system offers a choice of either one or two 420M-byte Winchester disk drives or one Winchester drive and one Cipher Data Products, Inc. magnetic tape drive. It is fully field-upgradable, according to the vendor.

The price of the MS200 is $27,500 with one 420M-byte disk drive, and with the addition of one Cipher tape drive, it costs $35,500, the vendor said.

Metheus-Computervision, P.O. Box 959, Hillsboro, Ore. 97123.

MICRO TECHNOLOGY, INC.
MD4000 series subsystems

Micro Technology, Inc. has introduced three products in its new MD4000 series of subsystems. The products are designed for use with Digital Equipment Corp.'s LSI-11, LSI-11/2, LSI-11/23 and LSI-11/73 computers running under DEC's RT-11 and RSX-11M operating systems and using S&H Computer Systems, Inc.'s TSX-Plus time-sharing software.

The MD4260 consists of a 40M-byte fixed Winchester drive and a 60M-byte streaming cartridge tape and is designed for speed and reliability on backup capability, the vendor said.

The MD4910 is a 5¼-in. form factor removable Winchester subsystem. It consists of dual 10M-byte removable cartridges and is said to lend itself to sensitive or classified applications.

The MD4110 consists of a 40M-byte fixed Winchester drive and a 10M-byte removable media Winchester device and lends itself to on-site backup, software upgrades and installation of new software, according to the vendor.

The price of the MD4260 is $7,156, the MD4910 is $5,679, and the MD4110 is $6,370.

Micro Technology, 1620 Miraloma Ave., Placentia, Calif. 92670.

NCR offers 9100/System, POS units for retail use

DAYTON, Ohio — NCR Corp. has announced the 9100/System hardware and software for general merchandise retail operations and two point-of-sale terminals for the specialty store marketplace.

The 9100/System is said to use very large-scale integration technology and communications technology that allows files resident at local sites to be accessed by remote central computers. The architecture provides on-line transaction processing, automatic price lookup, efficient inventory control and automatic credit authorization.

The system uses the company's standard computer system interface, an Ansi standard peripheral interface protocol. The 9100 features up to 1M byte of memory, a 5¼-in. flexible disk, two 5¼-in. Winchester disk drives, up to 37M bytes of storage and the standard computer system interface controller. The desk unit measures 10-in. wide by 27-in. deep by 29-in. high.

The 9100/System uses IBM's Systems Network Architecture for data communications. The company's Tcos operating system is intended for maximum efficiency in a distributed transaction processing environment.

Tcos has a series of subsystems, including a Cobol interface, a function scheduler and a file management system.

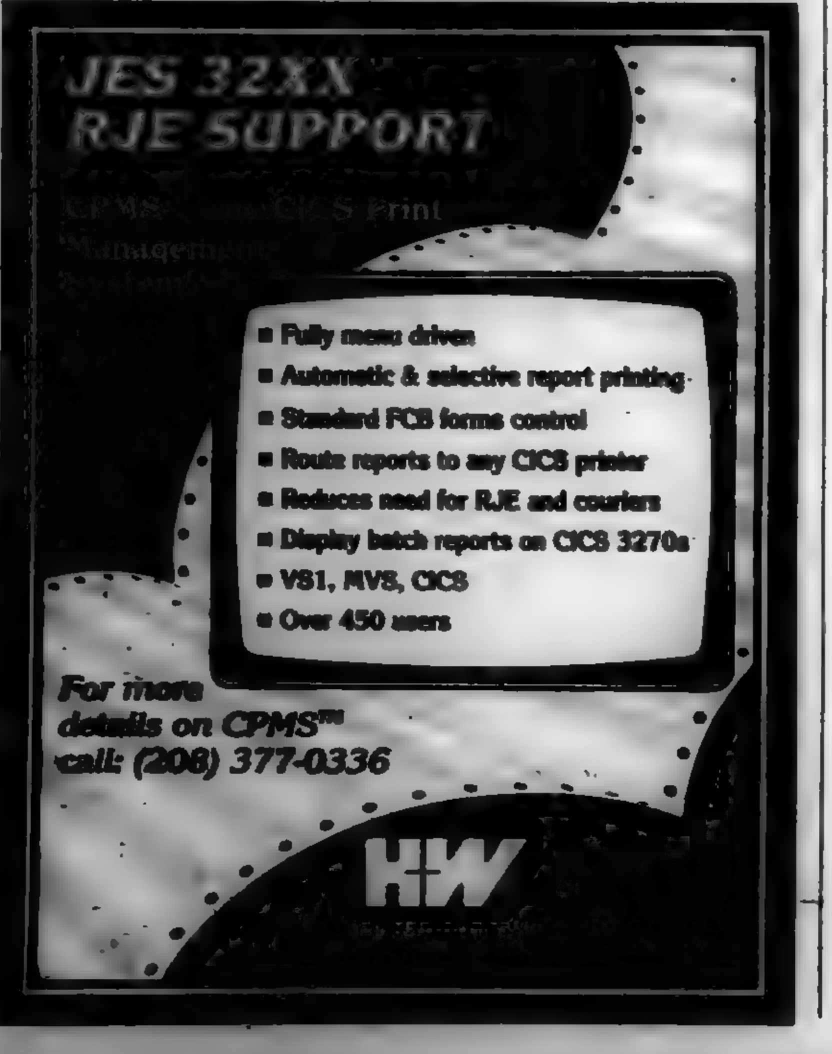
The price of the 9100/System hardware is $23,000, and the price of the software is $8,000, the company said.

The 2155 terminal can function as a stand-alone or primary terminal controlling 2154 satellite terminals in a cluster. The 2154 is intended to function as a secondary terminal. Both terminals are programmable in Basic, the company said.

The 2155 and 2154 terminals in a cluster environment operate on a shared resource basis. The 2155 has a programmable 50-key, point-of-sale function keyboard, 170 line/min printer, cash drawer and operator display, the vendor said. A 5¼-in. floppy disk drive, expandable to dual flexible disk drives, is included with the terminals. Standard memory is 128K bytes, expandable to 256K bytes.

Three communications adapters available include asynchronous, common carrier Data Link Control and common carrier bisynchronous for communicating with the host processor. The price of the 2154 is $3,310, and prices for the 2155 start at $4,405, according to the vendor.

Additional information is available from NCR, which is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.



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Q. CAN A CABLING SYSTEM UNTANGLE TELECOMMUNICATIONS?

A. With all the various devices a company uses to process, move and store information, it's easy to lose sight of one important element—the need to connect all these devices together. That's where a uniform, structured cabling system fits in. But are you just substituting one set of wires for another? Here are some questions and answers that might help you better understand the role a cabling system can play both in solving your communications problems today and in protecting your telecommunications investment for tomorrow.

Q. First of all, just what is a cabling system?

A. A cabling system is designed on a "wire-once" concept. Just as electrical wires are run in buildings today, a cabling system is a permanently installed set of wires that connects the computers, terminals, workstations, telephones and PBXs within a large office building or a campus. This cabling system should also be the foundation for local area networks of the future.

Q. Aren't my computers and telephones already hooked up to a cabling system?

A. It's not so much a cabling system as it is a bunch of cables. Look above the drop ceilings in most office buildings, and you'll discover miles and miles of all kinds of cable. And much of it, strangely enough, is unused. The reason for this waste is that few devices (i.e., telephone, terminal, personal computer, etc.) use the same type of cable. Consequently, when a new device is installed or when one is moved from one office to another, it's quicker, easier and cheaper to run a new cable than it is to remove and reroute the old cable.

This is not to suggest, however, that running a new cable is quick, easy or inexpensive. Relocating just one terminal can cost as much as $1,500. Not to mention a week or two of downtime while the wiring gets done. And when you think about how often office workers move from one workplace to another, you can see that we're talking about a considerable expense.

Q. How can a cabling system help solve my wiring problem?

A. Once installed, a cabling system can make wiring for a new or relocated terminal as easy as moving a plug from one socket to another. The IBM Cabling System calls for the one-time installation of a single cable running from each workplace, inside the walls, and into a central "wiring closet." In the office, that cable terminates in a standard faceplate on the wall, not unlike an electrical outlet. In the wiring closet, the cable terminates in a patch panel that can connect it to any number of devices.

The installation of the IBM Cabling System should be considered if you're adding a number of new workstations, installing a PBX, doing a major renovation or building a new office building. In many cases the "wire-once" benefit will cost-justify the IBM Cabling System in five years.

Q. How do the telephone and the IBM Cabling System work together?

A. The IBM Cabling System can be used for data only or for both data and voice. When the voice capability is used, the voice wires are separated from the single cable in the wiring closet and run to a telephone switching system. Several major PBX manufacturers have tested their PBXs and telephones with the IBM Cabling System. They report that the voice wires fully support their PBX features and transmission speeds.

Q. How can the IBM Cabling System help me today?

A. Currently being installed in office buildings, the IBM Cabling System can connect most of the available IBM data devices, such as personal computers and workstations, small and intermediate computers. We expect that it will also connect many devices made by other manufacturers.

Q. How will the Cabling System help answer my telecommunications needs of the future?

A. The quality and reliability of the IBM Cabling System enable it to transmit data at very high speeds. This makes it the ideal foundation for IBM's planned general purpose local area network (LAN). This LAN, utilizing a "token-ring" technology, can be implemented gradually to connect different workstations, departmental systems and large processors. So by investing in the IBM Cabling System today, you'll not only save money on current installation and rewiring costs, you'll also be better prepared to meet your telecommunications needs of the future.

Q. How do I go about getting the IBM Cabling System?

A. There are a number of design and installation companies that can plan your cabling system and do the actual wiring. The cable and accessories are available through authorized distributors. Your IBM marketing representative can provide you with the names of these companies. The cable and accessories can also be ordered directly from IBM.

Q. Where do I go from here?

A. Installing the IBM Cabling System today is really installing the foundation for your company's future in telecommunications. So you'll want to plan quite thoughtfully. We can help. If you'd like a free copy of the brochure, "The IBM Cabling System," call 1 800 IBM-2468, Ext. 90, or return the coupon.

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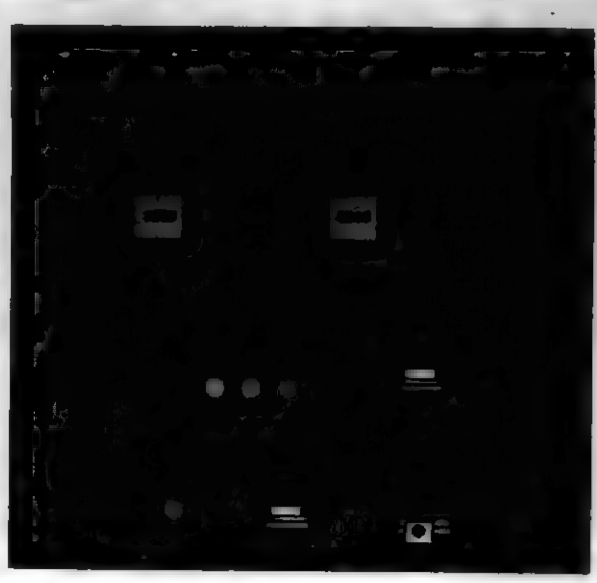

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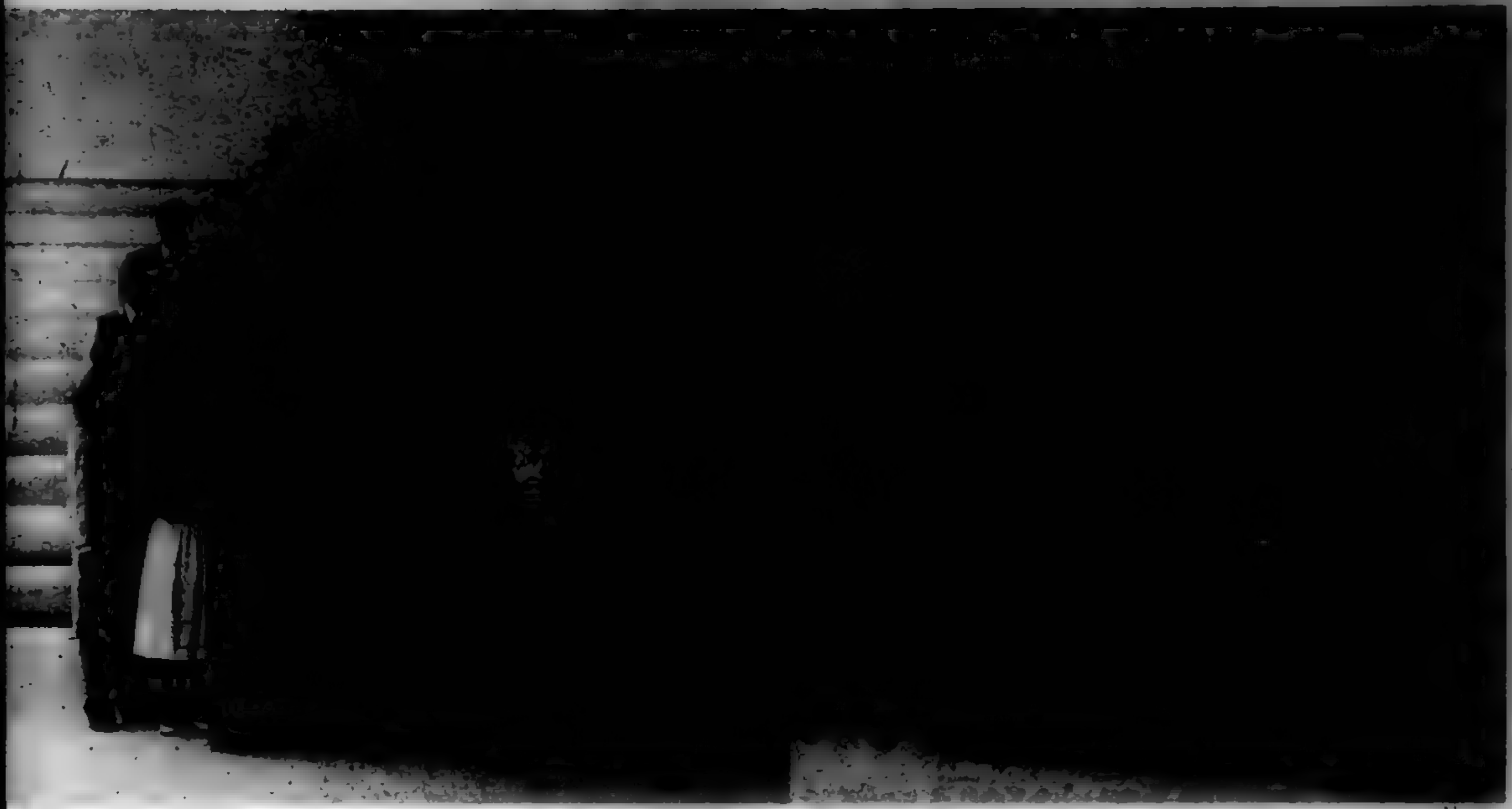

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In Europe, write Michael Zandwijken, Hewlett-Packard, Dept. 003203, P.O. 529, 1180 AM Amstelveen, The Netherlands.

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SYSTEMS & PERIPHERALS

TERMINALS

ANN ARBOR TERMINALS, INC.

Ambassador XL; Guru XL

Ann Arbor Terminals, Inc. has introduced two vertical format 15-in. display terminals. The units were designed for word processing applications and are part of the company's XL series of Ansi standard CRT display terminals.

The Ambassador XL features a 4,800-char. memory that can be positioned on the screen in a 60-line by 80-col. format and scrolled or vertically zoomed through in other user-defined display formats ranging from 18 to 60 lines, the vendor said. This editing terminal can operate in both interactive and block modes at data rates up to 19.2K bit/sec.

The Guru XL has a 28K-byte memory that can be configured in formats of up to 66 lines by 170 columns. The off-screen memory can be partitioned into pages of text or scrolled through horizontally and vertically to accommodate large files of data, according to the vendor. Set-up modes allow for black characters on a white background and adjustment of screen brightness levels.

The keyboard used on both units is programmable with any Ascii string on up to 30 levels. Keys can be tagged for local only, send only and repeat control.

Price of the Ambassador XL is $1,595 and for the Guru XL is $2,395.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

INTECOLOR CORP.

Model 8810, 3810 terminals; Series 2000 monitors

Intecolor Corp. has introduced the Model 8810 and 3810 color terminals, compatible with the company's 8001G terminal, and the Series 2000 19-in. monitors.

The Model 8810 features 32K bytes of random-access memory, three serial I/O ports and one parallel port and support for up to seven character sets of 128 characters each, according to the vendor.

The Model 3810 color terminal, a smaller version of the 8810, features a 13-in. display, tilt screen and detached keyboard and a display format of 80 lines by 48 characters, the vendor said. A rack-mounted version of the 3810, the Model 3881, is also available.

The Series 2000 monitors are intended for personal computer-based control applications and are available for Texas Instruments, Inc.'s Professional, IBM's Personal Computer and compatibles.

The Model 8810 color terminal costs $3,145; the Model 3810 costs $2,645; and the Model 3881 costs $2,995, the vendor said. The price for a Series 2000 monitor is $1,595.

Intecolor, Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

See UNITS page 54

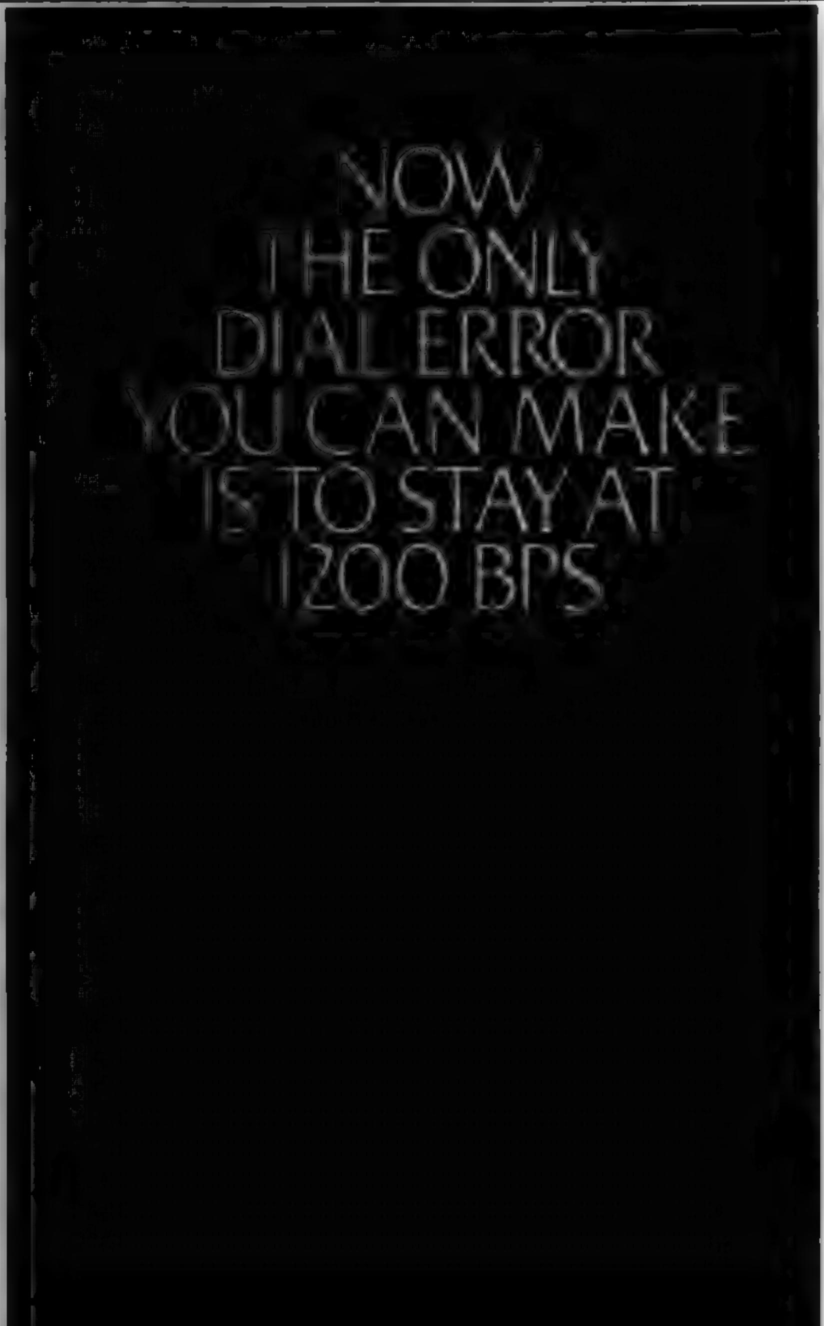
DEC from page 47

ability, distributed file management and software development features. "It's a very sophisticated operating system. It's a strong alternative to [AT&T's] Unix," he said.

Clay Prestia, vice-president of technical development for Raxco, Inc. of Rockville, Md., which provides analysis and performance aids for VAX VMS systems, characterized the 8600 as having a mainframe-like architecture that is distinguished from the VAX-11/780 supermini architecture by the 8600's separate memory-to-CPU and I/O transfer buses. "The big slowdown with the previous architecture in the 780 was the big slowdown in the memory path," Prestia said. "Anytime the I/O is happening, the CPU has to wait for the memory path to clear. That doesn't happen in the 8600."

But while DEC would like to compete with IBM with the 8600, Prestia said, "Where DEC shoots themselves in the foot . . . is [in] the efficiency of the I/O handling in their software. DEC will have a hard time making a big dent into traditional DP areas until they do something about the efficiency of the software."

The analysts agreed that the 8600 announcement puts no immediate pressure on competing supermini vendors to match performance, since the 8600 is a catch-up product. But since the biggest box is often thought to be the easiest to sell, firms like DG and Prime are likely to respond eventually.



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CW 1110

UNITS

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ZENTEC CORP.
Zephyr DD-220

Zentec Corp. has introduced an alphanumeric terminal designed to be compatible with the Digital Equipment Corp. VT220 terminal.

The Zephyr DD-220 is said to emulate fully the VT220 and to feature a 14-in., lockable tilt-and-swivel monitor. It has a 105-key, detached, low-profile keyboard with an 18-key accounting-style pad. Fifteen of the 20 function keys are programmable, the vendor said.

Available character fonts include Ascii, the U.K. national set, DEC special graphics, multinational characters and a downloadable soft character font. The 25-line display can be 80 or 132 columns with bidirectional scrolling. Green or amber phosphor displays are available. The terminal also features blinking, bold, underline, normal or reverse video and double-high, double-wide and blank attributes on a character-by-character basis, the vendor said.

The Zephyr DD-220 costs $850.

Zentec, 2400 Walsh Ave., Santa Clara, Calif. 95050.

TERM-TRONICS, INC.
Miracle 178P

Term-Tronics, Inc. has announced the Miracle 178P, an IBM 3178-compatible terminal said to be equipped with a printer port that can be used to make an Ascii printer operate like an IBM 3287-type asynchronous printer.

The terminal features a 12-in. CRT, a 1,920-char. green phosphor screen, a tilt-and-swivel base, operator-adjustable screen contrast and brightness and an RS-232C printer port, the vendor said.

The Miracle 178P is priced at $1,145.

Term-Tronics, 7408 Trade St., San Diego, Calif. 92121.

MOTOROLA, INC.
KDT 480 Mobile Data Terminal

Motorola, Inc.'s Communications Sector has announced the KDT 480 Mobile Data Terminal, a wireless data terminal that can act as a stand-alone unit or be connected to a vehicle's radio.

The terminal can be connected to a fixed-position radio that transmits to and receives from a mobile radio, sending information back to a controller that acts as a telephone modem, the vendor said. The microprocessor-driven controller reportedly can communicate with IBM's Systems Network Architecture as well as binary synchronous and asynchronous protocols.

Features reportedly include random-access memory storage of up to 3,000 char., a text area of more than 20 sq in. and 12 lines of 40 char. in each format.

The terminal is priced at $3,295.

Motorola, Communications Sector, 1301 E. Algonquin Road, Schaumburg, Ill. 60196.

PRINTERS/PLOTTERS

GENERAL BUSINESS TECHNOLOGY, INC.
6630XP

General Business Technology, Inc. has announced the 6630XP laser printer for use with IBM's System/34, 36 and 38 processors, as well as with IBM's Personal Computer.

According to the vendor, the 6630XP produces up to eight pages of letter-quality type per minute. Two type styles are built-in, and additional font cartridges are available.

The printer interfaces with IBM systems via standard twin-axial cable. For remote applications, the printer may be connected through an IBM 5251-12 or 5294, the vendor said. The 6630XP is priced at $5,995.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714.

GOULD, INC.
Colorwriter 6120

Gould, Inc.'s Recording Systems Division, has announced the Colorwriter 6120, a seven-pen, general purpose plotter for business, scientific and engineering graphics.

The Colorwriter 6120, with RS-232C or Centronics Data Computer Corp.-type interfaces, is said to be compatible with Lotus Development Corp.'s 1-2-3 and Symphony, Sorcim Corp.'s Supercalc 3, Ashton-Tate's Framework, Decision Resources, Inc.'s Chartmaster and Signmaster and Graphic Communication, Inc.'s Graphwriter.

Features include paper size selection, front panel pause, reset and scale controls, a 7 in./sec plotting speed and .002 in. resolution. Prices begin at $895.

Gould, Recording Systems Division, 3631 Perkins Ave., Cleveland, Ohio 44114.

SYTEK

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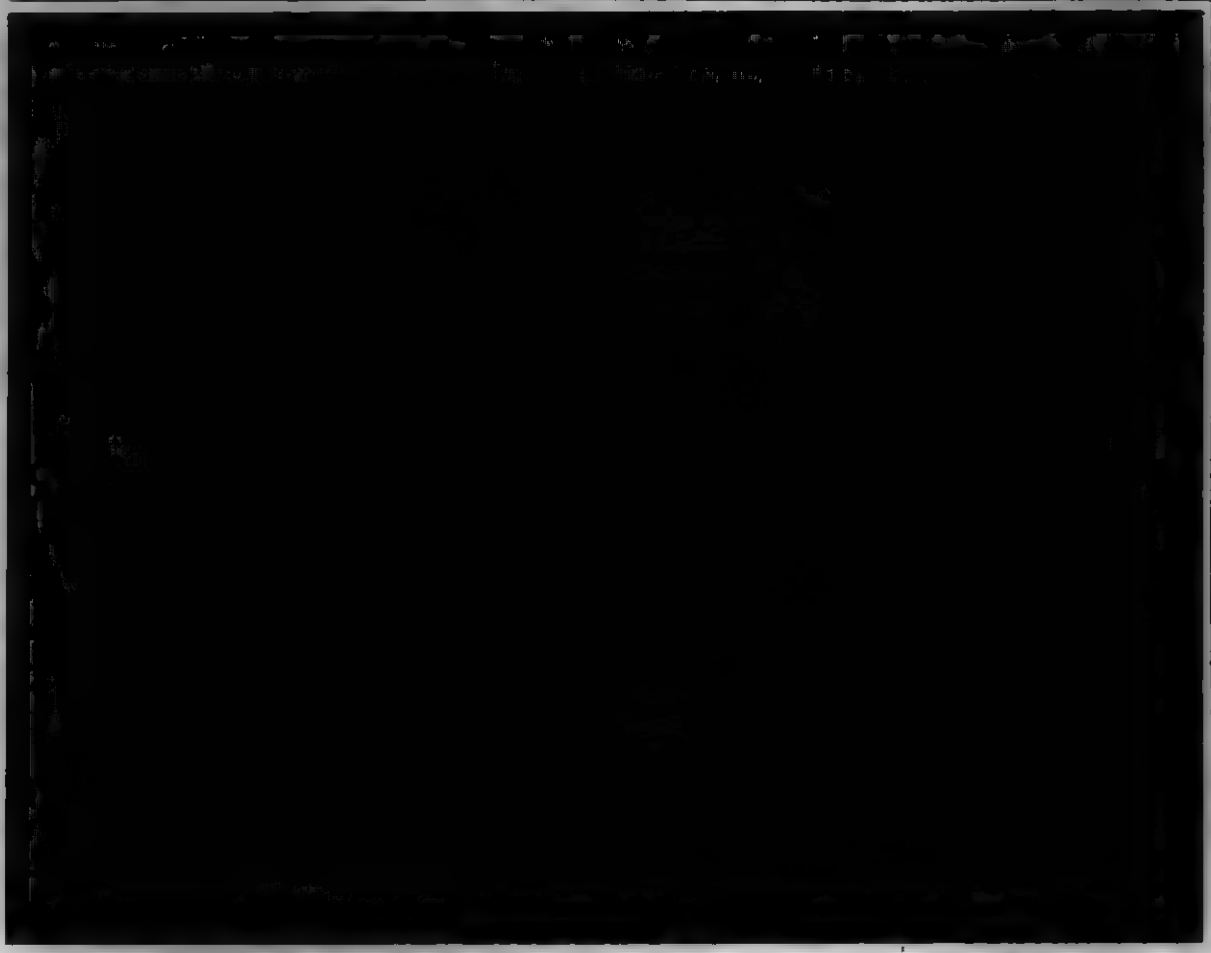
store a list of authorized users and certain characteristics about each user in its memory. The Authentication Server is also said to maintain a record of user logon attempts in memory.

Sytek said the system will be available in mid-January. The price for one Authentication Server and 50 Passports will be $31,000. An additional server would cost $25,000, while another 100 Passports would cost about $8,000.

Additional information is available from Sytek, Data Security Division, which is located at 1225 Charleston Road, Mountain View, Calif. 94043.



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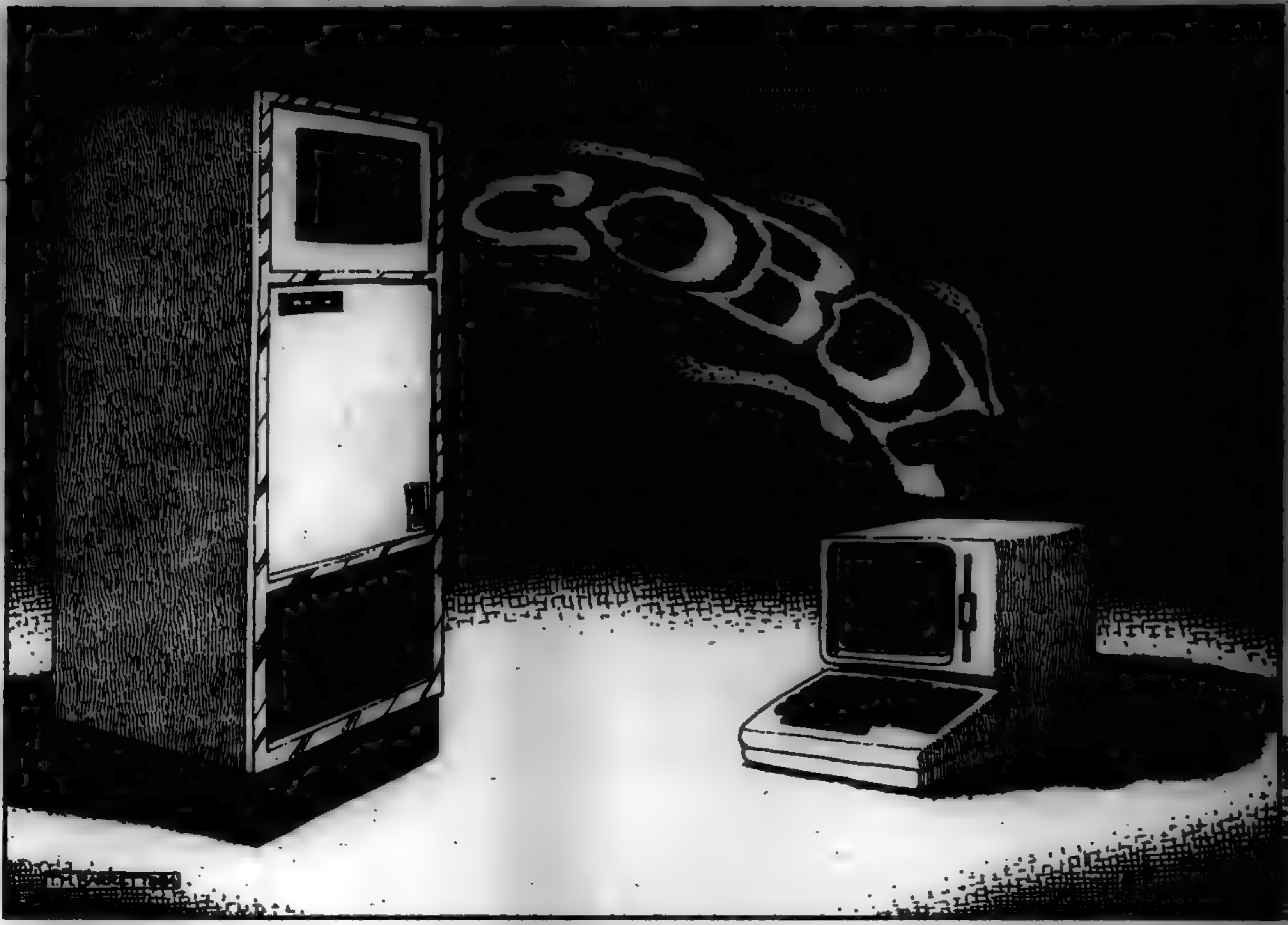


Running your Cobol on micros

(at least some of it sometimes)

By Anthony Fedanzo Jr.

Any Cobol programmer should be able to begin programming on a micro within a week — given microprocessor hardware, a Cobol compiler, word processing for source editing and a data communications package to transfer source and test files.

Even in this age of the microprocessor, the tremendous investment in existing Cobol applications should be exploited as long as possible.

Major vendors such as IBM, Hewlett-Packard Co. and Digital Equipment Corp. have responded almost without notice by providing 16-bit machines to run many mainframe and minicomputer Cobol applications. This response is possible because these companies and other 16-bit systems vendors run Microsoft Corp.'s MS-DOS operating system and one of several Ansi Cobol-74 implementations.

With some relatively minor modifications, many existing mainframe and minicomputer applications can be transported to available 16-bit micros. Two conditions favor decentralized computing by distributing work to microprocessors: the cost of creating replacement application systems and the backlog of systems development.

Microprocessor distributed data processing (DDP) affords the benefits of decentralized computing along with a potentially large saving that would otherwise be expended on replacement systems. While each vendor's product runs a slightly different version of MS-DOS, the fact that they have this common operating system means they are very similar from an applications perspective.

The real and potential benefit to corporate and small-business computer users stemming from this standardized micro operating system and language is the opportunity to implement DDP on systems costing $4,000 or less, while using existing source code.

Little, if any, discernible difference exists between Cobol applications on a major vendor's system and those of the so-called IBM Personal Computer clones. At the level of MS-DOS and Cobol, the similarities between 16-bit micros far overshadow their differences. This situation is unparalleled in the mainframe and minicomputer market, where vendor-to-vendor application transfers are frequently difficult even at the source-code level.

Compatibility of the basic operating system from vendor to vendor has made it possible to implement standard Cobol (and enhancements) on a wide variety of 16-bit systems. Most major vendors have contracted with a software company to implement the version of Cobol they offer. With few exceptions, these implementations are Ansi X3.23-1974-compatible. At this time, there does not appear to be a push taking place to implement Cobol-80 on microprocessors. It is reasonable to assume that the lack of a new version of Cobol simply reflects a benign neglect on the part of vendors and software houses, rather than a deliberate plan to retard the spread of Cobol in the micro world.

Similar implementations of Fortran 77 (Ansi 3.98) have taken place within the last two to three years. It is now possible to transport Fortran 77 code from, for example, an HP 3000 minicomputer, make a few slight I/O syntax changes and then bring it up on either an IBM Personal Computer or HP 150 without further modification. Business applications and some scientific Fortran applications can be moved from system to system with very little modification in the source. Because most business applications are written in Cobol, that language will serve as the exemplar for microprocessor DDP as outlined here.

The real and potential benefit to corporate and small-business computer users stemming from this standardized micro operating system and language is the opportunity to implement DDP on systems costing $4,000 or less while still using existing source code. Existing source code in Ansi format can be downloaded to a micro via the available data communications packages, then modified slightly for differences in disk I/O, file types and CRT handling, as required.

The minimum microprocessor hardware required for practical microprocessor DDP is a 256K-byte system with two floppy disk drives. Increasing memory or adding a hard disk expedites the course code conversion task in many cases, but it is not essential. It is fairly easy to convert 2,000-line Cobol programs that access files containing thousands of records using a 256K-byte microprocessor system with two floppy disk drives.

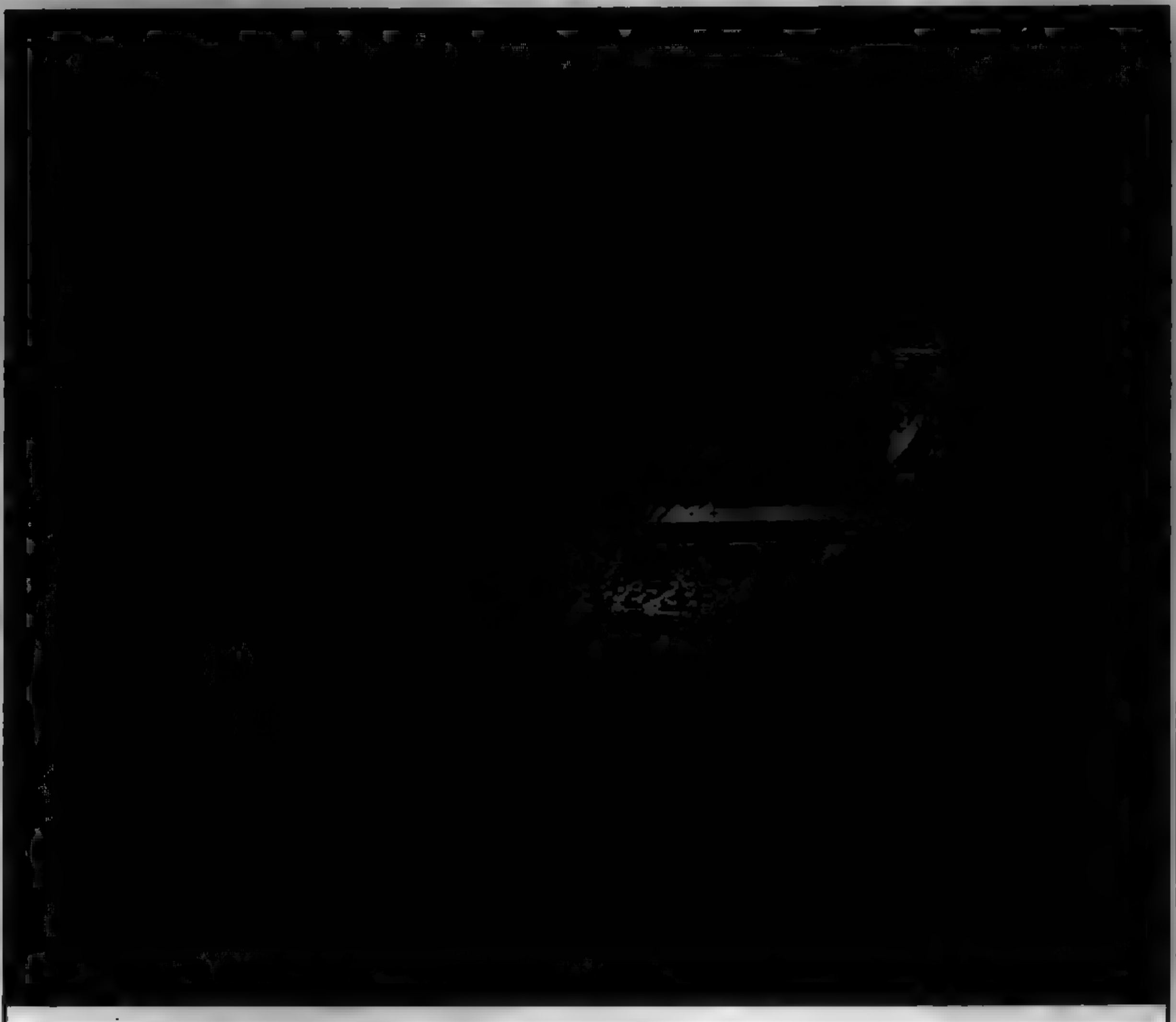
If you are planning on doing a substantial volume of Cobol work, the added expense of larger memory and a hard disk on development systems are worth the cost. The major problem to avoid when using large microprocessor development systems is the chance that executable program size will exceed the main memory limitation of the intended target hardware. This problem can be kept under control by keeping a target machine near the development system for testing purposes.

Advantages of Cobol

Most of the attention that Cobol on microprocessors has received centers upon using the micro as a programmer's workbench. While this is certainly a useful approach to off-loading mainframe tasks, it is only one side of the potential use of Cobol on micros. The other side is implicit in the very ability to write and compile mainframe-compatible Cobol on a microprocessor in the first place.

For buyers of 16-bit microprocessors, the "gee-whiz!" emphasis of much software advertising and the problems of coupling micros to mainframes in useful configurations has tended to obscure the fact that they are general-purpose computers in their own right. The ability to function as stand-alone machines means normal Cobol and Fortran programming tasks can be conducted on these systems. When this capability becomes noticed, it's natural to begin thinking about using them to run routine business applications just like their 16-bit minicomputer and larger mainframe cousins.

When micros are used to run routine applications, the goal of centralized data type and format control can be attained while still allowing individuals and groups local control of the data itself. This accomplishment goes a long way toward distributing and decentralizing data processing without abandoning the equally desirable goal of maintaining a single organizational data standard.



The 3270 alternative designed for the way the other half works.

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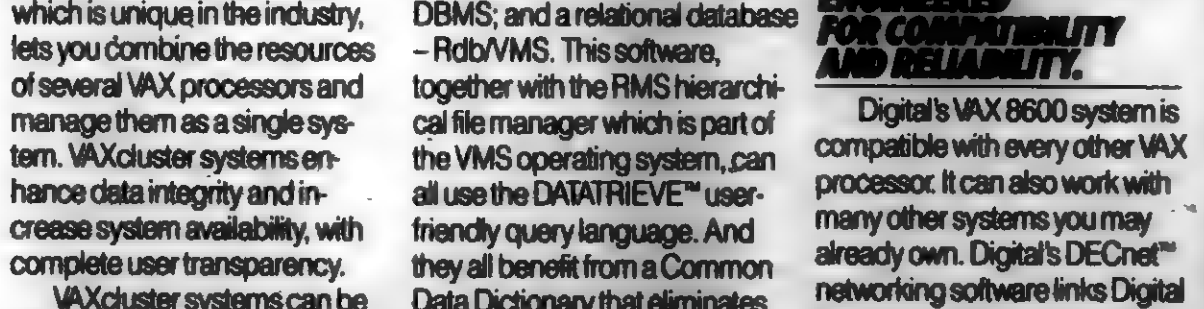

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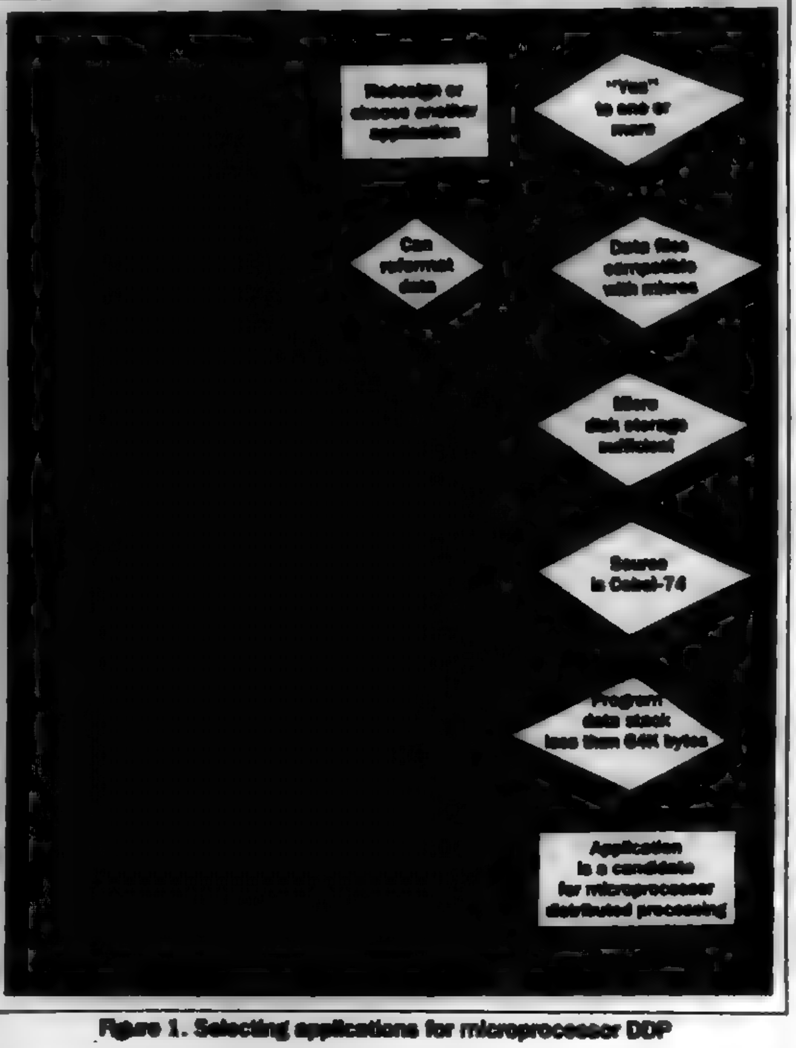
Redesign or choose another application
"Yes" to one or more
Can reformat data
Data files compatible with micros
More disk storage sufficient
Source is Cobol-74
Program data stack less than 64K bytes
Application is a candidate for microprocessor distributed processing

Figure 1. Selecting applications for microprocessor DDP

The limitations on types of applications that are candidates for transporting to microprocessor DDP are mostly hardware-related. Even the new 16-bit micros do not handle large data bases with many access paths very efficiently.

Minimal user retraining is required when existing applications are simply transported to a microprocessor environment. This factor is especially important in light of the time and expense required to train users in various applications. Because the microprocessor itself will require learning new skills, time saved not learning the application will be available for gaining familiarity with the new hardware and procedures.

User familiarity with existing applications can serve as a tool for building basic confidence in those who lack skills or are reluctant to approach the burgeoning generation of microprocessors. Most users will approach a microprocessor with less trepidation if they can still use a man-machine interface with which they are already familiar. This familiarity will be most helpful for batch-entry systems and operators, but it extends to even the more sophisticated look-up and accounting-type systems and to their users as well.

Another notable advantage of transporting existing applications to micros lies in the fairly small amount of DP staff retraining that is required. Since most shops operate with a staff of more or less competent Cobol programmers rather than Pascal or Basic wizards, the expense of either retraining or hiring experts in these other languages can be avoided.

Data processing management must provide its staff with the microprocessor hardware, a Cobol (or Fortran) compiler, a word processing package for source editing and a data communications package to transfer source and test files from host systems to the micro. With these tools, nearly any Cobol programmer should be able to begin programming on the micro within a week. The approximate cost of a compiler, word processing package and communications package is $1,500. Very generous discounts are available from some dealers.

Suitable applications

Most batch data entry systems are suitable candidate applications for microprocessor DDP. This covers the range of those that simply accept input from the CRT and pass it to a plain file, through those that do on-line validation of key items such as names, Social Security numbers, client IDs and the like. Branch office project management and inventory control systems exemplify other kinds of applications that are readily transported to a microprocessor. This transportation makes the most sense when packaged software either is not available or would require significant conversion from existing systems to utilize.

Figure 1 shows the general procedure for determining whether an application is a likely candidate for conversion to microprocessor DDP. The essential steps are those that determine data structure, operating cost and program size factors. If these criteria are satisfied, most applications that satisfy them can be moved to a microprocessor.

Locally relevant detail is not always required by a home office. Many time-sharing systems can be transported to and implemented on local microprocessors with a minimum amount of change. Typically, older systems are easier to convert to microprocessor DDP since they tend to be built in less highly integrated modules than newer systems. Micro-to-host data transfer can be facilitated by sending all data in fixed format Ascii files.

This strategy succeeds in most cases because summary reporting rather than wholesale data base transfers frequently constitute the bulk of micro-to-host interactions. In addition, so long as both host and micro can manipulate Ascii data with minimal conversion it is the simplest solution to the data exchange format problem.

For example, an accounts receivable and payable system based on local invoice billing cycles is operable independent of a host system if the Cobol source code and keyed files (Isam or Ksam) are transported to a micro. Since the information a head office typically requires includes weekly sales volumes, plus accounts receivable and accounts payable balances by general ledger account number, this data can be processed locally and sent to the host in summary form.

At this time, the limitations on types of applications that are candidates for transporting to microprocessor DDP are mostly hardware-related. Even the new 16-bit micros do not handle large data bases with many access paths very efficiently.

This factor tends to exclude software that is built upon data base management system (DBMS) packages until Cobol-accessible versions of the mainframe and minicomputer DBMS software are available on micros. It is, however, quite feasible to send subsets of large data bases to micros so long as the transfer takes place in a suitable data format and the data can be held and used locally in plain or Isam files. Transmission of subsets of host data bases will probably comprise the bulk of host-to-micro communications in a microprocessor DDP network.

Technical considerations

A 16-bit microprocessor has an inherent data stack limitation of 64K bytes. This means that applications from 16-bit minicomputers will transport without encountering this limitation. Minicomputers and mainframes that have a larger word size or data address could present problems if the programs to be transported to a micro use a data area larger than 64K bytes. In these cases, the solution is to modularize the program's tasks by either creating separate programs that are run separately or separate programs that are

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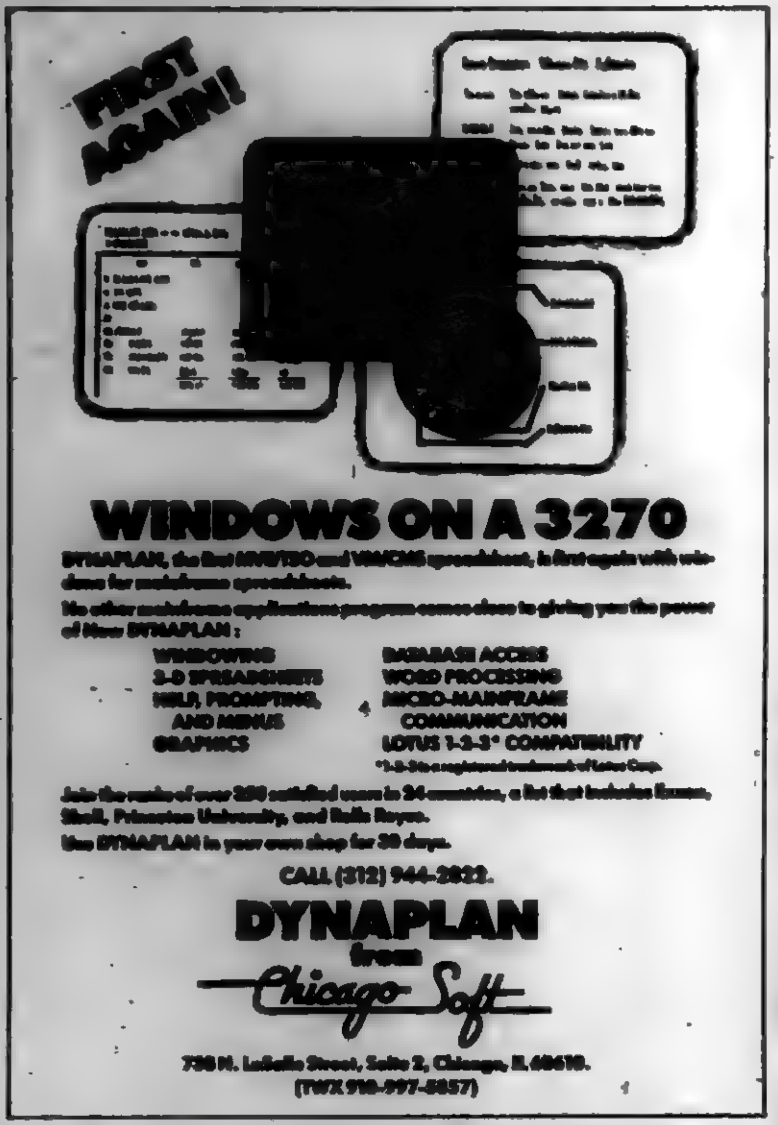
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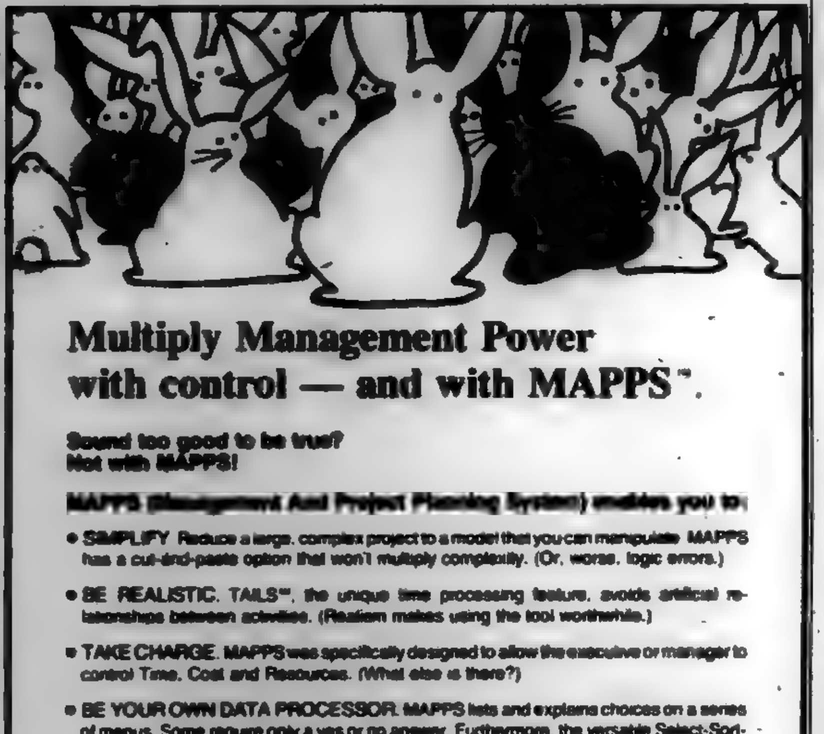
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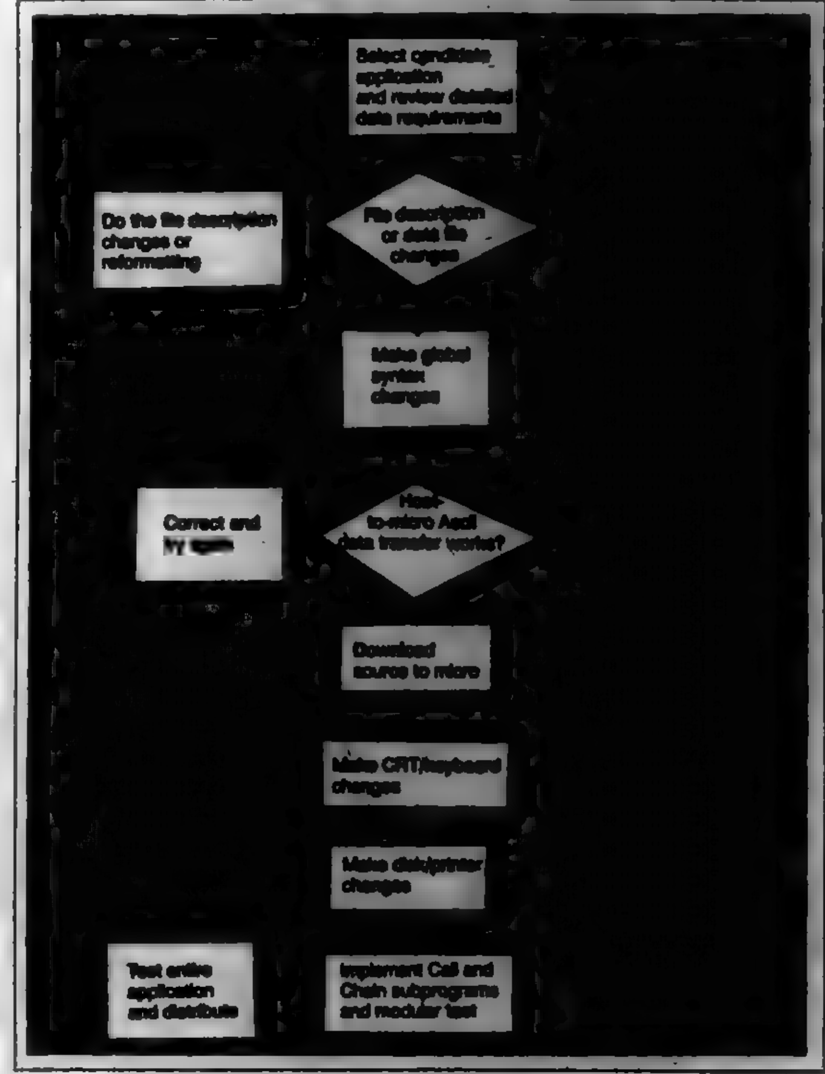
Select candidate application and review detailed data requirements
File description or data file changes
Do the file description changes or reformatting
Make global syntax changes
Host-to-micro Ascii data transfer works?
Correct and try again
Download source to micro
Make CRT/keyboard changes
Make disk/printer changes
Implement Call and Chain subprograms and modular test
Test entire application and distribute

Figure 2. Mainframe-to-micro Cobol conversion process

linked via the CHAIN statement familiar to Basic users.

As outlined in Figure 2, there is a general procedure for transporting and converting applications to a 16-bit micro. Note that the selection process shown in Figure 1 leads into the tasks required for actually doing the application transportation and conversion. As noted previously, the key factors in such a conversion center upon data, then programs, once the cost justification is completed.

Generally, those applications written in Cobol (or Fortran) that utilize plain files, Isam or Ksam files or relative (random or direct) access files can all be transported to major vendor's 16-bit microprocessors. Practical limitations on program sizes are discussed below and have to be considered on a case-by-case basis.

One obvious limit to program size tends to be just how long it takes the microprocessor to execute a code segment before getting back to the user. In Cobol, one hundred lines of IF . . . ELSE . . . logic seems to be a practical limit above which people notice that response time is not virtually instantaneous. Good structured programming will help minimize this perceived execution time significantly.

As on many mainframes, data files accessed by Cobol programs exist in a Cobol format that requires some minor, but necessary, reformatting before they can be transferred as plain Ascii files or used by programs written in another language. For example, micro Cobol sequential files have two leading bytes of data prefixed to the data files. Relative files have six bytes of header information in the first record of each file. Index files have three bytes prefixed to each data record plus a separate key file.

This file and/or record housekeeping information is transmitted to the host by the available data communications packages. Therefore, it must be stripped off prior to transmission by the micro or upon receipt at the host. In either case, the task is a fairly trivial exercise in data reformatting.

Until a major vendor releases a DBMS package that can be accessed by micro Cobol, three familiar file types make up the range of data storage formats available. These are plan sequential, relative and Index (Isam) files.

Sequential files are available in two forms, depending upon whether the file was created within the micro Cobol environment or from another source such as a word processing package. The relative files, sometimes called direct or random-access files, are used virtually identically to those found on mainframes and minis. Index files in micro Cobol allow a single key only, usually up to 60 characters in length. Judicious selection of the fields making up this key will usually allow it to do double duty as a more complex sorting method.

It is worthwhile to attempt to emulate the microprocessor environment on your mainframe, at least with respect to file structures. This will assist in pretransport changes and provide an opportunity to think through potential problems before they are encountered on the microprocessor. A related advantage of an emulation step is the fact that program changes can be made much faster on most mainframes and minicomputers than on a micro. This

IN DEPTH/COBOL ON MICROS

saving of time can be significant when many programs or lengthy programs need to be transported and converted.

CRT screen displays usually are defined and used within a single micro Cobol program. Two general methods exist for doing this. The first is via the screen section declarations of the data division. In this section, row and column references position field headings, variable fields and their edits. These are referenced by DISPLAY and ACCEPT verbs that simply name the declared screen records.

The second method of CRT handling utilizes direct row and column addressing in the DISPLAY and ACCEPT verb syntax to achieve the same screen layouts as found in the screen section. There are fewer editing options available to the programmer in this second method, but it works equally well.

Most 132-column (or less) line-printer reports will convert to output on a microprocessor provided two basic conditions are met. First, the WRITE statements must be standard Cobol-74 and contain no machine-dependent carriage control that lacks a counterpart in the micro. Second, the printer selected for the microprocessor must be able to print a full 132 columns; many small system printers print only up to 80 columns. You should also consider whether you need multipart forms. Generally, it is difficult to get more than three-part carbon forms to give a clear image on small-system impact printers.

Hardware requirements

The hardware required to compile micro Cobol programs depends upon the program size. A 256K-byte microprocessor with dual floppy disk drives can easily handle 2,000-line Cobol programs. Compile time for programs of this size is about 15 minutes, including generation of the disk image of the listing file. Linking compiled code is done in a second step, as is usual on mainframes and minis. Actual program execution requires that a special Cobol environment file be resident on disk with the application program(s). At runtime, it is loaded into memory along with the application code, for which it provides a runtime library and debug interface.

Most competent Cobol programmers will have little trouble switching between mainframe or minicomputer Cobol and that available on micros. Structured coding techniques still apply to this environment, as do the usual concerns about data editing and security. A great advantage of using Cobol on 16-bit micros resides in the very low level of programmer retraining required. This holds even more true when the programming task is simply transporting existing code to the smaller machines.

Data security on a microprocessor requires careful consideration. Since no single-user 16-bit microprocessor available today has an automatic, foolproof logon/logoff event record, the need for sensible physical security of sensitive data and programs is evident. Physical security in the form of restricted access to the system and data disks is probably the most useful security measure to safeguard your information.

It is easy to add an encryption/decryption algorithm to your Cobol programs or their runtime library to scramble the data in the files accessed. When this measure is taken, distribute only the executable versions of programs to the remote user microprocessors.

Management perspective

The microprocessor may be the wave of the future, but it is a wave that conceals potentially disastrous undercurrents as well as the promise of more effective computing. The programming environment available on 16-bit micros today resembles that available on minis and mainframes during the mid-1970s. Managers should allow for extra man-hours in their estimates of project time because the relatively fast development tools and compilers found on larger systems are not yet on the market for micro versions of Cobol

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and Fortran. Use of hard disks and more main memory will alleviate this situation somewhat, but allowing for the extra time is still prudent.

Consequently, transporting software to micros is faster than writing applications on micros from scratch. Global syntax changes can be made to entire source files prior to transferring them to the micro, where editing and compiling are relatively slow.

These differences in overall performance during programming phases of a microprocessor DDP development project indicate the need for careful advance planning and scheduling. In cases where a new system is scheduled for development of a micro DDP system, coding is often more efficiently handled on a mainframe. It can then be transported to appropriate micros for final development and installation.

In many cases, given appropriate project planning and using a standardized hardware and software base upon which to build applications, the cost of transporting existing Cobol application systems to a microprocessor environment also compares favorably with that of creating whole new applications on them. Again, this is because the task of transporting existing source code is often less costly and time-consuming than that of ground-up analysis, design and implementation.

The issue of who buys the microprocessors in an organization should not seriously impact whether they can be used in a microprocessor DDP strategy. A wide degree of latitude in purchasing micros can be accepted so long as those that are acquired all meet some basic requirements.

In order to use the kind of microprocessor DDP strategy outlined here, all 16-bit micros purchased should be able to use MS-DOS Level 2.0 or above. An X3.23-1974 Cobol language and linker compatible with the MS-DOS operating system should be available. A good data communications package for file transfers to and from host systems should be supported on the microprocessor. These are basic requirements in most planned micro acquisitions and place few, but still firm, restrictions upon the number of vendors from whom hardware can be selected.

User familiarity with existing applications tends to facilitate their conversion to a microprocessor environment. Unless the application is seriously in need of revision or replacement, transporting programs to micros compares favorably with buying packaged software. Even the best packages will require time-consuming learning of some entirely new procedures, plus necessitate fairly radical data format conversions if existing data is to be somehow moved into the package's files automatically.

In the worst case, a package will require manual reentry of large volumes of data already on file. Microprocessor DDP allows electronic transfer of this data with no manual reentry.

Any company that has spent time and effort to develop an organizational data standard will not readily abandon that standard just because packaged microprocessor software does not adhere to its standard. Since existing applications presumably already meet the organizational data standard, their migration to a micro poses no serious problems for maintaining the accepted standard.

Transporting programs to micros often compares favorably with buying packaged software.

This consideration can be crucial if the consequence of using a packaged product entails loss of central control over data formats, edits, validations and types. Where this is an issue, microprocessor DDP using transported applications is a reasonable alternative to changing a data standard or the organization's way of doing business.

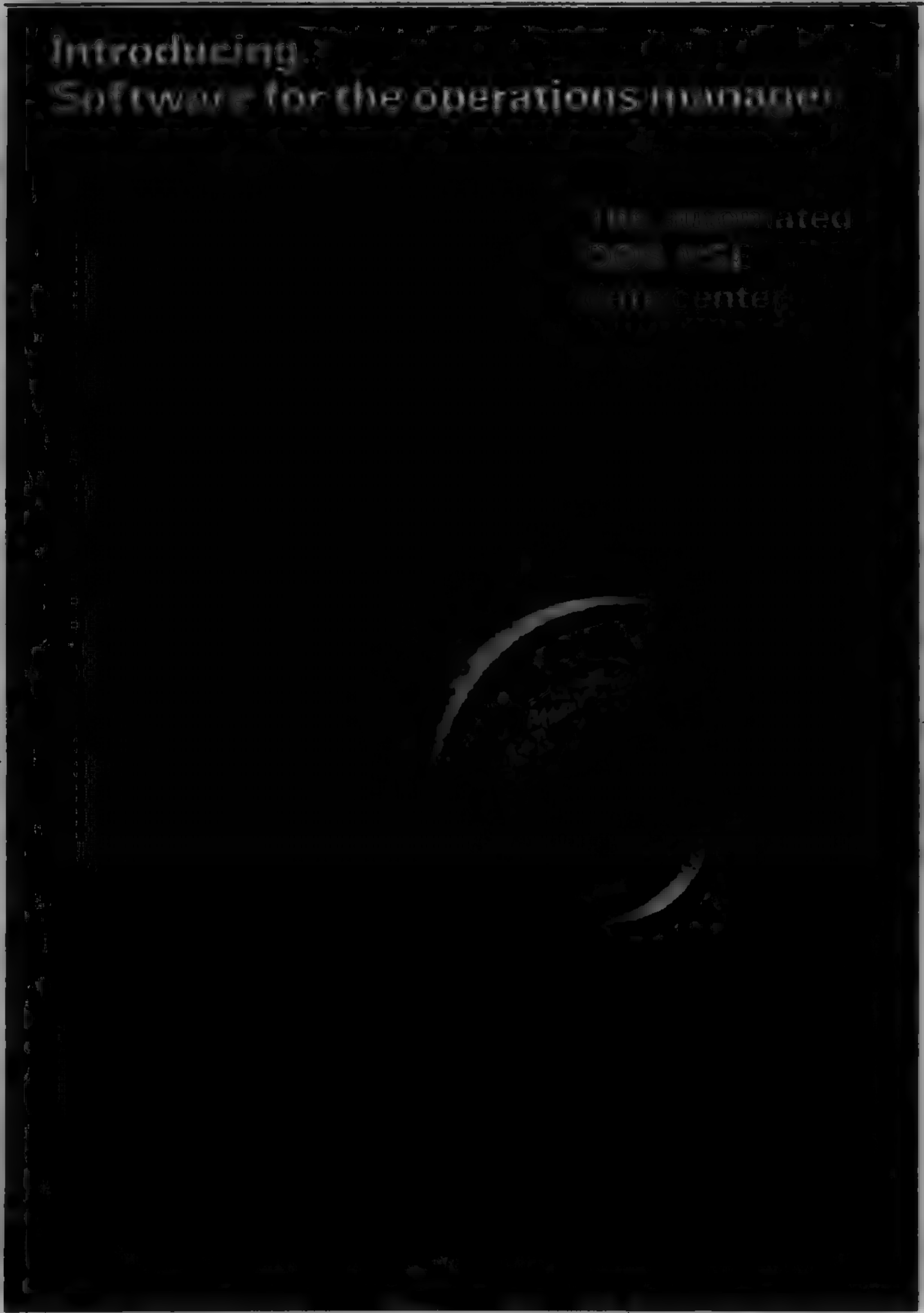
DDP is lauded for its role in reducing data communications costs, especially when replacing time-sharing systems. Microprocessor DDP also provides the same benefit as a communications cost saver. In addition, the new 16-bit systems provide intelligent single-user workstations for word processing, spreadsheets and graphics. A workstation may not always be cost-justified solely for word processing or spreadsheet usage. But because it can also be used to reduce data communications expense, the synergism of multiple uses for the same hardware ultimately justifies the initial expense.

In the final analysis, the 16-bit microprocessor is a computer in its own right. If it is used with that fact firmly in mind, these machines can make a valuable contribution to the overall efficiency and effectiveness of a firm's computing services.

The rationale for introducing microprocessor DDP can be based upon reducing I/O loading on the mainframe, reducing communications costs, maintaining an organizational data standard or allowing the use of new technology without massive retraining. The success of the undertaking ultimately will depend upon a planned approach and a healthy dose of common sense.

About the author

Anthony Fedanzo Jr. is data processing manager for Harding Lawson Associates, a geotechnical engineering firm in Novato, Calif. He has 10 years' experience with both scientific and business data processing and communications.



IN DEPTH

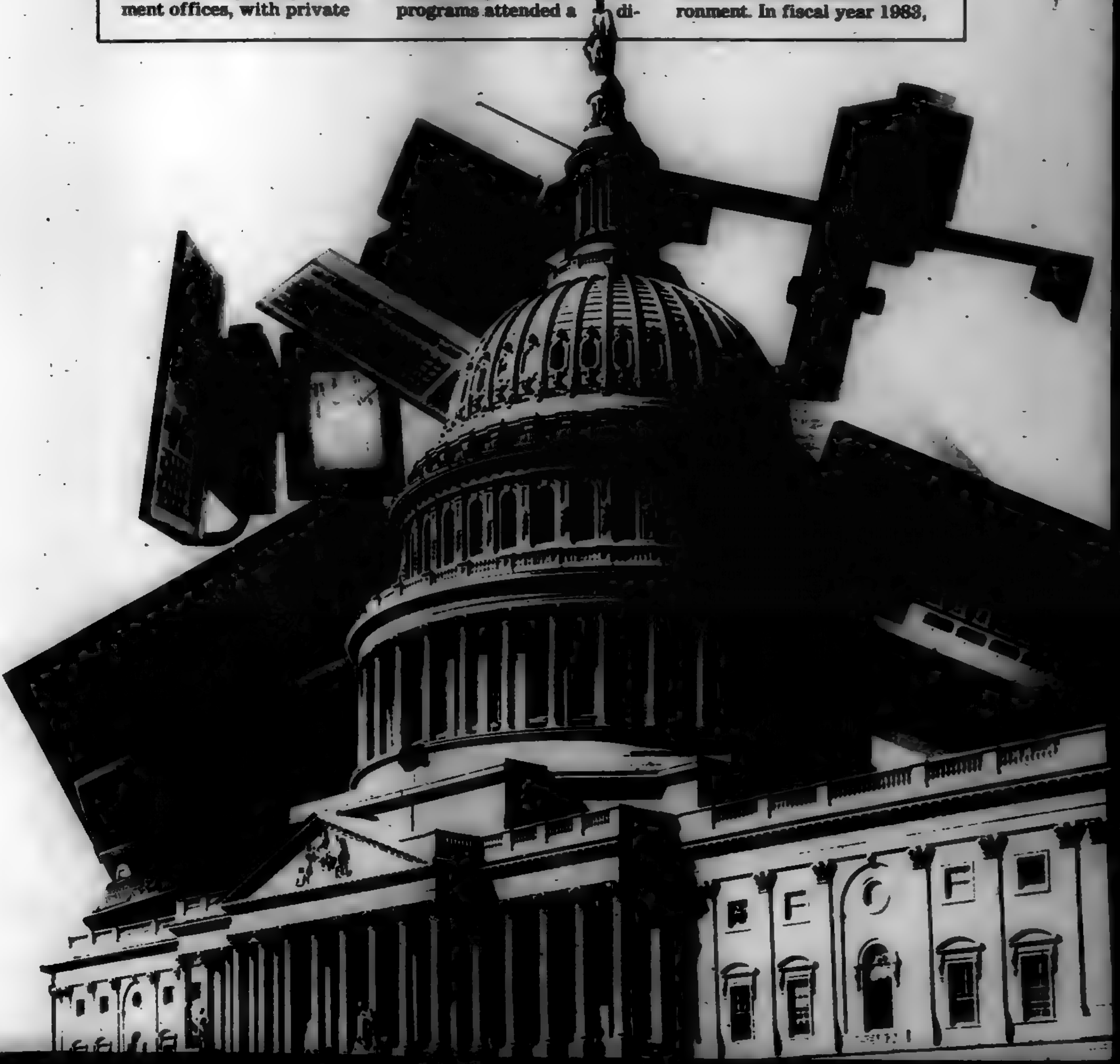
The changing picture of federal office systems

By Charles Guiarson and Cheryl Smith

Federal government office systems are undergoing widespread changes. The trends include larger systems purchases, more single-vendor microcomputer buys, more systems integrator-type procurements, greater integration of micros and increasing incorporation of office systems organizations into information resource management departments. Internal networking is still in the early stages in government offices, with private branch exchange (PBX) systems and broadband networks being pilot-tested more and more frequently.

These were the findings at a special meeting of the federal government office systems program directors at the Federal Office Automation Conference earlier this month. More than 40 directors of major federal OA programs attended a directors' roundtable discussion, which centered on OA policy, planning and implementation.

A lot has changed in the last year. Just one year ago at the 1983 Federal Office Automation Conference, the program directors of more than 30 key government agencies stated that integration of multiple-vendor office systems was a fundamental problem. Integration is still a problem because most agencies have a multivendor environment. In fiscal year 1983,



86% of federal agencies were serviced predominantly by a single vendor, compared with 74% in 1984. Internal networking was a potential solution to integrating multiple-vendor systems. However, less than 10% of the agencies were pilot testing internal networking systems in 1983; less than 50% were even considering the implementation of internal networks.

This year, most major government agencies are considering internal networks, but less than 40% have pilot projects under development. The use of internal networking is expanding but is still not part of the standard federal government agency office system.

The trend is toward broadband networks and digital PBX systems. The broadband systems are concentrated in the defense agencies and civilian agencies that interface most directly with the defense agencies. It appears that most civilian agencies are using baseband systems and reviewing digital PBX systems as a potential method to integrate data and voice system requirements.

Another internal networking trend in the federal government is the linking of microcomputers into terminal or personal computer networks. Hard-wired connections are costly, and long delays are caused when terminals are relocated as organizations change. To avoid this problem, government agencies are implementing permanently installed terminal networks — a single logical network — to link microcomputers and terminals.

Terminal networks provide for low-speed communications between user devices and can be either part of a broadband solution to connectivity or are a separate baseband or twisted-pair solution to internetting terminals. As the organization changes, microcomputers and terminals can be moved along with the personnel and relinked into the centralized or geographically concentrated terminal network.

Other networks being pilot tested in the federal government are office systems networks to integrate minicomputer-type office systems. These networks interconnect the processing and communications components for geographically localized groups of users. They can range from a single physical network serving the entire group to a hybrid office system network composed of several physical networks interconnected to each other via gateways to form a single logical network service.

Another internal networking trend in the federal government is the development of mainframe networks such as Network Systems Corp.'s Hyperchannel. The mainframe network provides a high bandwidth connection between mainframe computers that perform a large number of high-speed, high-precision computations and support large program libraries and data bases. The mainframe network permits the high-speed transfer of files and more timely access to mass storage devices.

The type and structure of the internal network being considered is directly related to the way the agencies are organized and the age and structure of the buildings. In some buildings, the walls are very thick, and it would be prohibitive to install centralized single physical cable-type networks. In these cases, most agencies are reviewing digital PBXs and smaller geographically located networks.

As of this year, more than 90% of all agencies have implemented electronic mail and spreadsheet applications.

If agencies are centralized organizationally and not constrained by building structure, more broadband cables are considered for implementation. In many respects, this is obvious and reflects the characteristics and operating culture of the specific agency. But it is interesting to note that less than 40% of the government agencies have internal networking pilot projects under development.

Applications development

Another interesting trend is the rapid development and implementation of office applications. In 1983, approximately 90% of the agencies had implemented word processing, and about 80% had implemented some sort of electronic mail system. The statistics dropped rapidly in the area of applications usage. Less than 50% of the agencies last year had implemented some sort of electronic spreadsheet.

In 1984, more than 90% of all agencies have implemented electronic mail and spreadsheet applications. In addition, more than 70% of the agencies already installed or plan to implement other centralized administrative support software. This support software includes:

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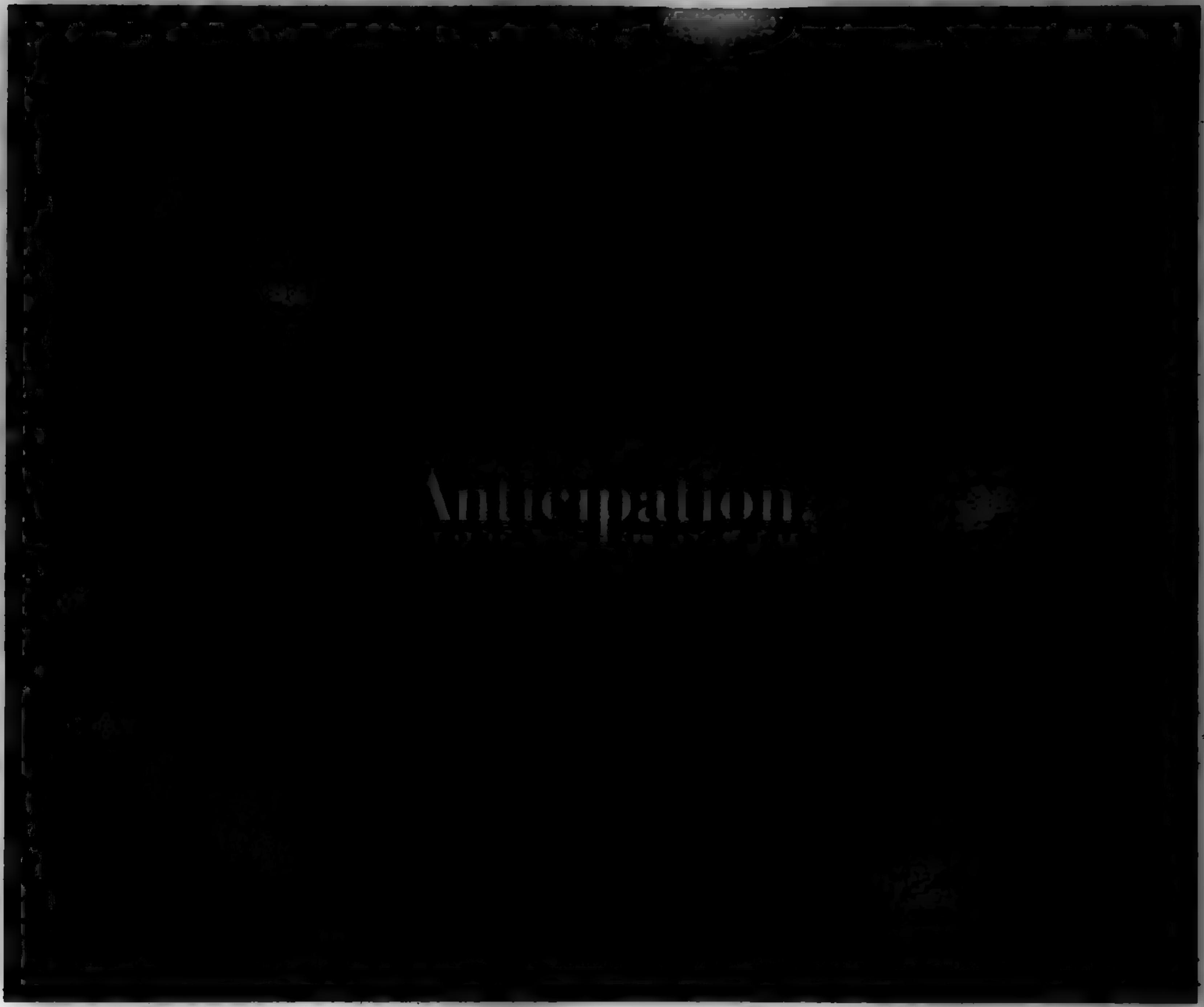

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Figure 1. Applications implemented in fiscal year '83 compared with '84

end-user tools. They are one reason for the growth in usage of administrative support software. Another reason is the increased usage of these packages in microcomputers. Approximately 50% of the responding agencies have now installed these applications compared with 20% in 1983 (see Figure 1).

Merging text, graphics

One area in the federal government where there has been little applications development is in the graphics area. Most agencies are using standard business graphics software that operates on microcomputers, but few have comprehensive systems that merge text and graphics. However, several agencies have data interchange research experiments under way.

The Department of Defense, in cooperation with the National Bureau of Standards, launched a program to expedite the development and implementation of data interchange standards required in a computer-aided graphics program. Over the past decade, there has been an increasing need to exchange graphics and textual data. The types of equipment would include word processors, electronic typewriters, communications terminals, electronic copiers, character printers, typesetters, graphics devices, computer-aided design systems and many others.

This growing demand for data interchange has led to the formation of the Data Interchange Study Group, under the auspices of the American National Standards Institute, to examine data and data interchange requirements for programming languages, office systems, open systems interconnection, data representation, graphics, data dictionaries and data bases. Initial Graphics Exchange Specifications, Graphical Kernel System, Core, Programmer's Hierarchical Interface to Graphics and North American Presentation Level Protocol Standard are some of the standards under review.

More than 60% of the agencies have a need to merge text and graphics, but additional research and development is required before doing so is cost-effective.

Procurements change

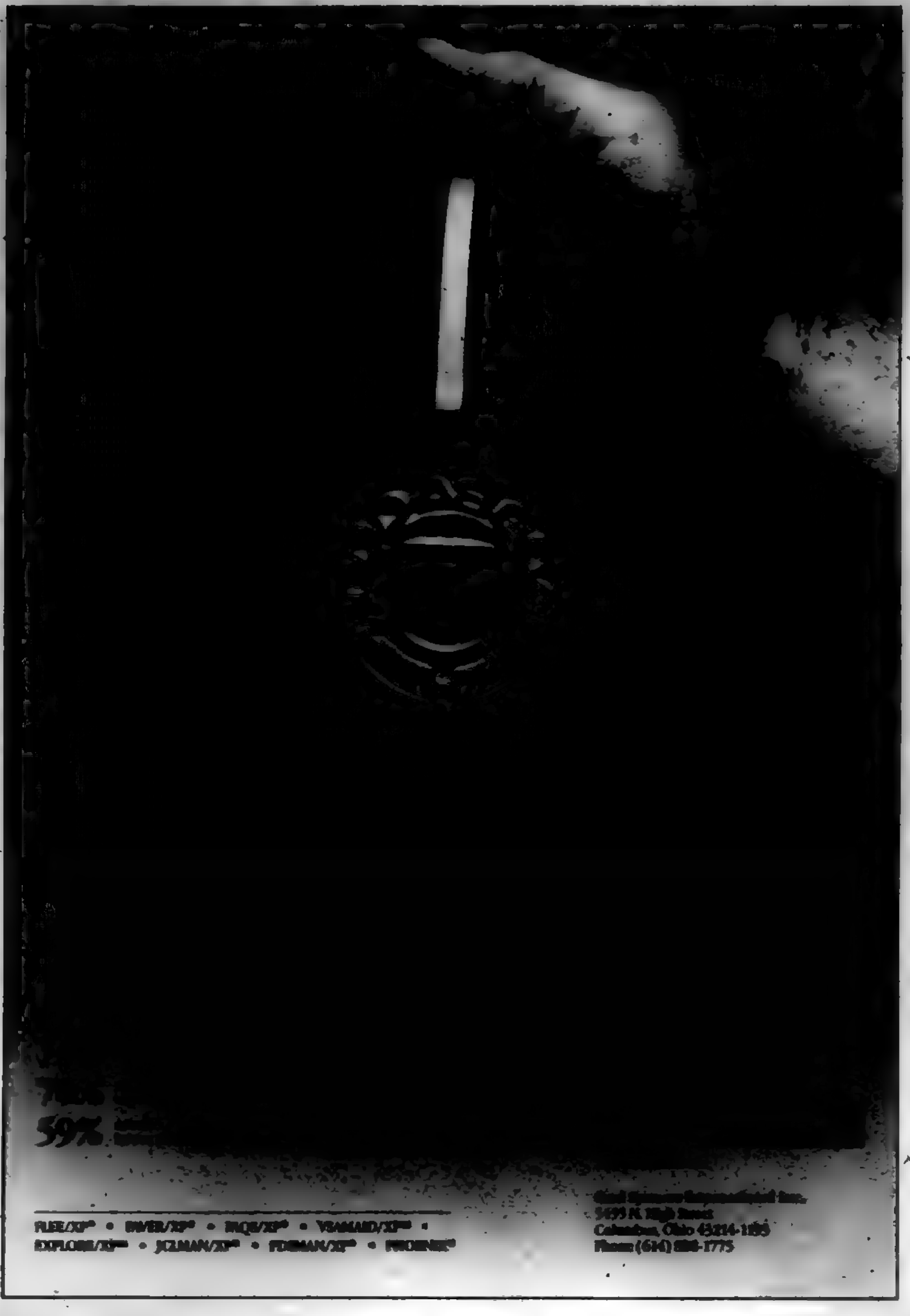
Last year, more than 50% of the federal agencies were planning large office systems buys, and almost 30% were planning large microcomputer buys. Several large microcomputer buys were completed in 1984. The U.S. Navy and the Air Force jointly procured more than 10,000 Zenith Data Systems Corp. 150s (IBM-compatible personal computers) and just recently completed a procurement for Zenith Tempest-certified personal computers. The Department of Defense recently completed a joint service procurement for more than 3,400 IBM Tempest-certified personal computers. The list goes on and on.

A major concern a year ago was that most personal computer buys were stand-alones, and no provision for networking these units was made. This, too, has changed. Several agencies have expanded the procurement requirements to include personal computer-type networks and protocol converters.

"A dynamic trend," according to Randy Ivanciw, who assisted in the development of the Program Directors Roundtable, "is for agencies to avoid the possibility of multiple and noncompatible personal computers by procuring large numbers of units that can be networked."

The procurement trend seems to be in the direction of developing specifications for a central CPU or file server for centralized storage, processing and data base management systems with personal computers serving as multifunctional workstations. It appears that the personal computer, with up to 10M bytes of storage, is quickly becoming the de facto multifunctional workstation for which the government has been looking.

Large centrally controlled office system purchases seemed to be the norm rather than the exception during fiscal year 1984. TRG Washington Group predicts that this trend will continue and increase in 1985. Many agencies choose to avoid



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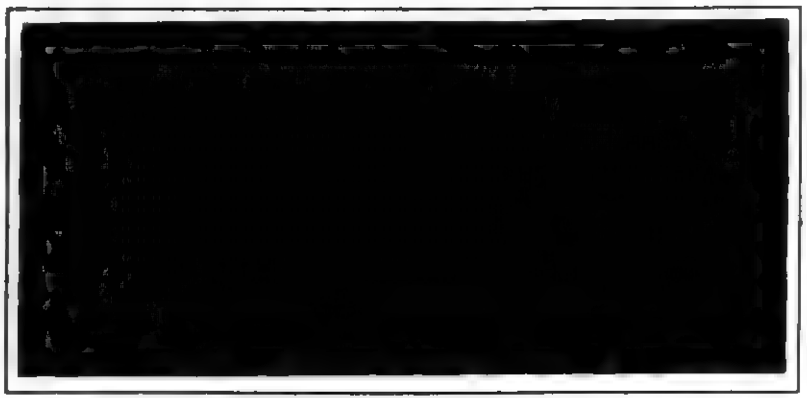

Figure 2. Major issues and concerns

interoperability and interconnectivity problems by standardizing on single vendors or multiple vendors with very specific communications protocols: the Intelligence Community and State Department field offices on Wang, the Forest Service on Data General and the Treasury Department Headquarters on DEC.

Procurements are now more functional-specification rather than hardware-specification-oriented. Procurements include the full range of functional requirements, including software (both system and application software capabilities), maintenance, end-user training and systems engineering support.

As experience grows in OA procurements, a lesser emphasis is being put on just the hardware costs. It appears as though the 100% hardware with 100% cost procurements are gone. Too many agencies have been stung by procuring the least expensive hardware buy. It appears cost-effective, but it couldn't be further from reality.

Today's more progressive agencies look toward life cycle cost — the cost over the life of the project. This means that the total cost to implement a system is being evaluated. More agencies want one contracter to provide the hardware and the software required to automate the major functions of the agency, maintain the system, train the end users and resolve any interface issues necessary to make the system fully operational.

In fiscal year 1983, the agencies talked about this concept; in fiscal year 1984 they did something about it, and in fiscal year 1985 it appears as though it will be standard operating procedure.

Organizational aspects

Information resource management (IRM) has been in effect for more than a year. It appears as though IRM departments are more and more responsible for office systems, but the culture or nature of the IRM department is changing. One year ago, data processing professionals did not have an appreciation for the role OA had in information management. That is rapidly changing.

The merging of the information technologies — data processing, records management, communications and OA — is affecting every federal agency. While each agency is addressing the blend of technologies and procedures of IRM differently, they are addressing them in a more structured, comprehensive approach.

OA procurements now include the communications requirements, interoperability with the agency's mainframes requirements and records storage capabilities that were often missing in the specifications a few short years ago.

The major issues and concerns of organizations have shifted from funding to cost/benefit analysis and the technical problem of interfacing to the agencies' mainframes. Figure 2 depicts this shift. The shift will influence the internal structure of IRM organizations.

The federal government has been accused of being behind private industry in the development of complex office systems. Nothing could be further from the truth. At the Program Directors Roundtable at the 1984 Federal Office Automation Conference, more than 45 representatives from approximately 35 key agencies and subagencies discussed how to implement office systems on a cost-effective, productive basis in the federal government.

The trends revealed that the federal government is moving rapidly toward larger, more centrally administered procurements of compatible systems, more microprocessor-based systems, more broadband and digital PBX-based communications capabilities, more integration of text and graphics and more integration of voice and data. One thing is clear: Leading government agencies will be a significant force in the setting of standards for office systems in the second half of the '80s.

About the authors

Charles Gularson was industry chairman of the Federal Office Automation Conference held in Washington, D.C., Nov. 6-8 and moderator of the Office Automation Program Directors Roundtable, where he presented his survey results. He is president of TRG/Washington Group, Inc. in Falls Church, Va.

Cheryl Smith is director, advanced office systems, of TRG/Washington Group.

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Who Are End Users?

By Leilani Allen

More than ever before, businesses need an experienced professional to plan for meeting end-user service needs with optimum capacity at reasonable cost. This function will be the province of the information engineer.

Users in 1990 may be classified in three general categories, based on different sets of needs and problems that require different systems solutions. These categories are; central site users, remote users and telecommuters. The categories, in turn, may be subdivided into classes.

The information engineering needs of each subgroup are assessed according to four information areas: processing, storage, transfer and management. The following groups come under the category of central site users:

Clerical. Among information users, this group is still likely to be the largest. Its needs are probably easiest to assess. Typical applications will continue to be data entry (especially the feeding of production information bases), information base inquiry and update, report production and (to a more limited extent) word or text processing.

This work will require massive amounts of storage (both direct-access storage devices and mass storage devices). Processing will still be done largely on the mainframe, although some word processing and ad hoc report writing may be transferred to multiuser, mini or micro configurations.

> ***The challenge for the information engineer is to see beyond the broad label "users." Then he can match technical support to individual needs and wants.***

Transfer capabilities will not be especially significant, since this type of user will generally experience information coming to him, in the form of customer phone calls or invoice records. However, there may be some element of data transfer from automatic scanning devices (such as for inventory applications) or in batch mode from outlying sites without their own processing capabilities.

The management component will concern itself with production information base design and maintenance, data security, update standard enforcement, backup and recovery. Sophisticated, real-time performance monitoring, analysis and diagnostic tools will also be essential.

Professional. IBM estimates that by 1990, 50% of all professional workers will have direct access to the computer system. International

IN DEPTH

Data Corp. puts the figure at 65%. This class includes analysts and managers of all types, engineers and programmers. Typical applications will be spreadsheet and statistical analysis, modeling, graphics, computer-aided design and text processing. The majority of processing will be done on micros and minis, with the ability to download data from the mainframe. With the exception of computer-aided design and manufacturing, incremental storage requirements will be fairly negligible, and transfer requirements will be confined primarily to electronic mail and access to external information sources via time-sharing vendors.

Management issues will include data handling protocols, the enforcement of design standards and integration of information bases. Capacity management will be particularly crucial because this type of work tends to grow in a volatile and significant fashion. Analysis of employee productivity, particularly the relationship between given levels of response time to productivity, will be a major focus.

Executives. There is no question that this group will experience increased hands-on use of the computer. However, few executives will use the computer as their most trusted or most frequently accessed information source. It is interesting to note that much of the current discussion of computer tools for executives centers around the need to provide executives with direct access to the production information bases. This need is based on the assumption that executives will want to enmesh themselves in detailed data manipulation and analysis. Yet executives themselves are far more interested in the big picture.

Access to production information base data will, in all likelihood, be provided by means of daily summary files created by subordinates that can be downloaded to the executive workstation. There, a sophisticated decision support system interface will use the data to update a variety of "canned" graphical and report formats that have been customized to the executive's preferences.

Rather than learning programming syntax and commands, the executive will merely type one character (for example, "S" for "sales report") or point to a report icon on the screen. The program will then show the executive the latest indicators and a variety of "what if" scenarios based on preprogrammed assumptions.

Storage and processing requirements will be minimal. They will be handled by a microcomputer, although the initial preprocessing of the summary data will be done by extraction routines on the mainframes, both central and remote. Transfer will involve shipping the summary data only.

Management requirements will include stringent provisions for data integrity and security. Initially, a high-level analysis of the executive's information needs will have to be performed, most likely using many of the techniques developed in expert systems research. Indeed, the advancement and spread of artificial intelligence and expert systems design methodologies will probably be most fully exploited in the commercial sphere in the creation of executive user interfaces. Ongoing consulting/programming assistance will also be required as information needs change.

Industrial. This will also be a relatively new group of users. It will include workers and supervisors in a wide variety of manufacturing-related roles. Typical applications include inventory control, production control, fault-testing, robotics, inspection, problem diagnosis and repair.

Processing will largely be done on the mainframe and will require a large amount of storage. Once again, expert systems technology will be useful here, as the relevant information about each failure/problem is captured and stored in the knowledge base, which in turn can be accessed and analyzed by problem processing systems. Even if this level of sophistication is not possible, a historical file of incidents will be maintained as a guide for appropriate

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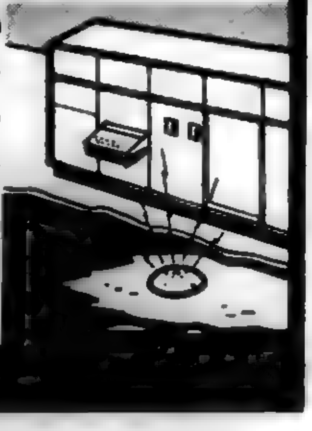

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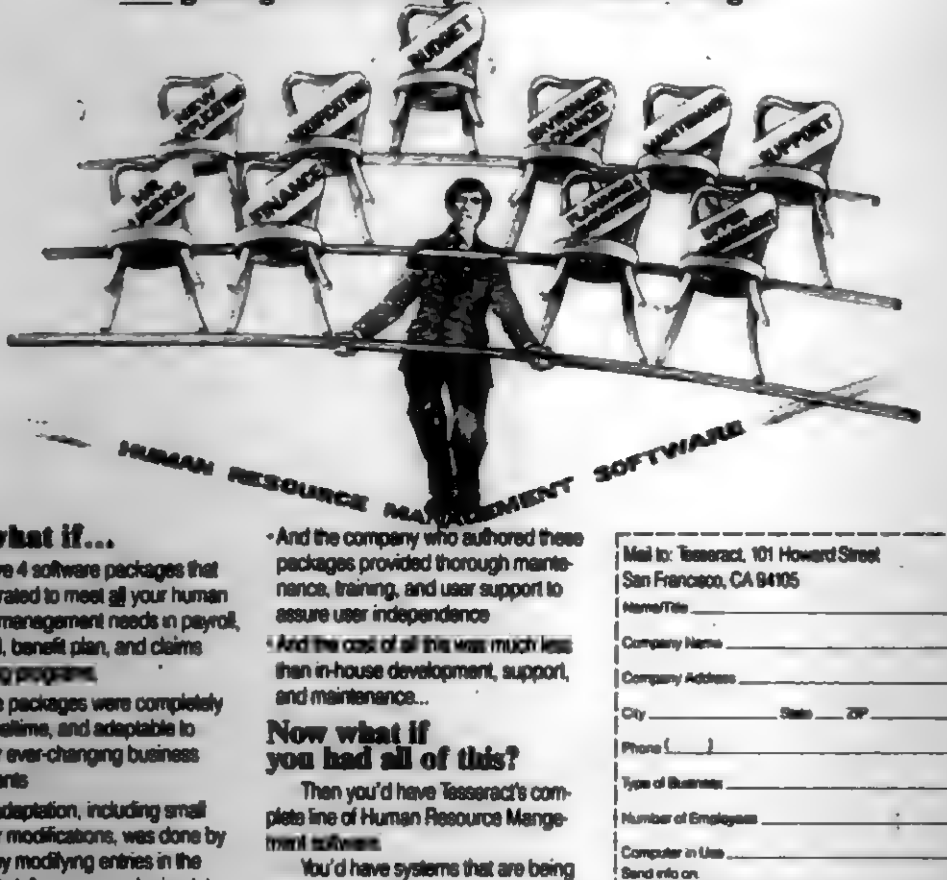

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action. Transfer requirements will be negligible for the centralized manufacturing installation.

Management requirements are similar to those of the production information bases but with less stringent update protocols. Education of industrial users will be a key information management element, largely because this group of users has had far less exposure than clerical workers to computer equipment and possesses minimal keyboard skills. As a consequence, voice and image recognition capabilities will be the most important technical enhancement for hardware used in industrial settings.

Remote users

Office staff. Remote offices may be viewed as containing a smaller representation of each of the central site components. Many of the applications will (in fact, must) be identical to those at the central site. However, transfer of information will be a much more crucial element.

Processing will be handled largely by powerful (1M- to 2M-byte) microcomputers with hard disk storage capabilities. Selected data from these individual machines may then be loaded to a local minicomputer, that in turn will be linked via high-speed line to the central site mainframe. The sequence of the transfer process and the regulation of precisely which information will need to be forwarded on to other locations will be a key management issue.

Also, remote education and technical consulting capabilities will be required. Because of the expense and administrative problems associated with maintaining large training staffs in multiple locations, computer-based or computer-aided education will be the primary vehicle for providing expertise to the remote sites. The final management element will be decentralized network performance monitoring and problem diagnosis.

Field. One of the most interesting of the new classes of users will be personnel in field locations. The oil and gas industry, in particular, will need to support decision making at drill sites, off-shore oil platforms and producing fields. The construction industry will also see increased use of technology-supported test and inventory control activities in remote sites. Rugged, portable terminals capable of accessing specialized information bases will be increasingly evident.

Thus, a crew confronting an engineering problem could enter the indicators into the terminal and have that data analyzed by expert-systems software to get advice on how to proceed. The time-consuming and costly delays associated with tracking down a human expert to analyze the problem and then try to relay that information over the phone could be virtually eliminated.

Processing responsibilities will be shared between the portable terminals and the central or regional mainframe. Incremental storage requirements would be minimal since most of the transactions would be one-time or ad hoc in nature and would not require significant post-processing or analysis. The transfer element will be significant, probably involving the use of built-in modems and dial-up facilities. Again, depending upon how remote the field locations were, local-area network facilities might serve as the transfer medium.

> ***The time-consuming, costly delays associated with tracking down an expert to analyze the problem and then trying to relay that information over the phone could be virtually eliminated.***

The management issues would be security, the selection of appropriate network architectures and, of course, field training. Also, the physical maintenance of the machines themselves will have to be addressed.

Customers. Once again, this represents a relatively new group of users.

Banks, insurance companies, retail stores and other consumer-driven industries are realizing that to stay competitive in the '90s, they will have to reduce the labor component in the services they provide. Giving customers direct access to information bases is one major way to achieve this goal. Automatic teller machines, home banking, automated check-in terminals at car rental agencies, shopping at home via converter boxes on home TV sets — all of these will become widespread in the next few years, especially in major metropolitan areas.

This past February, IBM, Sears Roebuck & Co. and CBS, Inc. announced a joint venture to develop a nationwide commercial videotex service for households with computers. J.C. Penney, Citicorp and American Express have also expressed interest in this technology. One industry expert predicts that videotex could be a $30 billion industry by the mid-'90s.

Processing will take place largely on the mainframe, although there may be minimal intelligence at the node. Storage requirements may be quite significant, especially to hold large customer archive files. Information from these files will be intensely analyzed to support future marketing strategies and will constitute a major information asset.

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Transfer will also be a significant and costly element, primarily because of the need for leased lines. Management issues will predominate. These issues will range from privacy and security concerns to backup, recovery and equipment repair to maintain stringent availability standards.

Telecommuters

This final major category will be the most diverse group of all. It will include permanent and part-time employees working at odd hours and accessing a wide range of information sources.

Sales. New technical developments will allow the traveling sales representative to achieve a higher level of communications sophistication. Portable computers will be used for everything from typing up the notes of a meeting to dialing up a home-office computer to demonstrate product features. The sales representative might also use a portable to call up needed information (such as current delivery schedules, price quotes, discount or financing options). Instead of leaving brochures, the representative might leave a complete, customized proposal.

These developments should help shorten the overall sales cycle and enhance the revenue-generating ability of a sales force. In addition, the portable terminal could transmit updated sales or forecast data directly to the home or regional office, thereby improving communications between management and its sales operatives. This development may also reduce the amount of clerical support required at field sales offices since contracts could be generated by computer as well.

Cellular radio systems in large metropolitan areas will finally make car phones feasible, allowing sales representatives to stay in touch with their customer bases and significantly reducing telephone tag, which is frustrating and unproductive.

Word processing and financial analysis could probably be handled by the portables directly, with the more sophisticated demonstrations and inquiry processing handled by regional minicomputers or central-site mainframes. Storage requirements will be minimal. Transfer capabilities could be handled with a local-area network architecture or simple dial-up lines. The key management issues will, once again, be security (contract and pricing information is highly confidential), education and equipment maintenance.

Working parents. Two of the most interesting developments of the last decade have been the vastly increased number of mothers with careers and fathers who wish to play a more active role in the care and raising of children. By the end of the decade, it will be increasingly common to see one or both spouses working primarily from the home.

These working parents will largely be professionals, simply because executives are involved in too many meetings and other face-to-face activities to make telecommuting feasible. Industrial workers are still required to be physically situated in the production environment, and the costs of allowing clericals this work option will probably be viewed as prohibitive. However, the typical white-collar employee usually does a good deal of work in isolation and is far more likely to interact directly with an information base of some kind rather than numerous peers or higher-ups.

Programming, technical documentation, computer-aided authoring systems, financial modeling, credit and brokerage functions — all can be successfully carried out with a telephone and computer at home. The working parent could take care of household chores, dial up the mainframe and

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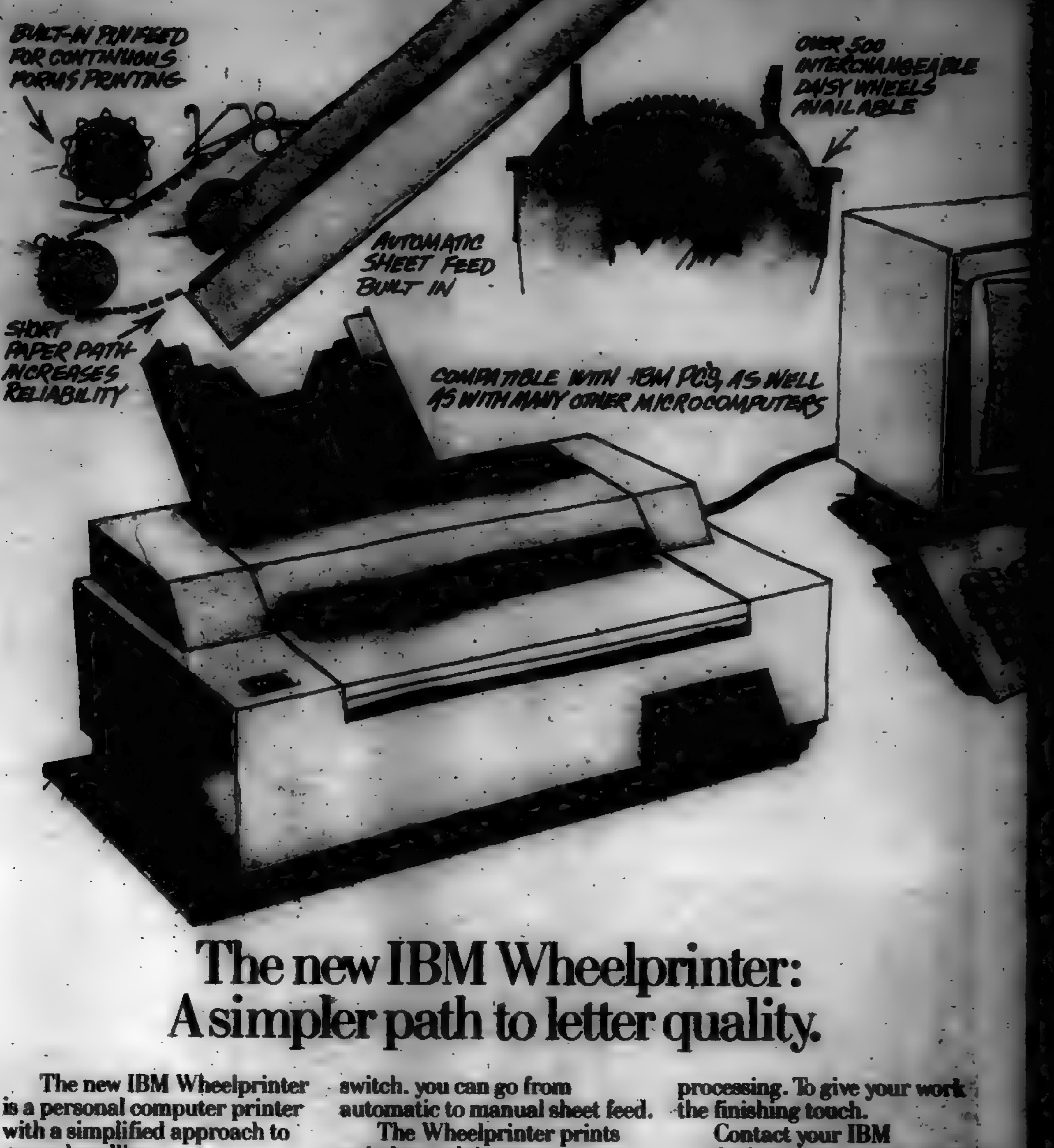
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ask for information to be loaded to his micro and begin the day's analyses. Work might stop when the children return home from school and resume again after dinner. The resultant updated material could be placed in a file to be transmitted to the mainframe during off-peak hours (say, after Johnny Carson or at 7 a.m. while packing the school lunches).

Apart from improving productivity and employee morale, this option offers intriguing capacity management opportunities in terms of work scheduling. The important management issues will primarily be security and integrity of information bases, backup and recovery of home-based systems (what happens when the home hardware breaks down?), the enforcement of data standards and availability of help and consulting facilities to support the home user.

Consultants. One element in today's labor market that is drawing increased attention is the widespread use of consultants as a supplement to, or substitute for, permanent staff. The tremendous rise in the cost of benefit packages and of real estate, as well as an increasingly volatile economic situation, have forced many companies to look long and hard at personnel increases.

Consultants offer a corporation a great deal of flexibility in fulfilling short-term requirements or compensating for real or imagined inadequacies in staff training or capabilities. Complementing this corporate need is an increased entrepreneurial spirit among today's middle managers and senior analysts. These people are attracted by the financial and tax advantages, personal autonomy and growth opportunities that having one's own business presumably offers.

Consultants may not require office space, retirement plans or secretarial support. However, they will require access to corporate information bases. Indeed, the overwhelming part of a typical consultant's job (and, naturally, the biggest component of the fee) is data collection. Streamlining this task will not only allow more time to be spent on solid, site-specific analysis (too often missing from many final reports) but will also allow the client more frequent (perhaps daily) updates as to the contract's progress. Also, allowing the consultant to use client information resources and facilities may result in recommendations that are more feasible.

From an engineering standpoint, consultant processing, storage and transfer needs will be very similar to that of the working parent, although they will be more likely to require access to many different information bases and external time-shared services, depending on the nature of the task. Security and privacy will, once again, be key management issues, and stringent controls will have to be implemented to ensure the proper handling (and perhaps eventual destruction) of confidential information.

Industry trends, technological developments, government regulations, consumer attitudes — all of these are large unknowns. Yet all will affect working people. The challenge to the information engineer is to determine who those people will be, what they wish to do and how they can most productively do it with the best the technology has to offer.

About the author

Leilani Allen is assistant general manager of the Institute for Information Management in Sunnyvale, Calif. She teaches classes in information management in the U.S. and abroad.

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MICROCOMPUTERS

DEC launches LN03 desktop laser printer

LAS VEGAS — Digital Equipment Corp. last week introduced a desktop laser printer that prints eight page/min and carries a $4,195 price tag.

DEC's LN03 can produce 300 dot/in. for text, twice the density of standard dot matrix printers, according to DEC. The LN03 also is said to produce simple business graphics with resolutions up to 150 dot/in.

Resident fonts allow the LN03 to print up to 120 char./line in the vertically aligned portrait mode and up to 150 char./line in horizontal landscape mode, according to the vendor. The printer's input cassette and output tray each hold up to 250 sheets of standard letter-size paper, DEC said.

The device is said to support both single-user and multiuser printing configurations. "A dedicated LN03 offers the single user the ability to add fonts by plugging in [read-only memory] cartridges," said Bruce Hunter, product marketing manager for DEC's Terminals Business Unit.

"When the LN03 is used as a shared resource, [random-access memory] cartridges are plugged in, and the host system down line loads fonts to the printer's expanded memory," he said.

The LN03 is driven by an on-board controller and has a serial interface with a selectable bit/sec rate of up to 19.2K, DEC said. The printer is said to be compatible with many applications written for DEC's LQP02, LA100 and LN01 printers.

Deliveries of the new desktop printers are scheduled to begin in February, according to the firm.

DEC is located in Maynard, Mass. 01754.

TI laptop, designed for mobile professionals, available soon

AUSTIN, Texas — Texas Instruments, Inc. last week introduced Pro-Lite, a 10¼-lb portable version of the TI Professional Computer, designed for mobile professionals and available in January for $2,995.

Pro-Lite reportedly features a 12-in. LCD with an 80-col. by 25-line display in text mode and a 640- by 200-pixel resolution (scrollable to 720 by 300 pixels) in graphics mode. Based on an 80C88 microprocessor (the Cmos version of Intel Corp.'s 8088), the Pro-Lite includes 256K bytes of random-access memory (RAM), expandable to 768K bytes; a 79-key, full-size keyboard; and a single 3½-in., 720K-byte microfloppy disk drive.

Pro-Lite runs under Microsoft Corp.'s MS-DOS 2.12. Approximately 30 packages will be available in microfloppy format in first-quarter 1985. These will include applications such as Ashton-Tate's Framework and Dbase-III, languages and vertical-market software, TI said. Other packages licensed on a single-user basis can be downloaded from a desktop Professional through a $75 interface cable, which also can transmit data files from IBM Personal Computers, according to the vendor.

The 768K-byte RAM capability, greater than that provided for most computers running MS-DOS, "will allow Pro-Lite to take advantage of future expert systems and natural language products," TI said.

A battery pack or second microfloppy disk drive, or both, can be added through an expansion box that plugs into the Pro-Lite's back, according to the vendor. The battery pack allows operation of up to five to eight hours and

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IBM-compatible Radio Shack micro bundled with application software

By Kathleen Sullivan
CW West Coast Bureau

FORT WORTH, Texas — Radio Shack Corp. a division of Tandy Corp., this month introduced the newest member of its Microsoft Corp. MS-DOS family of personal computers, the Tandy 1000, a floppy-disk-based system that includes bundled applications software.

The Tandy 1000, which uses the Intel Corp. 8088 microprocessor, is "close to 100% compatible with the IBM Personal Computer," said Ed Juge, director of market planning for Radio Shack.

The Tandy 1000's bundled applications packages, known as Deskmate, feature a variety of software programs, including text processing, spreadsheet, data base management, calendar and electronic mail.

Juge described the Deskmate ap-

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Current well-behaved packages leave user dreams unfulfilled

SMALL TALK
Eric Bender
CW Senior Editor

Today's "well-behaved" personal computer packages play by the rules of Microsoft Corp.'s MS-DOS, docilely going through the operating system every time. They're like well-behaved storybook children, running around everywhere and never getting messed up. They play on networks, in windows, in operating system environments and wherever else they please.

Among the drawbacks in this happy scenario, of course; well-behaved programs tend to be slow and not very interesting.

Best-selling packages such as Lotus Development Corp.'s 1-2-3 generally are ill-behaved Peter Pans rather than Wendys. They bypass the operating system to grab the hardware directly, achieving strong performance advantages.

However, you take your chances introducing them into a new environment. The most striking recent case is the host of best-selling IBM Personal Computer software that's not quite ready for prime time on the Personal Computer AT.

Things get further complicated, naturally enough, under new system software environments such as IBM's Topview or Digital Research, Inc.'s Graphics Environment Manager (GEM).

These new environments potentially offer users jazzy features such as mice, icons and windows and a lot of other benefits as well. And system software vendors say their goals include a way for applications developers to create well-behaved programs that run without modification on every MS-DOS machine, avoid paying any penalties in performance or functionality and benefit fully from the system software features.

But most application software vendors are wary about customizing their products. They are looking at multiple environments — Topview,

See BEHAVE page 62

Analyst says IBM's OA strategy augurs ill for marketplace rivals

By Edward Warner
CW Staff

BOSTON — Office automation consultant Amy D. Wohl thinks IBM's recent introduction of high-powered word processing software for its Personal Computer is "formidable," and that Apple Computer, Inc.'s "take-a-Macintosh-home" promotion will not generate sales to corporations.

Wohl expressed these thoughts during a speech and an interview at the East Coast Computerfaire, a personal computer show here this month.

Wohl, who operates Amy D. Wohl & Associates of Bala-Cynwyd, Pa., predicted that IBM's offering of Displaywrite III for the Personal Computer and Displaywrite 36 for its System 36 minicomputer, with smooth transfer of documents between the two systems, will make things tough for competitors, especially Wang Laboratories, Inc.

Wohl, however, said IBM has yet to offer the business graphics or project management software that she feels are needed by a well-rounded OA vendor. The firm, she added, does possess a competitive advantage in its Topview operating environment.

IBM's internally announced goal, she claimed, is "to own 65% of the Personal Computer market." The most likely way for them to do that, she continued, is by "making certain features that are very attractive only available to those who use its products."

A study by her firm, she noted, found that 88% of the corporations it surveyed required that their personal computers have Microsoft Corp. MS-DOS operating systems, for IBM Personal Computer compatibility. She added that 72% of the firms made IBM's PC-DOS an outright requirement, limiting purchases only to IBM equipment.

Apple Computer's Macintosh, currently being offered for overnight free trial to anyone holding a major credit card, has failed to crack the OA market, she claimed, because it lacks software.

The OA market is not closed to the arrival of a new vendor, she observed, adding that the likely candidate will be a Japanese firm marketing its hardware through the existing channels of an American vendor who is "product bankrupt, but has a strong distribution scheme."

Novell offers software for Netware local-area networks

OREM, Utah — Novell, Inc. has introduced Advanced Netware 1.0, local-area network operating system software that is said to support the use of multiple file servers on all Netware local-area networks and transparent bridges between these networks. It also reportedly has the ability to access special-function network servers.

Advanced Netware gives every user access to eight servers simultaneously, with storage capabilities up to 500M bytes per server, according to Novell.

Netware bridges essentially act as servers and communicate through a normal local-area network link, the vendor said. Reception and transmission are said to be completely transparent to the user.

The bridges reportedly also allow a personal computer to access the network from remote locations in either remote or local execution mode.

Remote execution "provides actual distributed processing by transferring applications programs and their data via modem for remote execution at the bridged personal computer," according to the company. This feature is said to give the remote personal computer all the capabilities of a local node. In local execution, only screen and keyboard information is transmitted to the remote personal computer, Novell said.

Using Novell documentation, managers can write the software necessary to accommodate special functions on a value-added server, and those functions will be fully integrated into the local-area network, according to the vendor.

Advanced Netware, which may be adapted to all Netware networks, is priced at $1,595 and will be delivered by January, Novell said.

Novell is located at 1170 N. Industrial Park Drive, Orem, Utah 84057.

TI

from page 57

costs $129. The second disk drive is priced at $595, while the two options together carry a $724 price tag.

Internal option slots

A 300 bit/sec internal modem, priced at $300, is said to plug into one of the Pro-Lite's two internal option slots. The other slot can accept an RS-232 interface, an external monitor adapter or programmable read-only memory modules provided for specific applications, according to TI.

A 12-in. external monochrome monitor costs $325, while a color monitor is priced at $695. An optional 45-char./sec thermal transfer printer handles either plain or thermal paper and costs $499.

Initially, TI will sell the Pro-Lite through direct and value-added reseller channels.

More information is available from Texas Instruments Data Systems Group through P.O. Box 809063, Dallas, Texas [illegible].

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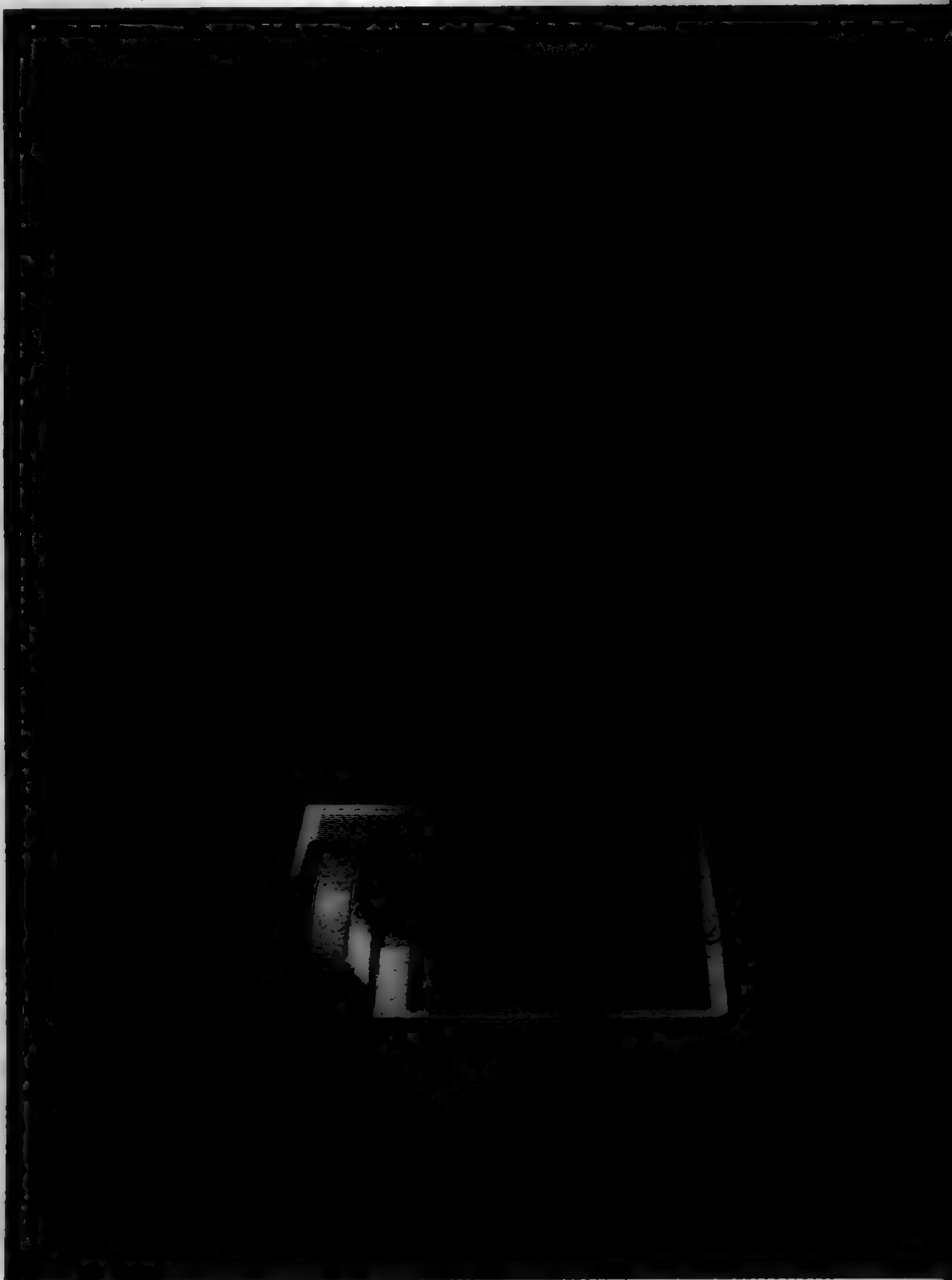

Data base program bows for IBM micros

CAMBRIDGE, Mass. — Infocom, Inc. has introduced a relational data base program for IBM Personal Computers said to be designed for nonprogrammers.

Cornerstone is designed for business professionals who need a data base for individual applications such as tracking sales leads, customer support and personnel management, Infocom said. According to the vendor, Cornerstone enables a nonprogrammer to create a data base by answering a series of simple questions.

The program is said to feature an interactive report writer that can draw information from any file or combination of files. It also allows users to add notes or comments to a file at any time, the vendor said.

Cornerstone includes a Help facility and an options feature, Infocom said. The options key shows the user exactly what to type next, whether it is a command, file name or item in the data base, the vendor said.

The program is available for the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles. It can be used in conjunction with packages such as Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar, as well as other spreadsheet and word processing programs. The price is $495.

Infocom is at 55 Wheeler St., Cambridge, Mass. 02138.

Orchid adds products to PCnet

FREMONT, Calif. — Orchid Technology has introduced several products for its PCnet local-area network for the IBM Personal Computers, including Lancomm, which reportedly allows dumb terminals on PCnet to function as intelligent workstations when linked with an IBM Personal Computer.

Lancomm reportedly allows Personal Computers on PCnet to support two dumb terminals simultaneously, with each terminal having full access to the network and its shared resources.

Also introduced for PCnet were PCnetmail, an electronic mail software package, and Command Spooler, a print spooler for the network, according to Orchid Technology.

PCnetmail reportedly offers store and forward functions and automatic remote networking communications. Command Spooler reportedly allows PCnet users to share one to three printers connected to their machines with other users or servers.

Prices for the products are: Lancomm, $395; PCnetmail, $695; and Command Spooler, $195.

For more information, Orchid Technology is located at 47790 Westinghouse Drive, Fremont, Calif. 94539.

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SOFTWARE

BV ENGINEERING
PC Plot

BV Engineering has announced PC Plot, a graphing program that is said to create linear, semilogarithmic and full logarithmic plots in any combination of the X and Y axes.

PC Plot requires 64K bytes of memory and runs on microcomputers including the IBM Personal Computer, Zenith Data Systems Corp. 100 and 150, Corona Data Systems, Inc. Corona PC and on micros from Compaq Computer Corp. and Columbia Data Products, Inc.

The price for PC Plot is $62.95.

BV Engineering, Suite 207, 2200 Business Way, Riverside, Calif. 92501.

WARNER SOFTWARE, INC.
Desk Organizer

Warner Software, Inc. has announced that its Desk Organizer software is available for microcomputers running Microsoft Corp.'s MS-DOS operating system and for the Apple Computer, Inc. Macintosh.

Desk Organizer reportedly is used in filing, organizing notes, telephone dialing, writing and printing, calculating, transferring data and managing time.

The MS-DOS version will run on the IBM Personal Computer, Personal Computer XT, PCjr, Personal Computer AT and compatibles, the vendor said. The MS-DOS version requires a minimum of 95K bytes of random-access memory.

The price for the Macintosh version, scheduled for December shipment, is $149. Cost for the MS-DOS version is $195.

Warner Software, 666 Fifth Ave., New York, N.Y. 10103.

ADVANCED PRODUCTIVITY SOFTWARE
Executime

Advanced Productivity Software has announced an enhanced version of its Executime time management/scheduler program for the IBM Personal Computer AT, using either IBM's PC Xenix or IBM's PC-DOS 3.0 operating system.

Among enhancements in the new version is a Multiple Schedule File capability, which allows a single user to create many separate schedule files, the vendor said.

A Universal Search option is said to speed the user's access to a list of appointments and reminders that contain any user-defined name, word or symbol.

The Warning Notice feature reportedly alerts the user when a requested appointment time has already been scheduled.

The price for Executime for PC-DOS is $49.95; for Xenix, it is priced at $69.95.

Advanced Productivity, 2565 E. Chapman Ave., Fullerton, Calif. 92631.

See TOOLS page 64

Irma adapted to IBM's AT

NORCROSS, Ga. — Digital Communications Associates, Inc. has announced that its Irma micro-to-mainframe communications board has been adapted to the IBM Personal Computer AT.

Using Irma, the Personal Computer AT can emulate an IBM 3278 or 3279 terminal and transfer data to and from a mainframe while retaining its stand-alone capabilities, Digital Communications said.

The adaptation of Irma to the Personal Computer AT brings to the AT a host of software programs developed with the Irma board in mind, according to the company.

Irma for the IBM Personal Computer AT is priced at $1,195.

Digital Communications Associates is located at 303 Technology Park, Norcross, Ga. 30092.

BEHAVE from page 57

IBM's Virtual Device Interface (VDI), GEM, Microsoft Windows, Microsoft Networks and others — which may conflict with each other.

In the most spectacular example, Topview, the leading contender for widespread adoption, does not seem to be compatible with VDI or IBM's PC Network or much of anything else. Developers want to follow IBM's lead, but many are not quite sure what that means.

Until the dust clears on the requirements for the well-behaved packages of the future, many software developers will avoid committing themselves, and those impressive new environments may not mean much to users.

TANDY from page 57

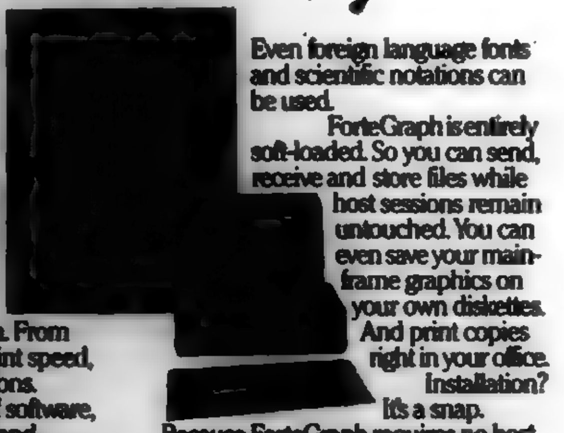
plications as a set of "desk organizer" programs and said the bundled packages are not meant to compete with "full-blown" applications software.

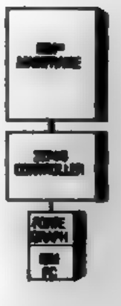
The Tandy 1000, which comes with one floppy disk drive and a detachable keyboard, provides 128K bytes of random-access memory, expandable to 360K bytes, the company said. It is priced at $1,199, exclusive of the monitor.

The model features a three-voice sound generator and several built-in capabilities, including support for color and monochrome monitors, parallel printer port, joystick and light pen ports, according to the company.

Radio Shack is located at 1700 One Tandy Center, Fort Worth, Texas 76102.

Forte puts mainframe graphics on your PC





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You've heard the buzzwords: user friendly, integrated, smarter, faster, cheaper. But when you push the rhetoric aside you're still asking the same question, "Why can't I get a system that solves more problems than it creates?"

You can. It's called DunsPlus and it's built to respond to your information-related business demands without creating demands of its own.

DunsPlus gives the IBM PC XT a built-in business environment. This lets you mold DunsPlus to fit the way you do business.

Within the DunsPlus environment is a software base of the best. Lotus, MultiMate, Western Union electronic mail (to name but a few), are all ready for immediate use. But additional programs to solve your unique problems can also be added with ease.

Instant, yet controlled, access to your choice of mainframes and subscription databases is also a part of the DunsPlus environment. And transferring data throughout the system is as easy as moving a piece of paper from the In Box to the Out Box.

Immediate end-user productivity is not an issue: DunsPlus is a menu-driven system requiring minimal keystrokes for maximum results.

Installation is not an issue: DunsPlus is installed by IBM.

End-user training is not an issue: Training and support are part and parcel of DunsPlus.

Flexibility is not an issue: Any part of the DunsPlus solution—hardware, software, or service—can be tailored to meet your precise business needs.

In fact, there are no issues. DunsPlus does what you want, the way you want it—now.

Designing systems that reflect the way you do business is business as usual for us. NOMAD2, the premier 4th-Generation-Language/DBMS from D&B Computing Services, has made us a leader in the field of information management services. And as your needs evolve, so do we. DunsPlus is just the latest step in translating technological advances into usable business tools—tools that reflect the way you do business.

DunsPlus: An Innovation In End-User Computing From Dun & Bradstreet

DunsPlus

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For further information call: 800-DNB-PLUS. Or drop your business card into an envelope and mail it to DunsPlus, 187 Danbury Road, Wilton, CT 06897.

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TOOLS

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SOFTWARE HOUSE
System 1032

Software House has introduced a version of its System 1032 data base management system for the Digital Equipment Corp. Microvax. System 1032 for the DEC Microvax reportedly is based on the System 1032 for DEC's VAX-11 minicomputers.

System 1032 did not require downscaling to run on the Microvax and contains the same features found in the VAX-11 version, the vendor said. Those features reportedly include user assistance, on-line documentation, full programming capabilities, host language interface, support for DEC's Decnet, data security and compiled procedures.

System 1032 for the Microvax is priced at $3,000 per CPU for those who already own a System 1032. Otherwise, it is priced at $8,000 for the first copy.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

COMPUTER SCIENCE INNOVATIONS, INC.
Software Design Language

Computer Science Innovations, Inc. has developed a software design language for use with the IBM Personal Computer and systems compatible with Microsoft Corp.'s MS-DOS operating system.

Software Design Language produces formatted design documents, the vendor said. The program reportedly can be used to design software at the system, process, module and algorithm levels. It is said to allow data items to be named and to support user-defined keywords.

A permanent license for the product costs $400.

Computer Science Innovations, P.O. Box 2628, Satellite Beach, Fla. 32937.

DATABASE DESIGN, INC.
Action Diagrammer

Database Design, Inc. has introduced a software editor that runs on the IBM Personal Computer and compatibles.

Action Diagrammer is said to be based on a structured, graphics representation of the action comprising a software program as a hierarchy of bracketed blocks. Action diagrams reportedly can represent a high-level overview of a system and progressively decompose it to the level of executable code.

At the highest overview level, a program is pictured as single bracket. Fully expanded control flow and processing logic are grouped and bracketed in deeper levels of the hierarchy, the vendor said.

Action Diagrammer is said to supply control structure syntax in English, Cobol, PL/I, Fortran, C, Pascal and fourth-generation languages automatically. It reportedly enables the system designer to integrate modularity, hierarchical organization, control flow and structured logic constructs.

The package is priced at $495.

Database Design, 2020 Hogback Road, Ann Arbor, Mich. 48104.

ZONTEC, INC.
SPC Timesaver

Zontec, Inc. has introduced a color statistical process control (SPC) package that runs on the IBM Personal Computer.

SPC Timesaver is said to be an integrated system for the analysis, storage and display of SPC chart information. These charts reveal variations from norm, percentage, failures, trends, number of samples outside control and whether the process is capable of producing the desired results, the vendor said.

The program reportedly is able to maintain multiple sets of control limits within a single set of samples. Five main analysis functions are included: control charts, descriptive statistics and capability, tool wear and economic impact analysis.

SPC Timesaver will run on any IBM Personal Computer or compatible with 256K bytes of memory. A color graphics board is recommended by the vendor, although the program will reportedly work with a monochrome display. Price is $695.

Zontec, Suite 4135, 1329 E. Kemper Road, Cincinnati, Ohio 45246.

FUJITSU MICROELECTRONICS, INC.
Concurrent CP/M 86 for Micro 16S

Fujitsu Microelectronics, Inc. has announced that Digital Research, Inc.'s Concurrent CP/M 86 operating system is now available for Fujitsu's Micro 16S series of personal business computers.

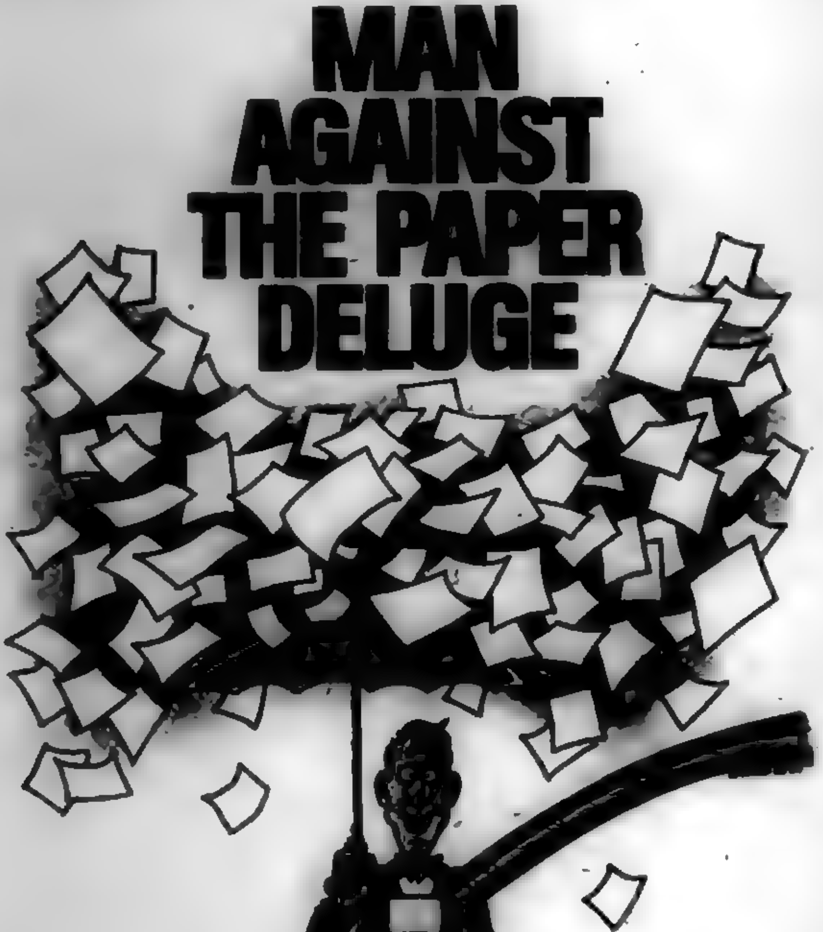
The multiuser Concurrent CP/M 86 operating system is said to enable Micro 16S and Micro 16SX computers to perform more than one computing task simultaneously and to support up to five external terminals.

As the main console, the Micro 16S can support four virtual consoles that can be accessed by pressing a designated combination of keys. The virtual consoles allow up to four programs to be active on the Micro 16S. While one program is being viewed, other programs can be completing tasks such as financial calculations in the background, the vendor said.

Concurrent CP/M 86 is priced at $200. A five-user configuration of the Micro 16SX system with a 13M-byte hard disk, 896 bytes of user random-access memory, controllers, color monitor and the multiuser operating system, excluding terminals and printer, is priced at $7,100.

Fujitsu Microelectronics, 3320 Scott Blvd., Santa Clara, Calif. 95051.

See TOOLS page 66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Micrographic Systems Division

NCR, Micrographic Systems Division, 520 Logue Avenue, Mountain View, CA 94043, [illegible]

Q: How Many People Are Afraid Of Your 4-GL/DBMS?
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With EZNOMAD, your end-users can sit back and follow a series of English-language instructions, menus, and pick-and-point screens. Now, those busy "management types" who "never have the time" to learn mainframe computing don't need to take the time. Infrequent users no longer need to "relearn" the system every couple of months.

EZNOMAD's micro-like capabilities access essentially all of the functions and power of NOMAD2. Imagine a senior manager in your company developing databases, creating applications, maintaining databases, and writing ad hoc reports — without your help.

Your senior management will not only be pleased with the capabilities of EZNOMAD, they will also be delighted with the cost of EZNOMAD—its's free to all NOMAD2 licensees.

In other words, you get the ease-of-use of a micro and the tremendous power and flexibility only a mainframe can deliver. And the price is right.

It's nice to know that when you pick NOMAD2 as the 4-GL/DBMS for your company, EVERYBODY will know first-hand that you've made the right choice.

EZNOMAD is the latest innovation in end-user computing from Dun & Bradstreet. NOMAD, now NOMAD2, has evolved over the years to keep pace with the demands for providing business professionals with maximum computing power. EZNOMAD is a major stride in that direction.

NOMAD2:
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D&B Computing Services

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For more information call: Roger Cox at (203) 762-2511. Or drop your business card into an envelope and mail it to Roger at: D&B Computing Services, 187 Danbury Road, Wilton, CT 06897.

NOMAD is a registered trademark of D&B Computing Services, Inc.

TOOLS

from page 64

DATAGRAPHIC SYSTEMS, INC.
CAD Master Version 2.0

Datagraphic Systems, Inc. has announced enhancements to its CAD Master, a computer-aided design (CAD) software package for the IBM Personal Computer line.

Among CAD Master's features reportedly are autodimensioning, autotolerancing, architectural dimensioning, curve fitting, filleting, mirror imaging and computation of volume and perimeter. Also included are a line and arc editor, a bill-of-materials function, data base extraction and a finite element preprocessor. Other features include "rubberbanding" of lines, arcs, circles and arrows.

CAD Master Version 2.0 is $1,795.

Datagraphic Systems, 9101 General Drive, Plymouth, Mich. 48170.

MICRO-SYSTEMS SOFTWARE, INC.
M-Edit

Micro-Systems Software, Inc. has introduced M-Edit, a tool for full screen editing on the IBM Personal Computer.

M-Edit reportedly offers word-processor-like functionality in as many as eight windows at once and also supports data transfer between windows. M-Edit includes block copy/block move functions. Each of the package's windows reportedly has a 64K-byte buffer and allows text lines of up to 240 char. to be created.

M-Edit is priced at $199.

Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, Fla. 33431.

MITCHELL MANAGEMENT SYSTEMS, INC.
Quick-Plan

Mitchell Management Systems, Inc. has introduced its Quick-Plan project planning software for personal computers running under Microsoft Corp.'s MS-DOS operating system.

Quick-Plan reportedly builds project plans based on time, costs and resources using a series of menus written in English. It is said to offer editing and modeling capabilities and 13 different report formats.

Quick-Plan's four types of connectors and use of precedence diagramming reportedly allow it to handle 250 activities, 99 resources and 500 connectors for each project.

Quick-Plan is priced at $995.

Mitchell Management Systems, Westboro Office Park, 2000 W. Park Drive, Westboro, Mass. 01581.

PRIORITY SOFTWARE PACKAGING, INC.
Softcop

Priority Software Packaging, Inc. introduced a series of software protection programs said to guard against software piracy on micros utilizing IBM's PC-DOS, Digital Research, Inc.'s CP/M 86, Softech Microsystems, Inc.'s P-System and Apple Computer, Inc.'s Apple DOS.

Software Controlled Operating Protection (Softcop) is said to use a combination of validation and defense systems to provide security of protected software.

In a related announcement, Priority Software said it is now offering Softguard System's Superlok software protection program for IBM's PC-DOS applications through a licensing agreement with Softguard.

Softcop and Superlok are said to feature hard-disk support and authorized backup. According to the vendor, all forms of software can be protected with Superlok and Softcop, including templates and interpretive Basic programs. The protection programs are said to be self-executing and invisible to legitimate users of the protected software.

Software protection ranges in price from 10 cents to $1.50 per diskette. The actual cost depends on duplication quantities and the protection features required.

Priority Software Packaging, Unit A, 2730 S. Harbor Blvd., Santa Ana, Calif. 92704.

TEXAS INSTRUMENTS, INC.
Framework, Dbase III for TI Professional

Texas Instruments, Inc. has announced that Ashton-Tate's Framework and Dbase III packages will be available on the TI Professional in the first quarter of 1985.

Framework, an integrated software package, combines outlining, business graphics, data management, word processing, telecommunications, Microsoft Corp. MS-DOS access, spreadsheet capabilities and a programming language, TI said. The recommended configuration for a TI Professional includes 512K bytes of random-access memory and either two floppy disk drives or a Winchester disk drive.

Dbase III is a data base management system that features storage capacity of over 2G records per file (contingent on system hardware), 128 fields per data base and the ability to use 10 files simultaneously.

Each product will cost $695.

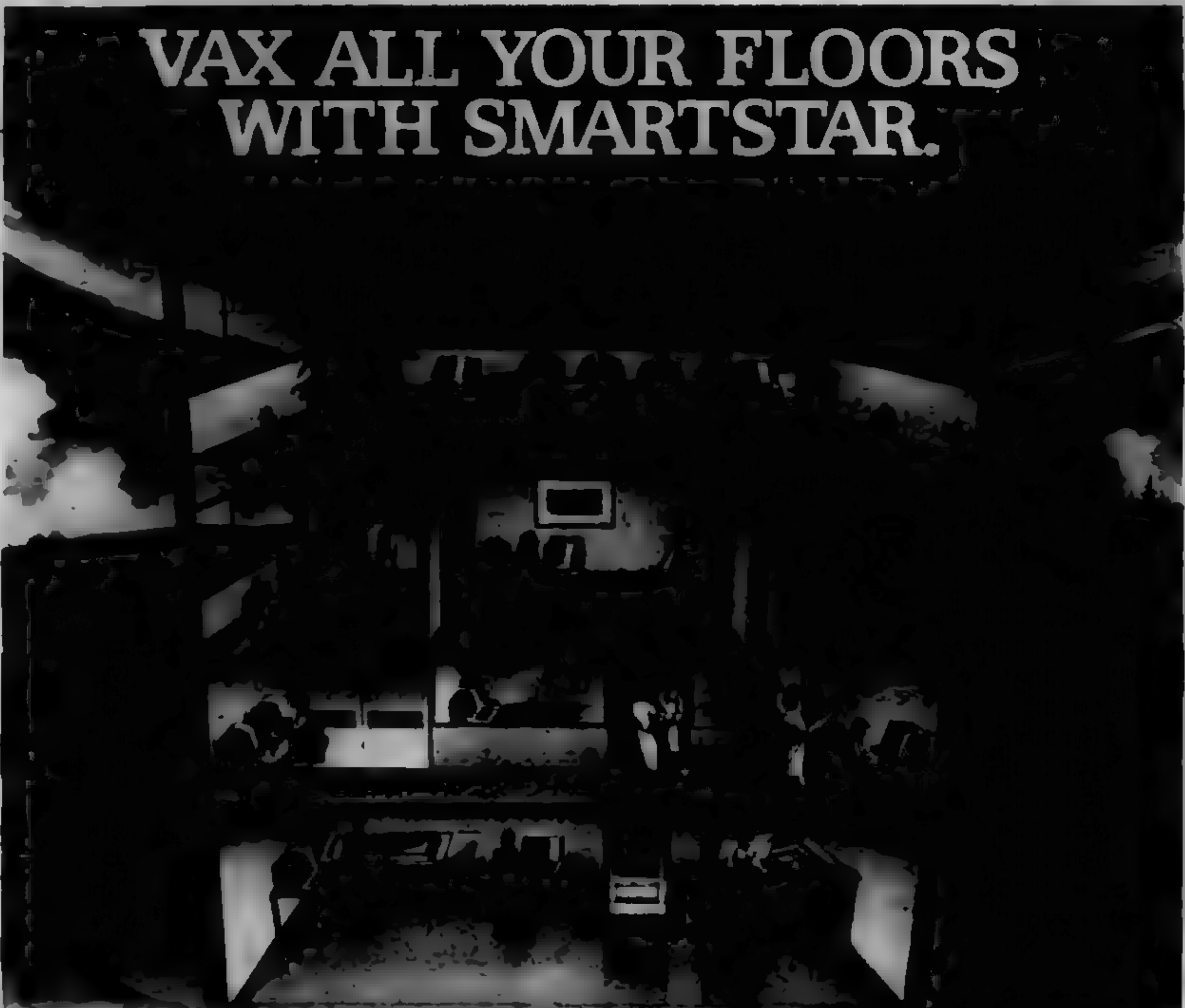
Texas Instruments, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

ENERTRONICS RESEARCH, INC.
Energraphics

Enertronics Research, Inc. has introduced Energraphics graphics software for the IBM Personal Computer.

Energraphics reportedly provides users with the ability to create and display or print line charts, pie charts and two- and three-dimensional bar charts. Also provided is the ability to produce maps, electronic circuit diagrams, mechanical and architectural drawings and surface diagrams, among other forms, Enertron-

Continued on page 68



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What if everyone in your office were suddenly able to design their own applications, whether they knew anything about programming or not? What if this left you and your computer professionals free to concentrate on really important jobs?

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For complex applications, SMARTSTAR's structured interface and built-in callable routines reduce development time by a 10 to 1 ratio. Features like scrolling format, multiple overlapping windows and simple keypad commands simplify the whole decision support process for everyone. SMARTSTAR even works with DEC's new VAX/Rdb to make accessing the database a snap.

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CONDUCTOR: The MIS Approach to End-User Access

Today—end-users need greater access to data. And MIS needs better control. To solve both problems, TSI introduced CONDUCTOR.

CONDUCTOR lets end-users get the data they need. CONDUCTOR selects, manipulates and delivers data to any end-user environment. Without programming. And CONDUCTOR gives MIS more control than ever over quality and integrity, with a new degree of security.

While others have tried to solve the end-user problem, they've only addressed a small part. CONDUCTOR goes for the big picture. So remarkably different, there's virtually nothing else like it.

CONDUCTOR is the latest innovation in software from Dun & Bradstreet. As such, it joins NOMAD, now NOMAD2, the premier 4-GL/DBMS from D&B Computing Services, and DunsPlus, the "people literate" microcomputer that reflects the way you do business.

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For the facts on CONDUCTOR, call 1-800-227-3800, Ext. 7005 or drop your business card into an envelope and mail it to Marketing Service, TSI International, 187 Danbury Road, Wilton, Connecticut 06897.

NOMAD is a registered trademark of D&B Computing Services, Inc. DunsPlus is a trademark of DunsPlus, a company of The Dun & Bradstreet Corporation.

Continued from page [illegible]

ics said.

Energraphics reportedly offers interactive operation and supports color and monochrome displays and several dot matrix printers.

Energraphics is priced at $350.

Enertronics Research, Suite 207, 150 N. Meramec, St. Louis, Mo. 63105.

SCIENCE MANAGEMENT CORP.
Thoroughbred

Science Management Corp. has introduced its Thoroughbred multiuser operating system (TB/OS) for the IBM Personal Computer AT.

The operating system reportedly upgrades the AT to a three-user system that can run more than one application simultaneously. TB/OS also reportedly operates in connection with standard Personal Computer AT hardware and does not require custom boards for the upgrade to multiuser status.

TB/OS does not interact with either PC Xenix or PC-DOS, both announced for the AT by IBM, the vendor said.

TB/OS is priced at $795.

Science Management, 1011 Rt. 22 W., Bridgewater, N.J. 08807.

TEXAS INSTRUMENTS, INC.
Natural Link

Texas Instruments, Inc. has announced Natural Link software packages, which permit TI Professional Computer users to interact with popular software programs using simple English commands.

The 10 packages reportedly translate user-constructed English sentences into commands that the underlying software package will recognize. The same Natural Link format is followed in each application package, giving users a familiar interface for all Natural Link programs, TI said.

The Natural Link programs are configured for Microsoft Corp.'s MS-DOS 2.1 operating system and nine application programs: Multimate, from Multimate International Corp.; Wordstar, from Micropro International Corp.; BPS Business Graphics, from Business Professional Software, Inc.; Supercalc 3 and Easywriter II, from Sorcim/Information Unlimited Software; Dbase III, from Ashton-Tate; Peachtext 5000, from Peachtree Software, Inc.; Microsoft's Multiplan; and Microrim, Inc.'s R:Base 4000 series.

Natural Link Access to MS-DOS requires a TI Professional or Portable Professional with MS-DOS 2.1 and at least 256K bytes of random-access memory (RAM). Natural Link Commands products require MS-DOS 2.1, 512K bytes of RAM and a Winchester disk drive.

Natural Link Access to MS-DOS costs $75. Natural Link Command programs for the above applications are priced at $125 each, the vendor said.

Texas Instruments, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

SYSTEMS

MOLECULAR COMPUTER, INC.
Molecular Series 36

Molecular Computer, Inc. has introduced the Series 36, a multiprocessor system said to provide each user with one or more dedicated personal computers through individual application processors.

All processors and peripherals for all users are contained within the Series 36's systems cabinet. The cabinet reportedly contains slots for up to 36 application processors, both 5¼-in. and 8-in. floppy disk drives, a Winchester disk drive and an optional cartridge tape drive.

Each user's application processor is interconnected to all others by the vendor's M/Bus interprocessors link, which also provides high-speed access to shared disks, printers and other peripherals, the vendor said.

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Molecular's N/Star network operating system software is said to provide the ability to share data files and is compatible with Digital Research, Inc.'s CP/M 80 and CP/M 86.

The combination of the M/Bus and N/Star is said to provide the equivalent of a local-area network within the systems cabinet.

Price is $21,995 without tape backup and $23,995 with disk drive.

Molecular Computer, 251 River Oaks Pkwy., San Jose, Calif. 95134.

WICAT SYSTEMS, INC.
System 2220; Wicat Interactive Terminal

Wicat Systems, Inc. has introduced its System 2220 and its Wicat Interactive Terminals (WIT).

A rack-mounted unit said to offer 1M byte to 12M bytes of random-access memory (RAM), the System 2220 reportedly supports from one to 64 users and features a 12.5-MHz Motorola, Inc. 68000 central processing unit, a 4K-byte cache memory system and zero wait states.

The WIT is said to be an intelligent color graphics terminal offering a video interface option.

The WIT also includes a 12.5-MHz Motorola 68000 microprocessor with zero wait states and 256K bytes of downloadable RAM, according to the vendor.

It also includes commands for high-speed graphics operation and audio capabilities, Wicat Systems said.

The System 2220 is priced starting at $40,720, including the central processing unit, an 80M-byte disk and a 17M-byte, ¼-in. tape cartridge storage unit.

The WIT is priced starting at $7,275, including the video option.

Wicat Systems, P.O. Box 539, 1875 S. State, Orem, Utah 84057.

COMMUNICATIONS

SOPHIA COMPUTER SYSTEMS, INC.
Link for IBM Personal Computer and SA700 emulators

Sophia Computers Systems, Inc. has announced a serial communication link for the IBM Personal Computer said to allow users to download microprocessor software developed on the Personal Computer XT to Sophia's in-circuit emulators.

The link supports file transfer from the Personal Computer XT to Sophia's SA700 in-circuit emulators, used for troubleshooting. Any Microsoft Corp. MS-DOS or IBM PC-DOS system can function as a development host, the company said.

The price for the Personal Computer link is $495.

Sophia Computer Systems, 3337 Kifer Road, Santa Clara, Calif. 95051.

CXI, INC.
3270 and 3278/79 IBM Personal Computer connections

CXI, Inc. has announced that its 3270 IBM Personal Computer connections and 3278/79 IBM Personal Computer connections are compatible with the Personal Computer AT under IBM's PC-DOS 2.0 and 2.1.

The connection products reportedly allow users to have from one to five host sessions, a PC-DOS session and two notepads displayed on screen simultaneously.

The CXI 3270 Personal Computer connections reportedly are available either as coaxial or modem connections and provide IBM 3270 emulation.

The 3270 Personal Computer coaxial and modem connections are $1,595 each. The 3278/79 Personal Computer coaxial and modem connections are $1,145 each.

CXI, 3606 W. Bayshore Road, Palo Alto, Calif. 94303.

See TALK page 71

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Working IBM® PCs into the world of large computers used to be quite a headache. But now that I've discovered AST and their full line of proven communication products, things are much easier.

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Today, I'm solving a complex problem for our Director of Marketing. He's opening up seventeen new field sales offices and wants to link them to our host at headquarters. Now, at the same time, we're looking to convert our communication network from BSC to SNA. Here AST really protects my hardware investment.

You see, they have SNA and BSC products with the same hardware. I can go with AST-BSC™ today, then just load another disk to upgrade to AST-SNA.™ And with AST's plug-in cards, PCs can emulate 3274/6 controllers, 3278-2 or 3279-2A terminals, even 3287 printers.

Using PCs in the field sales offices gives us the flexibility of local PC processing power, and the benefit of concurrent processing, since we can use DOS functions while continuing to maintain the mainframe link. It's certainly a major money-saver—a really smart alternative to dumb terminals.

We expect those new sales offices to grow rapidly. When they do, I'll be adding AST cluster functions so we can use PCs and VT-100™ or compatible terminals in our configuration. All of them can communicate to headquarters over a shared phone line to reduce our telecommunications costs.

Meeting the challenge of change is a key part of my job. AST always has the products to help me. Like LANs to tie all PCs—including ATs and PCjrs together. There's also an AST-5251™ to connect PCs to System/34, System/36 and System/38 for powerful interactive communications from remote sites.

AST was the first company to offer micro-to-mainframe products for the PC, and they continue to lead the pack with a full spectrum of communications products, including AST-3780™ RJE support. Customer support and product reliability. That's why AST is my single source.

Frankly, you should find out more about them. Give their Customer Information Center a call at (714) 863-1333 Ext. 5249 and get acquainted. Just tell them you were referred by another satisfied MIS director.

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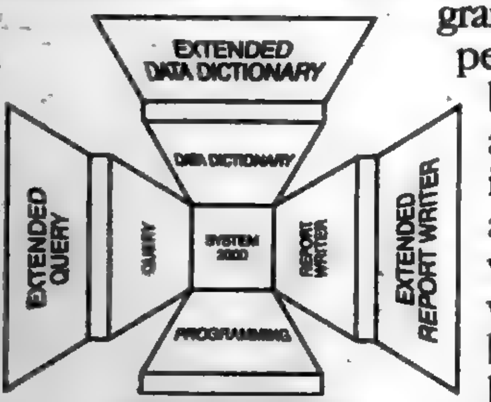

The SYSTEM 2000 DBMS offers a powerful set of integrated functions. The result is the broadest and deepest functionality of any DBMS.

You were right.

And, thanks to a continuing program of product enhancements, our DBMS keeps getting better and better.

While you keep looking smarter and smarter.

Now, in addition to all of our previous improvements, the SYSTEM 2000 DBMS also offers Relational Database Access (RDBA).

RDBA is an enhancement of our system's query and report languages which gives relational access to multiple databases. Which, in turn, enables users to greatly reduce programming time, perform database modeling and engage in "what if" analyses. Some very noteworthy user benefits in anybody's book.

It all adds up to the broadest, deepest functionality of any DBMS anywhere.

The kind of functionality that allows virtually any pc to share data with virtually any mainframe. We call it the Data Pipeline™ system.

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There's still time to go to the head of the class.

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TALK

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FORTE DATA SYSTEMS
Fortegraph and Forte 3270 PC

Forte Data Systems has announced that its Fortegraph software and board package is compatible with the Irma communications board from Digital Communications Associates, Inc. It also introduced its Forte 3270 PC for the IBM Personal Computer.

Fortegraph, running in conjunction with the Irma emulator for the IBM 3278/79 terminal, reportedly provides mainframe graphics capabilities to the Personal Computer. It also allows the Personal Computer to function as an IBM color graphics terminal and offers emulation of the IBM 3279 Model S3G color graphics terminal with programmed symbols, according to the vendor.

Forte 3270 PC reportedly allows the Personal Computer to gain the functions of an IBM 3270 workstation.

Forte 3270 PC is priced at $1,495. Fortegraph with Irma compatibility is priced at $1,595.

Forte Data Systems, 2205 Fortune Drive, San Jose, Calif. 95131.

STORAGE

PERCOM DATA CORP.
Superior Interior

Percom Data Corp. has introduced its Superior Interior 22M-byte, half-height disk storage system for the IBM Personal Computer.

The Superior Interior reportedly mounts in the second drive position of a Personal Computer, giving users internal floppy and hard-disk capability.

The disk storage system reportedly has a height of 5¼-in., a step time of 3 msec and a data transfer rate of 5M bit/sec.

It includes a soft-start motor and filtering system to reduce electronic noise, Percom said.

The Superior Interior is priced at $2,195.

Percom Data, 11220 Pagemill Road, Dallas, Texas 75243.

COGITO SYSTEMS CORP.
PT925 enhancement

Cogito Systems Corp. has enhanced its 25M-byte, half-height Winchester disk drive to provide a reported 37% increase in speed.

The enhanced PT925 features 25M bytes on two platters, using all four surfaces for storing data, according to Cogito Systems.

It also offers a dedicated head landing zone and three-axis shock mounts, said to be effective up to 40 g forces.

It also is said to include a band-driven stepper motor actuator operating in an open loop linear mode to achieve access time of less than 85 msec.

The drive is priced at $795, the vendor said.

Cogito Systems, 235 Zanker Road, San Jose, Calif. 95131.

PRINTERS/PLOTTERS/ PERIPHERALS

EXXON OFFICE SYSTEMS CO.
Exxon Ink Jet Printer

Exxon Office Systems Co. announced that its ink jet printer can now be used with the IBM Personal Computer and Personal Computer XT for high-resolution printing of graphics and text.

The Exxon Ink Jet Printer uses device driver software that is inserted into the operating system of the Personal Computer or Personal Computer XT. The printer is said to produce correspondence-quality print in a variety of type styles.

Users can choose to install up to eight resident fonts from a selection of more than 20 type styles, the vendor said. The device driver is said to permit the unit to print output from personal computer applications at speeds up to 90 char./sec.

Prices for the printer begin at $2,995. The device driver software costs an additional $95.

Exxon Office Systems, 777 Long Ridge Road, Stamford, Conn. 06902.

BOARD-LEVEL DEVICES

THEYS MEMORY PRODUCTS CORP.
Fastfile

Theys Memory Products Corp. has announced the Fastfile semiconductor memory system, featuring an access time of less than 0.25 msec and a data transfer rate of up to 1M byte/sec.

Fastfile has a built-in uninterruptible power supply and uses 256K-byte semiconductor memory chips. The chips feature single-bit error correction and double-bit error correction with parity checking on internal data transfers.

The product is intended to work in local-area networks and multiuser applications where it can reduce disk access time and the frequency of disk access, the company said.

The price for the 1.5M-byte storage capacity version of Fastfile is $1,795, and the price for the 5M-byte version is $3,495, according to the company.

Theys Memory Products, 7345 E. Acoma Drive, Scottsdale, Ariz. 85260.

AST RESEARCH, INC.
Preview!

AST Research, Inc. has introduced Preview!, a monochrome display adapter board for the IBM Personal Computer, Personal Computer AT and Personal Computer XT.

Preview! reportedly offers bit-mapped graphics compatible with several business software packages, including Ashton-Tate's Framework and Lotus Development Corp.'s Symphony and 1-2-3.

Preview! is priced at $399, the vendor said.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

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COMPUTER INDUSTRY

STC third-quarter report details losses

LOUISVILLE, Colo. — Storage Technology Corp. (STC) posted a third-quarter loss of $64.7 million, according to its recently released financial report. The company's anticipation of that loss had earlier led it to file for protection under Chapter 11 of the Federal Bankruptcy Act.

The loss for the quarter, equal to $1.87 per fully diluted share, compared to a year-earlier loss of $6.9 million, or 20 cents per fully diluted share. For the first nine months of the current fiscal year, STC posted a loss of $86.2 million, or $2.49 per share; that figure included a tax benefit of $24.3 million. The company had reported a quarterly loss of $5.4 million, or 5 cents per share, in the comparable period in 1983.

STC actually posted a revenue gain for the third quarter, $282.2 million, compared to year-earlier revenues of $201.4 million; however, costs and expenses soared to $282.2 million, compared to $212.5 million in the third quarter last year. For the first nine months, revenues declined to $656.6 million, compared to $659.6 million last year, and expenses increased to $767.2 million from $664.6 million the previous year.

The third-quarter loss was compounded by federal tax adjustments for the years 1977 and 1978, the company said. Despite a pretax loss of $52.5 million, the company paid income taxes of $12.4 million.

Lower than expected shipments

STC attributed the financial problems to lower than anticipated shipments, higher costs for new products, lower margins due to price cutting and increased depreciation expenses on rental equipment.

Additionally, the company said that it had placed its Dublin subsidiary, Storage Technology Products B.V., into receivership. That subsidiary, employing 363 people and engaged in manufacturing products for the European market, was acquired in 1980 as part of the acquisition of Documation, Inc. STC said its facilities in the U.S. and Puerto Rico would supply the market formerly served by the Irish subsidiary.

Prior to the release of the financial report, STC Chairman Jesse I. Aweida met with company creditors and U.S. trustee Dolores Kopel. Aweida pledged the company's full cooperation and desire "to emerge from Chapter 11 as rapidly as possible with a reorganization plan acceptable to

See STC page 86

■ Pansophic Systems, Inc. took aim at gaining a foothold in the high-end IBM mainframe software market with the recent acquisition of the developer of an on-line application generator/75

■ Control Data Corp. announced its intention to sell off a financial subsidiary and focus more on the computer industry/86

■ Lee Data Corp. will acquire Visual Technology, Inc., manufacturer of the Commuter portable computer, in a $16.8 million deal/86

INDUSTRY INSIGHT
David Olmos
CW Staff

Trade secret suits devastate firms

While not all trade secret lawsuits make splashy headlines like last year's IBM-Hitachi Ltd. case, such legal battles are being waged throughout the computer industry at terrific cost to the combatants. In some instances, the very survival of a company may be at stake.

Eagle Computer, Inc. and Franklin Computer Corp. are two recent cases in point. Eagle, a maker of IBM-compatible microcomputers, has been struggling to stay afloat ever since IBM slapped it with a patent infringement suit early this year. And Franklin, burdened by a $2.5 million settlement of a copyright infringement suit brought by Apple Computer, Inc., was forced into a Chapter 11 bankruptcy reor-

See SECRETS page 84

Xerox computer chief targets top of factory automation heap

By Kathleen Burton
CW West Coast Bureau

LOS ANGELES — Xerox Computer Services (XCS) President William Fello believes his profitable $100-million division of the Xerox Corp. will garner the lion's share of the lucrative factory automation software market by 1987.

Fello, who took over as XCS' president in April after serving as marketing vice-president, plans rapid growth for the division. Over the next two years, he will integrate Xerox office products with Xerox business systems products and increasingly target vertical markets. "By 1987, vertical software will be more profitable than our services, accounting for half our sales," he said.

XCS' first commercial product, a turnkey manufacturing system called the Xerox Business Management System (XBMS), was introduced last March. It is available on the IBM 4331, the IBM 308 mainframe and the IBM Personal Computer XT. The system's 23 business and manufacturing programs include decision support, computer-aided design/computer-aided manufacturing, engineering, manufacturing control, factory automation tools and a microcomputer-to-mainframe link.

The potential customer base for computer-based manufacturing tools is enormous, according to Fello. Only 5% of the nation's 45,000 small factories producing less than $10 million worth of goods annually have automated their businesses so far. "Most manufacturing plants in the U.S. are still untouched by computers, so computer-based manufacturing is still wide-open territory," he said.

Fello predicted that IBM would not challenge XCS' two-year lead in factory automation software. "IBM's a tough competitor," he said, "but both companies can coexist in this niche." According to Fello,

See XEROX page 86

In face of redoubled market competition, Cray boss optimistic

By Charles Babcock
CW New York Bureau

NEW YORK — Cray Research, Inc. Chairman John A. Rollwagen recently declared that his company will maintain its lead in supercomputers despite competition from the Japanese or possibly even IBM.

Two Japanese companies, Fujitsu Ltd. and Hitachi Ltd., have introduced their own supercomputers, but "there's nothing happening there that's going to knock us off the track," Rollwagen told the New York Society of Security Analysts recently.

"Cray has the lead at the moment, but it's a thin one. It can't afford to fail on one of its next-generation machines," said James C. Browne, professor of computer science at the University of Texas at Austin and chairman of a panel advising the U.S. Office of Science and Technology Policy on supercomputers.

Cray has the lead in producing multiprocessor supercomputers; the Japanese models are still single processor units, said Jack Worlton, a fellow at the Los Alamos National Laboratory, Los Alamos, N.M., who has evaluated tests of the Cray and the Japanese computers. He said the contest is a three-way race between competing technologies — emitter-coupled logic (ECL), gallium arsenide and Cmos semiconductor chips — and which one will win is not clear.

While IBM has not indicated that it will enter the race, Rollwagen's comments reflected concern that it will. About half of Cray's units go into IBM sites, and users transfer some of their engineering and research applications to the Cray machine. This delays the customer's need to upgrade his IBM mainframe, Rollwagen noted.

To stop this "leakage" of mainframe sales, IBM might be tempted to enhance its still-unannounced Sierra line or even offer its own supercomputer, Rollwagen said. "Cray is a tiny company, and I'd never say we can handle IBM. But if they come over to our turf, we'd give them a hell of a fight," he said.

Browne said the Hitachi and Fujitsu supercomputers are IBM-compatible, which puts pressure on IBM to enter the field. IBM cannot wait five or six years to develop its own entry if it finds Japanese units going into its customer sites, he added.

When the Cray-2 becomes available, the Minneapolis manufacturer will have the Japanese bracketed with high-performance, low-cost machines, Rollwagen added.

Half of Cray's components are supplied by Fujitsu; Rollwagen said his company assumes that any information they provide to Fujitsu's semiconductor division ends up in the hands of Fujitsu's computer division.

"Fujitsu tells us no, that is not so, that we are a valued customer," he told the security analysts. He said Cray officials have seen components in the Fujitsu VP 200 that they cannot buy from Fujitsu.

See CRAY page 83

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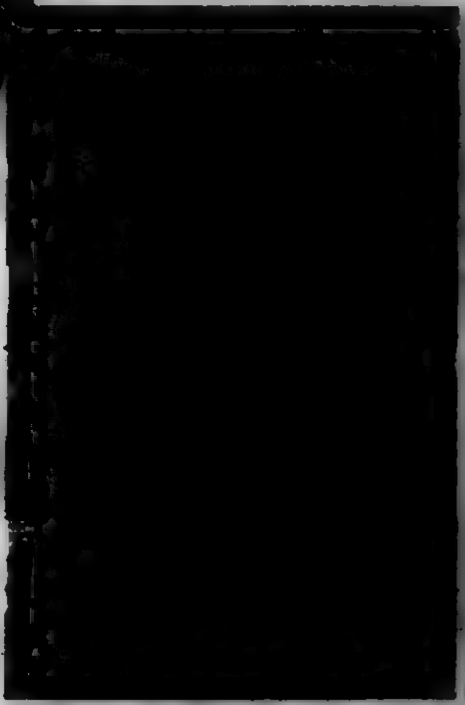

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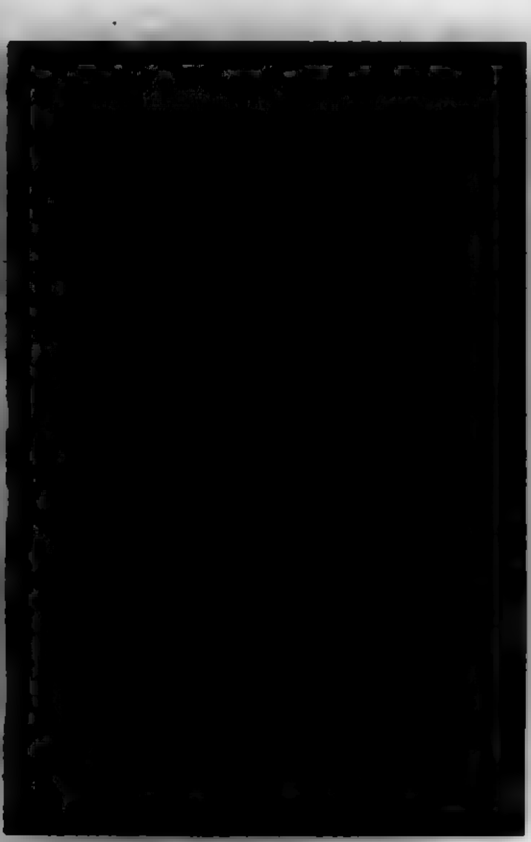

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High-tech industry needs to address Tax Reform Act;

OUTSIDE LINES
A.D. Saunders

Congress' approach to the Tax Reform Act of 1984 reveals major problems that must be addressed by the high-technology community.

First, on the issue of compensation and benefits, the act says a lot about too little and thereby makes compliance difficult because of the paperwork involved. Second, what the act does say often conflicts with other government policies designed to strengthen the ability of U.S. companies to compete on a global scale; and third, the act says nothing about software development accounting when something should have been said.

So many changes have been made that many high-technology companies will find it necessary to go back to the beginning and review all of their benefits via an audit. The crux of compensation and benefits tax policy is whether a benefit will be included as income to the employee or whether it will be deductible by the company as a business expense. Only an audit can pin down what is taxable or deductible and what is not: store discounts, tax preparation services for employees, dining and exercise facilities, parking, tuition reimbursement and the so-called cafeteria plans (which are not related to eating).

Another consideration in evaluating the impact of tax changes in compensation and benefits is whether the benefit is available to all employees or whether it is limited to key employees. The Tax Reform Act tends to favor democracy, so generally speaking, benefits available to all result in no tax to the employee. Certain perks which are usually restricted to senior personnel, such as interest-free loans and stock options, took a beating.

For example, under the old law, a portion of income from the exercise of incentive stock options is ordinary income, and a portion is capital gain. The new law increases the ordinary income amount for these stock options because, as Julia Bell, a tax lawyer with Gaston Snow & Eli Bartlett in Boston pointed out, although the long-term capital gain holding period was decreased in the Tax Reform Act generally, it was not decreased in the area of incentive stock options.

We hear so much adverse commentary about management compensation that we often overlook its real purpose: to attract top-flight people and reward their performance over time. In the high-technology world, being able to compete is as much a function of people as it is finances. Bill Bowman, chairman of Spinnaker Software of Cambridge, Mass., pointed out that a major obstacle has been that Congress "has no idea that stock options are as important and as widely used by small new companies" as they are by large companies like IBM.

Bowman testified at Congress' Joint Economic Committee's hearings and confirmed the fact that some members of Congress were thoroughly ignorant of the industry's views. Hopefully, Bowman said, the hearings will help revamp Congress' piecemeal approach and let them know that "stock options are an important way of life to smaller companies."

A golden parachute is a contract "to provide payments, contingent on a corporate takeover, often equal to several years compensation . . . [which are] deducted by the company as ordinary and necessary business expenses," according to an Ernst & Whinney (E&W) analysis of the Tax Reform Act of 1984.

Saunders is a Boston-based attorney with a practice which includes international marketing, antitrust issues and corporate finance.

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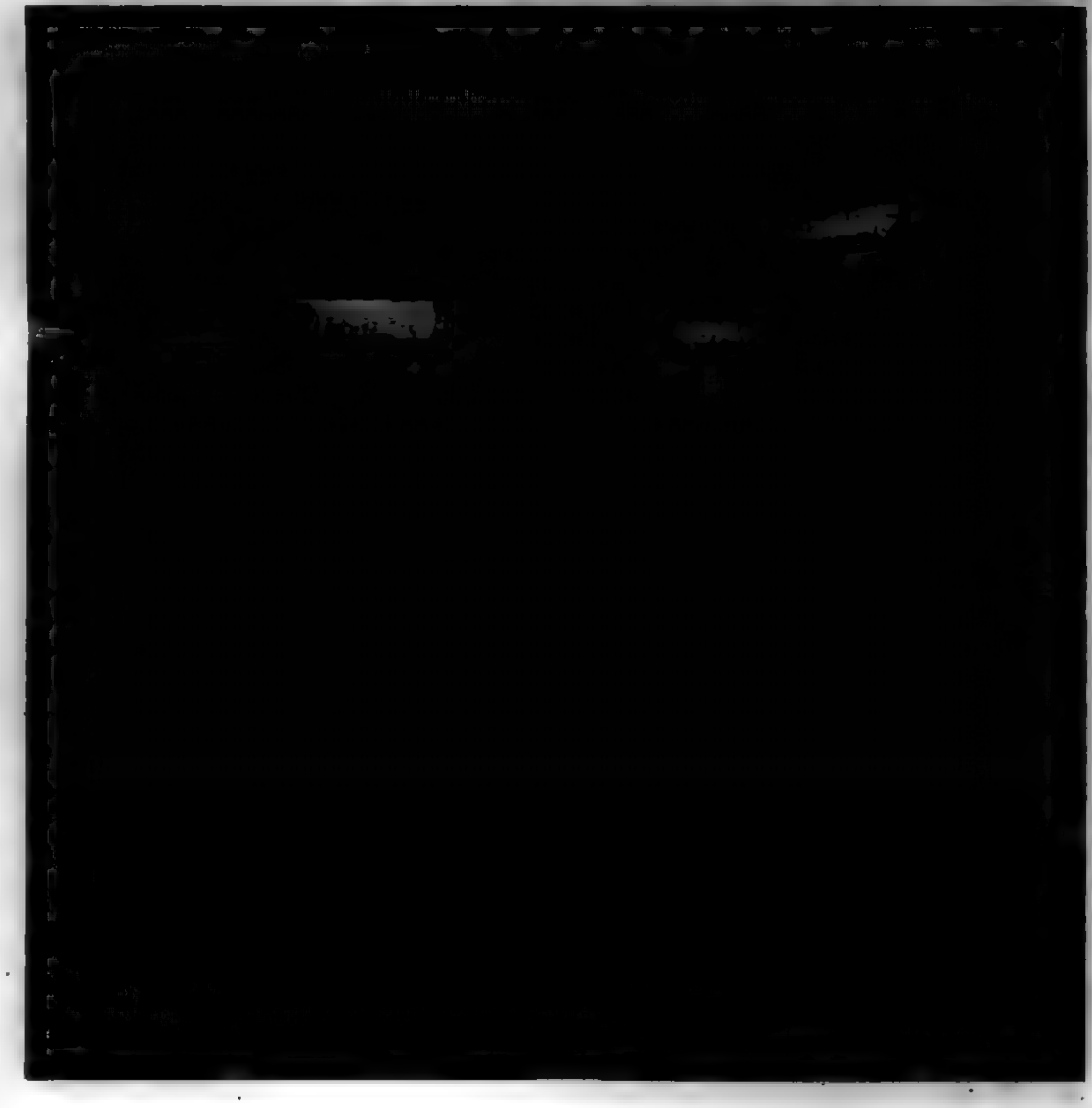

benefits, foreign tax, accounting issues raise concerns

According to E&W, excessive payments are now "presumed to constitute unreasonable compensation and are not deductible by the company. In addition, such payments are subject to [Federal Insurance Contributions Act] taxes, and a 20% nondeductible excise tax is imposed on the recipient."

There has been some talk of restructuring the golden parachute as a covenant not to compete. The payment would be for not doing something contrary to the competitive interests of the company as opposed to actually doing something for the company. The language of the Tax Reform Act makes the present value of the payment the test and not how that payment is otherwise characterized. So it is back to the drawing board for golden parachutes.

The Domestic International Sales Corp. (Disc) has new clothes. It is now called the Foreign Sales Corp. (FSC). The previously deferred Disc income, which would have been taxable under the old law at some unspecified time in the future, has been forgiven and becomes a permanent benefit to the tune of between $8 billion and $13 billion, according to George Yost of Coopers & Lybrand, Inc. The problem of the FSC is whether software will qualify as an export property for FSC purposes.

The new rules on withholding should help U.S. companies (and the U.S. Department of the Treasury) raise capital overseas. They obviate the need for international finance subsidiaries which were often incorporated in the Netherlands Antilles by U.S. companies as a way around the withholding problem. The withholding provision, however, has not come without its own baggage. Securities, bonds and other financial obligations purchased by foreigners are to be in "bearer" rather than "registered" form. The difference is important because of the anonomity they provide. The U.S. Senate feared losses to the public purse, believing only registered obligations, such as ones with the owner's names on them, could prevent tax evasion. The Treasury was in a quandary about what to do, but decided in late August to require money managers to certify that no purchaser is a U.S. citizen or resident. Bearer obligations stand, at least for now.

One of the very complex issues which international tax lawyers face is to determine whether the source of income is U.S. or foreign. If the income is U.S., then U.S. rates apply, but if the source is foreign, the company gets a credit against its U.S. taxes for payment of the foreign source income toward U.S. source income. The rules relating to these issues continue to "put U.S. companies at a competitive disadvantage" according to Jim Giarruso, Computervision Corp.'s vice-president for taxes.

Consider the transfer of intellectual property such as software to foreign subsidiaries. The Internal Revenue Service must now treat that transfer as a sale and will impose a tax. As Rob Langer, treasurer of Lotus Development Corp. pointed out, it was possible for many years to get an IRS ruling allowing the transfer to be tax free, but that route is "out the window now." The provision also has the potential for inflicting a significant tax liability. Since the transfer is a sale, whether or not there is profit, some corporate treasurers can outline a horrific [illegible] scenario in which up to a fourfold tax liability occurs as a result of the transfer.

ses voice/data integration.

The manufacturer of the first integrated voice/data switching system considers the issues.

Data is a major factor in office communications today. It's projected that within the next five years, data transmission will increase from the present 2% to 40% of total PBX traffic. That's explosive growth. And it means that companies must accommodate this increase by expanding their present systems or by planning now to replace obsolete systems with ones that can meet those needs.

A look at alternatives.

To keep pace with this change, an organization has two basic choices. First, it can stay with a limited voice-only PBX and create separate data networks. This, however, is a costly, inefficient method, and it becomes increasingly difficult to manage multiple expanding systems.

The second alternative is an integrated voice/data system. By installing one network, a company can have voice and data capabilities at every outlet.

Key benefits are the sharing of resources—devices and software—and consolidated network management. An integrated system is an investment in the future that can pay for itself in the savings of single network administration.

A definition of terms.

Integrated voice/data is sometimes thought of as simply combining voice and data in one switch. But it's really much more. It's the total integration of voice and data through a twisted pair network.

Because a digital system does not distinguish between voice and data, both look the same as they pass through the switch. So it's possible to apply sophisticated voice features to data—least cost routing, conference calls between workstations, callbacks on data terminals and other aids to productivity that are normally associated with voice-only systems.

Major considerations.

Universal Connectivity

One of the greatest challenges facing communications professionals today is the management of changing technology. In an environment where many approaches to office communications call for complete flexibility, only a system designed to be compatible with multi-vendor equipment is a safe choice. Such a system provides the format and protocol conversion capabilities for dissimilar devices to communicate with each other, freeing a company from the need to choose all its equipment from one vendor.

A system should be capable of connecting numerous dissimilar devices to a common network, allowing them to share peripherals, data and functions. This flexibile connectivity also protects your investment in equipment, ensuring its continuing value.

Non-Blocking Traffic

In voice systems, many calls can share one path through the switch because conversations are short and not everyone uses his telephone at the same time. However in data communications each device needs full access through the switch, and the long holding times of data calls place heavy demands on a network. As more data circuits are added to meet growing user needs, a system founded on voice-only design can't handle the traffic and begins to block calls from completion, or to degrade the quality of transmission.

Non-blocking matrix architecture, however, places no restrictions on voice and data access. As the data-to-voice proportions change, the system is reconfigured at the host controller. And there's no new cabling required. In non-blocking systems, savings are soon realized in simplified administration.

Processing Capacity and Speed

Many installed systems operate on 16-bit processors. While this may be adequate power for today's voice-only systems with few data options, it may not be sufficient for tomorrow.

Since a system's processors are the limiting factor, they must offer enough capacity for growth. A system offering 32-bit processors can handle both present and future capacity requirements. It's valuable insurance against obsolescence, with unlimited potential for applications like video and future developments.

The office automation industry is introducing more and more devices that operate at speeds up to 10 Mbps. Only an integrated voice/data system that offers 10 Mbps connectivity and integrated local area networking can successfully carry a company into the automated office environment now evolving.

A view for the future.

In 1979 InteCom introduced the first integrated voice/data system, the IBX™ Integrated Business Exchange, and since then has been setting the pace for the office communications industry.

The system has been proving its merits in installations all across the country for more than three years. It's backed by comprehensive support and refined through an ongoing program of research and development. Software-oriented, adaptive to new technology and protected from obsolescence, the IBX offers you the connectivity needed for tomorrow's automated office.

We hope this look at the issues of voice/data integration will be useful to you in your system selection. InteCom has met the communications requirements of companies in a wide range of industries. And today, our representatives are ready to help you evaluate your specialized needs.

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Pansophic buys out Christensen, acquires Telon

By David [illegible]
CW Staff

BOSTON — Pansophic Systems, Inc. completed an acquisition earlier this month aimed at helping the company gain a foothold in the high-end IBM mainframe software market.

On Nov. 1, Pansophic acquired the remaining 85% of the assets of Christensen Systems, Inc. which it did not already own. Christensen, a three-year-old Quincy, Mass., software company, is the developer of Telon, an on-line application development program designed for IBM IMS-DC and CICS operating environments.

Pansophic, a $53-million system software supplier based in Oak Brook, Ill., until now, had no product targeted at the high-end IBM customer. The company hopes the Telon product will enable it to establish a strong position in large IBM shops.

Christensen

David Eskra, Pansophic president and chief operating officer, in a recent interview here said the company wants to gain a foothold in 8,000 to 12,000 of the estimated 33,000 IBM mainframe installations worldwide. Pansophic claimed its present customer base numbers 7,600.

"Telon will elevate Pansophic's reputation in those big IBM shops and will help us sell products at all levels of IBM shops," Eskra maintained. "It allows us to have a more consistent strategy at the customer level, and it allows customers to buy more than one Pansophic product at a time."

"We want to be the market leader," said Alfred Seyler, Pansophic's vice-president and managing director of on-line products. Seyler claimed that no clear market leader has yet emerged in the IBM IMS-DC and CICS arena, in which companies like Informatics General Corp., Cincom Systems, Inc. and Oxford Software Corp. are the major players.

"We fully intend to dominate that market and to dominate it quickly," Seyler asserted.

Eskra

Telon sells for about $100,000, or about twice as much as any previous product in the Pansophic line. Because Telon poses a different kind of marketing challenge, Eskra said, Pansophic, which has a worldwide sales force of 105 people, plans to establish a separate U.S. sales force for the product.

According to Don Christensen, founder and president of Christensen Systems, Telon had been installed at 37 IMS sites, accounting for sales of about $3 million prior to the acquisition. Christensen explained in an interview that his company has been weak in the marketing area and that it lacked the extensive marketing channels a major company like Pansophic can offer.

Eskra said the company plans to continue to expand its product line through acquisitions, while at the same time, placing increased emphasis on in-house research and development.

Last April, Pansophic paid $500,000 to acquire a 15% interest in Christensen Systems. It decided to exercise its option to acquire the remainder of the company for $2 million. As part of the deal, Christensen will also receive royalties for the sale of its products during the next five years.

The acquisition provides that all Christensen personnel will retain their present positions and responsibilities.

CEC to market S1 to Japanese

LAWRENCEVILLE, N.J. — Multi Solutions, Inc. announced recently it had entered into an exclusive five-year agreement with Computer Engineering and Consulting Ltd. (CEC) of Tokyo, for the licensing and distribution of Multi Solutions' S1 operating system to Japanese companies.

Subject to the approval of the Japanese government, the agreement provides that CEC must pay Multi Solutions minimum royalties amounting to about $40 million to maintain the exclusive worldwide rights to license and distribute the operating system and all related products to Japanese computer manufacturers, software designers and other vendors. Multi Solutions said CEC may renew the agreement for an additional five years, in which case CEC must pay additional minimum royalties of approximately $20 million a year for each of the five years.

The S1 operating system is a multiuser, multitasking system said to be capable of operating on almost any computer hardware.

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Comdisco reports year-end plunge in profits, posts record revenues

ROSEMONT, Ill. — Computer leasing and brokerage company Comdisco, Inc. recently reported profits of $29.7 million, or $1.05 per share, for the year ended Sept. 30. Year-earlier profits were $51.8 million, or $1.78 per share.

The company said the decline in profits was primarily due to decreased volumes of tax-advantaged transactions, which were suspended during an Internal Revenue Service investigation that was concluded early this year without adverse action being taken. In fiscal year 1982, the company reported profits of $29.3 million.

Despite the IRS review, Comdisco reported record revenues of $558.3 million for the year just ended, compared with $543.1 million last year.

For the fourth quarter of the year just ended, Comdisco reported profits of $8.9 million, or 33 cents per share, compared with year-earlier profits of $15.7 million, or 53 cents per share. Fourth-quarter revenues were $142.6 million, compared with $141.8 million in the previous year.

Kenneth N. Pontikes, chairman and president of Comdisco, said the company "expects a strong resurgence in financial services activities in fiscal 1985."

Data Access reorganization completed under Chapter 11

BLACKWOOD, N.J. — Data Access Systems, Inc., an independent distributor of personal computers, peripherals and supplies, recently announced the consummation of its plan of reorganization under Chapter 11 of the Federal Bankruptcy Act, as earlier approved by the U.S. District Court.

The company said it made cash payments totaling $6.5 million to creditors in partial settlement of allowed claims of approximately $35 million. It also issued to creditors $14.5 million of noninterest-bearing notes and 150,000 shares of its $100 par-value liquidating preferred stock said to be valued at $[illegible] million.

Additionally, creditors received two million shares of common stock and warrants to purchase 400,000 more shares.

David Cohen, chairman and chief executive officer of Data Access, said that during the 20 months the company operated under Chapter 11 protection it "maintained and strengthened its fundamental business." Pointing out that the company recently achieved its first profitable year since 1978, Cohen added, "Now that the company is out of Chapter 11, it is in an excellent position to become even more profitable, and we feel it is on the threshold of a new period of growth."

The company reported revenues of $34.5 million for the year ended in August and said it has a $30 million tax loss carryforward that will enable it not to pay federal income taxes in the near future.

Verbatim trims domestic staff

SUNNYVALE, Calif. — Flexible storage disk maker Verbatim Corp. recently reported a staff reorganization resulting in the reduction of 176 of its professional and support staff at its U.S. locations — a 6% decrease in its worldwide work force.

The company had previously announced a restructuring of its operating divisions and said the reorganization was part of that restructuring.

The company said that no production employees were affected by the reduction whose purpose was to streamline the organization and improve the firm's ability to meet commitments to customers and overall objectives for sales and profitability.

Current production, product introduction and marketing schedules were not affected by the reorganization, the company said.

Vector Graphic earnings slide

THOUSAND OAKS, Calif. — Financially ailing Vector Graphic, Inc. recently posted a first-quarter loss of $1.8 million, or 24 cents per share, on a sharply declined revenue base.

Vector Graphic, which earlier had announced its intention to seek to be merged or acquired, saw its revenues decline to $2.1 million from year-earlier revenues of $6 million. The loss in the first quarter compared with a year-earlier loss of $701,000, or 12 cents per share.

The firm noted that in response to declining sales, it had previously reduced its work force by 66%, or roughly 100 employees. Expenses for the quarter were reduced to $4.1 million, compared with $7.2 million in the first quarter last year.

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CDC to sell credit company, acquires Visicorp subsidiary

MINNEAPOLIS — Control Data Corp. announced recently that it intends to sell its Commercial Credit Co. and related financial businesses. It was also announced that CDC had acquired Communications Solutions, Inc. (CSI) from Visicorp for approximately $5 million in cash.

The Commercial Credit unit was purchased in 1968 and served initially to finance CDC computer sales. CDC said it hopes to complete a sale by mid-1985 and focus more on its computer operations.

Profits at CDC have taken a decided downward turn for the first nine months of the current fiscal year to $600,000, compared with $113 million for the comparable period a year earlier.

The purchase of CSI follows an earlier move to acquire the rights to Visi On from Visicorp along with the absorption of the Visi On development team.

Robert Howell, director of business development for Control Data Software Co., said the acquisition addressed his company's focus on mainframe communications. CSI will operate as an autonomous unit of Control Data Software.

Lee Data to gain Visual Technology through stocks

MINNEAPOLIS — Lee Data Corp. will acquire Visual Technology, Inc. of Tewksbury, Mass., through an exchange of common stock valued at about $16.8 million, the two companies announced last week.

According to a preliminary letter of intent approved by the boards of directors of both companies, Lee Data will exchange one-half a share of its common stock for each share of Visual Technology's 4.9 million shares of common stock outstanding.

As a wholly owned subsidiary of Lee Data, Visual Technology will be operated by its current management, the companies said. Thomas R. Foley, president and chief executive officer of Visual Technology, will become an officer of Lee Data and a member of its board of directors, according to the planned merger.

Visual Technology, a manufacturer of asynchronous terminals, the Commuter portable computer and the Visual 2000 multiuser system, is expected to have its credit facility increased from $19 million to $22 million and, on completion of the merger, to $25 million, with the additional $3 million guaranteed by Lee Data. Additionally, Lee Data will make $3 million of additional financing available to Visual Technology, according to spokesmen.

Lee Data's sales force will market Visual Technology's products, the spokesmen said.

Firm's president indicted for chip trade violations

By Charles Babcock
CW New York Bureau

NEW YORK — The president of International Processing Systems GmbH, a West German firm, was recently indicted by a federal grand jury here for conspiring to smuggle semiconductors to North Korea.

Babeck Seroush was indicted on six counts of violating the Trading with the Enemy Act, with a possible penalty of 10 years' imprisonment and a $50,000 fine on each count, according to Rudolph W. Giuliani, U.S. attorney for the Southern District of New York.

Without informing companies of their destination, Seroush attempted to purchase the following parts, according to the indictment: 10,000 pieces of National Semiconductor Corp. part MM 54C373J; 6,000 pieces of Texas Instruments, Inc. part number SN 54LS154; and 4,200 hybrid integrated circuits designed as components for night vision goggles. All were designed for use at the temperature extremes required for military applications, Giuliani said.

Bound for North Korea

The parts were slated to be shipped to International Processing Systems in Cologne, West Germany, where they would be diverted to North Korea, according to the indictment.

Companies that were approached by Seroush included: Analog Devices, Inc. of Norwood, Mass.; Jaco Electronics, Inc., of Hauppage, N.Y.; Kemet Capacitors of Union Carbide Corp., Tarrytown, N.Y.; and Schweber Electronics of Westbury, N.Y.

Seroush, a 38-year-old Iranian national, until recently had homes in Westport, Conn., and New York as well as Germany. He has been arrested by German authorities for possible extradition to the U.S. to stand trial, Giuliani said.

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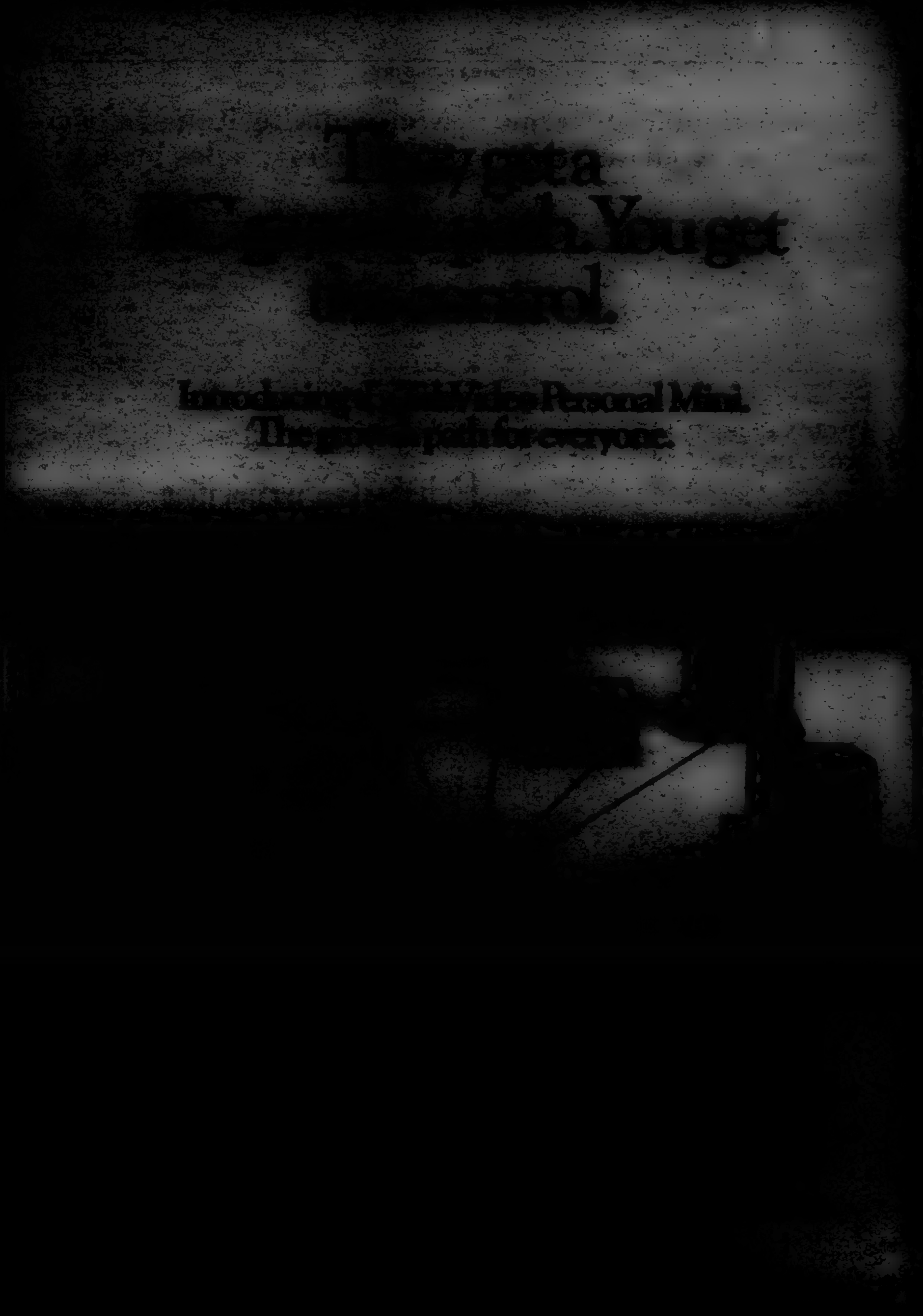
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Tandem doubles revenue with help from tax break

CUPERTINO, Calif. — Tandem Computers, Inc. recently reported that its fourth-quarter profits more than doubled to $21.8 million, or 53 cents per share, from $8.7 million, or 21 cents per share, a year earlier.

The company's profits were boosted by a one-time gain of $9.7 million, or 24 cents per share, resulting from a change in the tax law governing overseas operations.

Revenue for the quarter ended Sept. 30 increased 30% to $153 million, compared with $117.8 million during the same period one year earlier.

For fiscal year 1984, Tandem's revenue rose 27% to $532.6 million from $418.2 million during fiscal 1983. Profits for the year, including the $9.7 million tax benefit, were $42.9 million, or $1.04 cents per share, compared with $30.8 million, or 76 cents per share, the previous year.

James G. Treybig, president and chief executive officer, said sale of the company's high-end Nonstop TXP computer system, which was introduced last year, was the major contributing factor to revenue growth.

Nonrecurring items boost PE quarterly sales income

NORWALK, Conn. — Perkin-Elmer Corp. recently reported that first-quarter profits were $17.5 million, or 39 cents per share, compared with $8.8 million, or 20 cents per share one year earlier.

The profits included nonrecurring items that increased profits by $4 million, equivalent to 9 cents per share, and the company said profits without those items would have been $13.5 million, or 30 cents per share, a 53% increase over the same period on year earlier.

Sales revenue for the quarter ended Oct. 31 was $286 million, a 14% increase over the previous year.

Horace G. McDonald Jr., president and chief executive officer, said the company held the rate of increase in operating expenses below that of sales increases and the company experienced increases in new orders as well as in its backlog of unfilled orders.

Sales for the company's Data Systems Group were $60.2 million, up from $53.6 million a year earlier, and Semiconductor Equipment Group sales were $66.2 million, up from $49.4 million during the same period one year earlier.

Paradyne posts profit increase

LARGO, Fla. — Paradyne Corp. recently reported a 51% increase in third-quarter revenue and a 295% profit increase compared with the third quarter a year earlier.

Revenue for the three months ended Sept. 30 was $76.1 million, compared with $50.3 million a year earlier. Profits for the quarter just ended were $3.1 million, or 14 cents per share, compared with year-earlier profits of $804,000, or 4 cents per share.

Robert S. Wiggins, chief executive officer of Paradyne, expressed pleasure with the company's revenue and order rates during the third quarter but noted that "the international order rate appeared to be dampened by the effect of the strong dollar abroad."

EXECUTIVE CORNER

Jerome Meyer will join Varian Associates, Inc. in the newly created position of president and chief operating officer on Dec. 3.

■

Jonathan Yu has been appointed president and chief operating officer at Applied Micro Circuits Corp. Yu previously had been employed at TRW, Inc. and Burroughs Corp.

■

Frank Burcher has been named president and chief executive officer of Molecular Computer, Inc.

■

W. Kyle Willis, who recently joined TCS Software, Inc. as chief financial officer, has been appointed president and chief executive officer of the company.

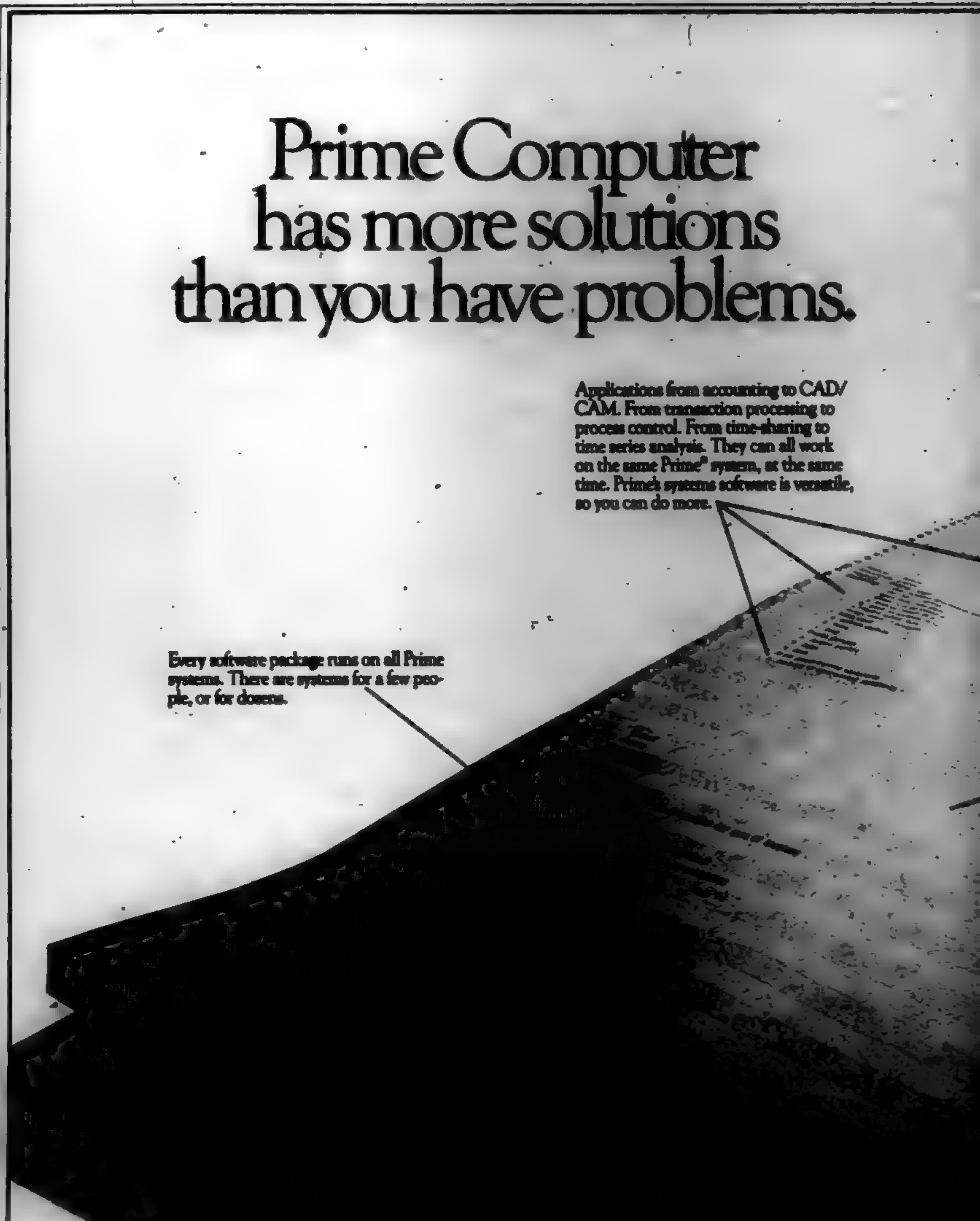
■

F. William Stamper has been appointed president of the MDS Systems Divison at Mohawk Data Sciences Corp. (MDS). Prior to joining MDS, Stamper worked for Control Data Corp.

■

William Porter has been appointed to president, chief operating officer and member of the board of directors

See EXEC page 84



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Cray Research sales up despite increased competition

By Charles Babcock
CW New York Bureau

NEW YORK — Cray Research, Inc.'s sales are increasing at a time when it faces growing supercomputer competition at home and abroad.

Cray Chairman John A. Rollwagen told the New York Society of Security Analysts recently that the Minneapolis-based supercomputer maker expects to install 21 multimillion-dollar systems in 1984. Last year it installed 16; next year it expects to install 30, Rollwagen said.

"If someone orders today, we have to say, 'Sorry, but we can't deliver until the first quarter of 1986, 15 months from now,'" he said.

Expects orders to grow

Still, the pace of orders is expected to grow, Rollwagen said. Forty-five prospects have submitted a written or verbal order for a Cray machine, and 24 of those ordering are new customers. New customers make up almost three-fourths of the prospects that are currently querying Cray, he added.

When asked if Cray, which is used to selling a handful of $6.5 million to $20 million machines a year, could ramp up production, Rollwagen answered by noting that in the past, Cray customers have been reluctant to say they would be willing to buy a new model three years down the road, so Cray forecasters would say demand was likely to decline in three years.

Now, Cray "is taking the courageous step" of predicting that demand will remain steady, rather than decline, and it is increasing production accordingly, he said.

While the bulk of Cray's customers continue to be government and university laboratories, Rollwagen said a growing share are commercial companies, such as the Ford Motor Co., which uses a Cray machine to simulate auto crashes.

Demand strongest for multiprocessor units

Rollwagen indicated that the demand is strongest for its X-MP/2 or X-MP/4 dual and quadruple processor units. "We misjudged to some extent the demand for the top of the line," he said.

He noted that the appetite for supercomputing power is driven by the desire to simulate physical phenomena, such as aircraft flying or atmospheric conditions.

John F. Carlson, Cray's chief financial officer, reported that the company garnered a revenue of $71.6 million and net earnings of $19.6 million, or $1.32 per share, in the third quarter ended Sept. 30. Revenue in the third quarter last year was $31.4 million, with a net income of $2.8 million, or 19 cents per share.

CRAY

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They worry that they will not get the most advanced components until two years after they have appeared in Japanese computers. Cray has developed its own gallium arsenide manufacturing capability to avoid becoming dependent on its competitors, according to Rollwagen; its first attempts have not yielded wafers with working chips.

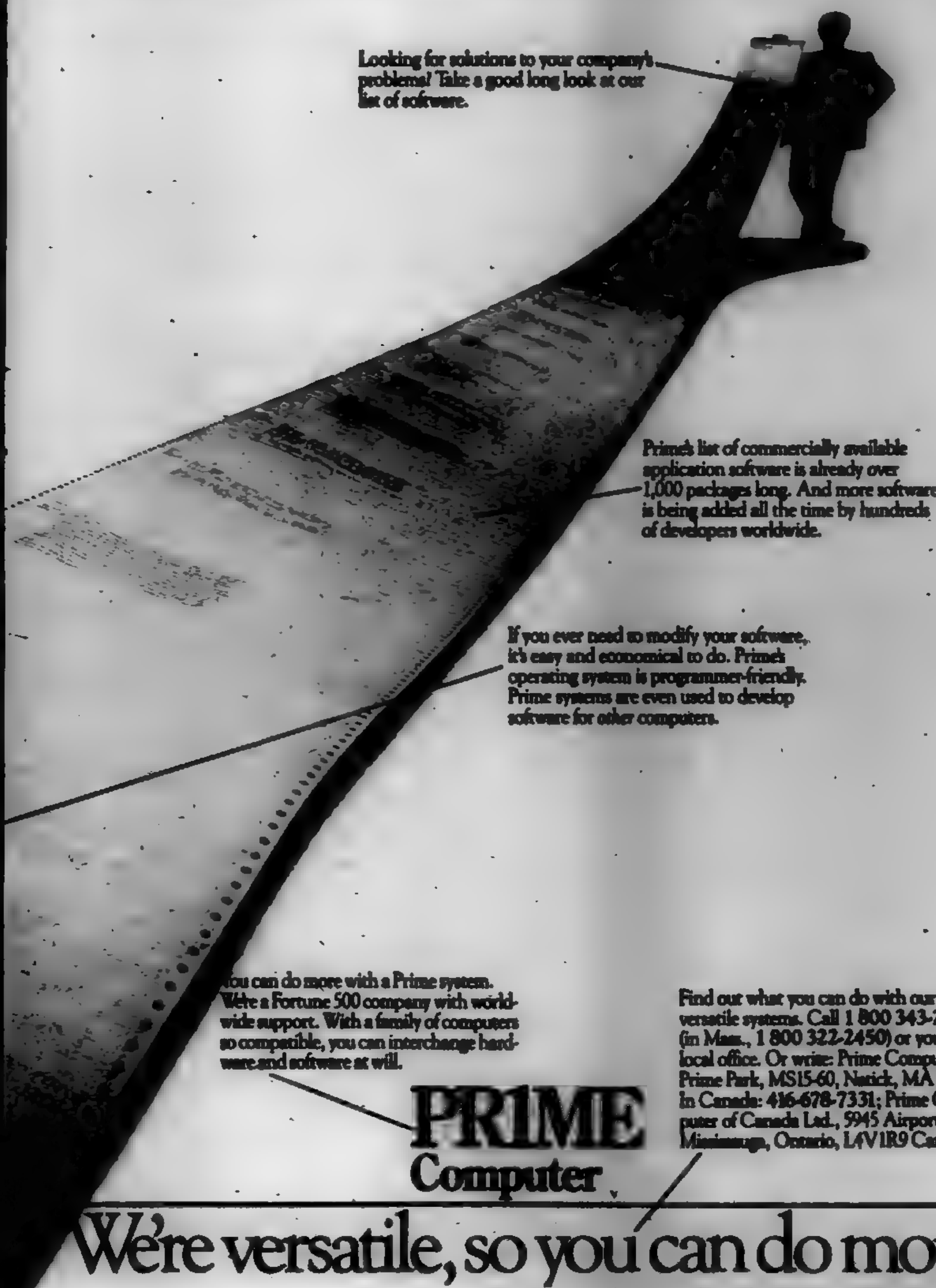
Japanese may have edge

Browne said taking the step to gallium arsenide components was risky, adding that the Japanese may have an edge in designing gallium arsenide chips.

A start-up company, ETA Systems, Inc. of St. Paul, Minn., an offshoot of Control Data Corp. of Minneapolis, is designing a supercomputer with Cmos chips that are slower than ELC or gallium arsenide but contain a very high density of components per chip. The chip is being designed to execute 10 billion floating-point operations per second and is scheduled to be available in the second half of 1986, ETA spokesmen said.

Rollwagen claimed Cray had a two-year lead on Hitachi and Fujitsu because the Japanese firms were still field-testing their new models and needed more time to develop them. Spokesmen for Fujitsu and Hitachi America Ltd. disputed the claim, saying they were past field-testing and were installing units at locations in Japan.

Amdahl Corp. of Sunnyvale, Calif., which markets Fujitsu supercomputers in the U.S. as the Amdahl 1100 and 1200, said they will be available in the second quarter of 1985. Hitachi has not decided yet whether it will market its S-810 and S-820 supercomputers in the U.S., Hitachi spokesmen said.



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SECRETS

from page 73

ganization last June.

In a book to be published next month, Palo Alto, Calif., attorney Robert Spanner likens trade secret litigation to "an excursion into the realms of hell." In a recent interview with *Computerworld*, Spanner, a trade secret specialist with Beckford, Spanner & Kelley, described the "devastating" costs that often result when a computer company gets involved in trade secret lawsuits.

Trade secret cases, Spanner said, "consume the attention and passions of management and are amazingly disruptive [to] the operations of the company." He said the damage can be particularly severe for a start-up company that is hit even by the threat of a lawsuit. Even if the start-up is able to defend against the charges successfully, the financial and emotional costs may doom the planned venture.

"One very important strategic consideration," Spanner noted, "is that as soon as word gets out to the stock market that there is a trade secret litigation instituted or threatened, [investors and customers] will avoid you like the plague."

Spanner said he believes trade secret litigation is on the increase in the computer industry. He said he counsels his clients to avoid such lawsuits "at all costs."

In his book, Spanner writes that one of the stickiest areas of trade secret law is differentiating between proprietary information, which a company's employee — in signing a nondisclosure agreement — promises not to reveal should he leave the company, and the employee's general knowledge and experience, which he is free to use as he wants.

"Courts have had a great deal of difficulty in differentiating an employee's knowledge from company proprietary information," he said. Spanner said that judges are sometimes uncomfortable with these suits because of the "fundamental considerations of personal autonomy involved." A judge must weigh such factors as the use of information that exists in the privacy of an individual's thoughts and an employee's freedom to move from one job to another and to better himself economically, he noted. There are, of course, important economic interests at stake, too; for example, promoting U.S. R&D to help the country's competitive position vis-a-vis foreign companies.

Spanner believes that trade secret law is in a state of general disarray. "Cases presenting similar circumstances are being decided in diametrically opposite ways," he maintained. He would like to see state legislatures consider this complex issue and adopt some kind of uniform statutes.

"It's important to prevent and avoid cynicism on the part of the public with any facet of the law," Spanner said. "I think the word is going to get out that there is no predictability in the trade secret area, and that it depends on who the judge is and whether he likes you. I think that is socially dangerous."

EXEC

from page 82

tors at Startel Corp.

■

Nancy Goodhue was named vice-president of Datatel Minicomputer Co.

■

William Morgan has been promoted to the newly created position of senior vice-president of product operations at Memorex Corp. Prior to working at Memorex, Morgan was employed by Texas Instruments, Inc.

■

Louis Clark has joined Integrated Planning, Inc. as vice-president of product development.

■

Honeywell, Inc. announced the following promotions to group vice-presidents: **Charles Johnson**, large computers and manufacturing systems; and **Eugene Manno**, small computers and office systems.

■

Andrew Knowles has been appointed corporate vice-president at Prime Computer, Inc. Knowles previously worked for Lexidata Corp. and Digital Equipment Corp.

■

George Perlegos, vice-president of engineering, has resigned from Seeq Technology, Inc.

■

Lee Data Corp. announced the appointments of **Douglas Pihl**, senior vice-president of corporate development; and **Don Miller**, vice-president of product development.

■

James Hart has been appointed to the newly created position of senior vice-president and chief operating officer at Avanti Communications Corp.

■

Edward F. Eddy has resigned his position of vice-chairman at NEC America, Inc. to join Ambi Corp. as chairman.

Stephen S. Yau was elected president of the American Federation of Information Processing Societies following the National Computer Conference this past summer. **Per A. Holst** was named vice-president, **Herbert B. Safford** was named secretary, and **Rolland B. Arndt** was named treasurer of the federation. Yau is a professor and chairman of the Department of Electrical Engineering and Computer Science at Northwestern University.

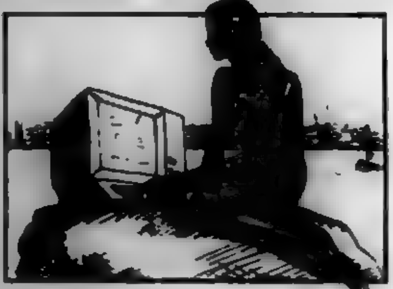
■

Victor D. Poor has resigned as an executive vice-president of Datapoint Corp. and will become a technology consultant to the chairman and chief executive officer of the company.

■

Donald W. Gouldsmith has been appointed to the position of president and chief executive officer at Madic Corp. Former president **Richard Wilke** becomes chairman of the board.

■



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MERGERS AND ACQUISITIONS

Avant-Garde Corp. announced recently it has reached an agreement in principle to acquire 100% of the common stock of **Human Engineered Software Corp.** (HES). HES will become a wholly owned subsidiary of Avant-Garde.

Final settlement will depend on Avant-Garde reaching a conclusive agreement with HES' principal secured lender. HES last month filed for relief under Chapter 11 of the Federal Bankruptcy Act. The bankruptcy court must also approve an HES plan of reorganization.

■

Anacomp, Inc. announced that the board of directors of its majority-owned subsidiary **USA Communications, Inc.** has approved an agreement in principle for the sale of substantially all of the assets of USA Communications to **Outlet Communications, Inc.**, a wholly owned subsidiary of the Rockefeller Group, a private company owned largely by the Rockefeller family.

The $22 million cash sale is subject to the execution of a definitive agreement and necessary USA Communications stockholder and regulatory approvals. On a fully diluted basis, assuming exercise of all outstanding warrants and options and the retirement of USA Communications' retained liabilities, the purchase price is equivalent to approximately $3.10 per share of USA Communications common stock. Anacomp owns 2.4 million shares of USA Communications common stock.

■

Bell & Howell Co. announced that it has agreed to purchase certain assets of 3M Co.'s computer-output microfilm (COM) business. A COM system electronically transfers data from a computer directly onto microfilm instead of paper and is the most economical computer data storage method available.

■

Honeywell, Inc. and **Digital Datacom, Inc.** have announced that they have signed an agreement providing for a merger whereby Honeywell will acquire Digital Datacom, a Laguna Niguel, Calif., maker of work center manufacturing systems, for $10 million in cash. The two companies had signed a memorandum of understanding in August.

■

Data I/O Corp., Redmond, Wash., and **Futurenet Corp.**, Canoga Park, Calif., jointly announced that they have entered into a definitive agreement associated with the Data I/O's acquisition of all of Futurenet's outstanding shares in exchange for 2.16 million shares of Data I/O common stock, which had been announced in late August.

The acquisition will be accomplished through the merger of a Data I/O subsidiary and Futurenet and will be considered a pooling of interests. The transaction is conditioned upon certain regulatory filings and approval of Futurenet's shareholders.

■

MSI Data Corp. entered into an agreement in principle to acquire **Azurdata, Inc.** of Redmond, Wash., for an undisclosed amount.

Completion of the transaction is subject to execution of a definitive agreement that must be approved by the boards of directors of both companies and by the Azurdata stockholders.

■

NCA Corp. announced it has agreed to acquire **The Systems Practice, Inc.** for an undisclosed amount of NCA common stock. Terms of the acquisition were not available.

SUPERSHORTS

Miniscribe Corp. has signed an agreement with **Arrow Electronics, Inc.** to distribute Miniscribe's entire line of Winchester disk drives. Lawrence J. Klassen, vice-president of marketing at Miniscribe, said the contract is a multiyear agreement with a potential value in excess of $20 million.

■

AT&T Information Systems and **The Computer Store, Inc.** announced an agreement whereby The Computer Store will market the AT&T personal computer and accessories in their 12 stores located in New England and the mid-Atlantic states. Terms of the agreement were not available.

■

Relational Technology, Inc. and **Burroughs Corp.** signed an OEM pact granting Burroughs the right to distribute Relational's Ingres relational data base management system with its new supermicrocomputer. Terms of the agreement were not available.

■

Savenet, Inc., CP National Corp., American Network, Inc. and **Pacific Telecom, Inc.** announced they have reached agreements in principle for the merger of the discount long-distance telephone services of Savenet and CP National's passport operations into American Network, a publicly held company. The agreements are subject to the approval of the boards of directors of all companies. The transaction is expected to be completed by late November.

■

Stratus Computer, Inc. announced the formation of two key corporate departments intended to enhance further the company's ability to deliver advanced products.

Hardware and software development have been consolidated into a single engineering department. A newly created group focused on emerging technologies and business opportunities also has been formed.

■

Charles River Data Systems announced an agreement worth an estimated $5 million to deliver 275 of its Universe 68 computer systems and Unos operating system software to the People's Republic of China over the next 18 months. At the same time, the company received a specific contract to ship the first $1 million worth of hardware and software.

■

Perex Microsystems, Inc. announced the formation of a new division called **Perex Information Systems** (FIS). Lead by Dr. Timothy Hallinan, FIS will develop a series of products to present a range of business, social, economic and financial statistics in a concise format on single diskettes.

■

Vitalink Communications Corp. and **Digital Equipment Corp.** announced an agreement under which the two companies will cooperatively market a hardware and software product called Transian that transparently connects local-area networks via satellites and/or terrestrial lines.

The agreement calls for Vitalink to receive a technology license from DEC as well as cooperatively market Transian with DEC. Transian will be sold, serviced and supported by Vitalink.

■

Ashton-Tate announced it has signed a $10 million contract with French software distributor **La Commande Electronique** to distribute Ashton-Tate's current business software products in France. Terms of the agreement were not disclosed.

■

Visual Technology, Inc. announced that it will be moving its New York printed-circuit board assembly operations to its principal manufacturing facility in Massachusetts. Work force reductions will result in the termination or layoff of approximately 190 employees, primarily in New York.

See SUPER page 69

STC

from page 73

shareholders, creditors, employees and customers."

The meeting was called by the trustee to form a creditors committee to review and make recommendations on the company's financial plans as part of the court-monitored reorganization. At the time of that meeting, the company announced the filing of a petition to place another subsidiary, Media Technology Corp., under Chapter 11 protection for reorganization.

Aweida told the creditors the company expects to emerge from reorganization as a "stronger, possibly smaller, but more competitive operation." He said the company is optimistic about its core business of providing storage tape and disk products and is excited about its optical disk products.

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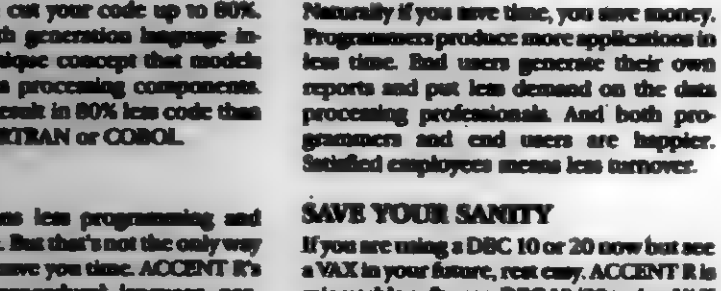

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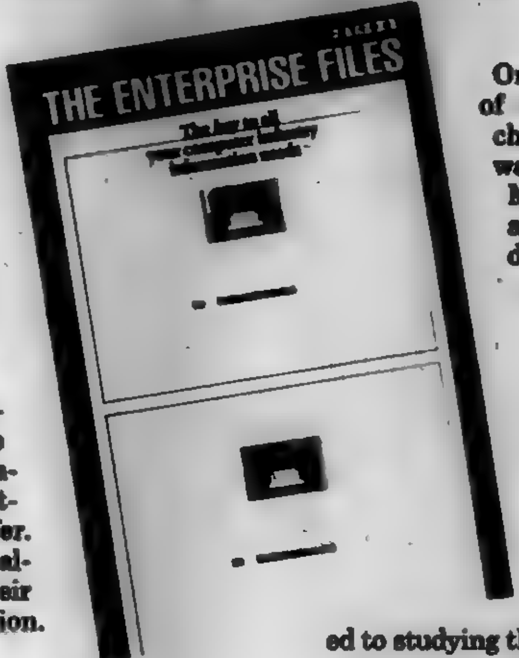

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NICKELS AND DIMES

Computer Sciences Corp. reported profits for the second quarter ended Sept. 28 were $3.4 million, or 25 cents per share, compared with $4.4 million, or 32 cents per share, for the year-earlier period. Revenues were $172 million, compared with $184.4 million in the corresponding period last year.

The lower profits resulted primarily from an expected decrease in international revenue and higher interest expenses, due to bank borrowings, according to William Hoover, chairman and president of Computer Sciences.

■

Masstor Systems Corp. announced that revenues in the third quarter ended Sept. 30 increased to $6.1 million, compared with $4.8 million in the comparable period one year ago. Net loss for the quarter was $3.8 million, or 24 cents per share, compared with a net loss of $3.2 million, or 22 cents per share, in the same quarter last year.

■

Stratus Computer, Inc. reported revenues for the third quarter ended Sept. 30 were $11.1 million, an 87% increase from $5.9 million in last year's quarter. Profits were $1.5 million, or 8 cents per share, compared with $695,000, or 4 cents per share, in the corresponding period one year ago.

■

Zentec Corp. announced revenues for the third quarter ended Sept. 29 of $6 million, compared with $5.4 million for the same period one year earlier. Profits were $101,000, or 3 cents per share, compared with a net loss of $950,000, or 28 cents per share, in the same quarter last year.

■

Keane, Inc. reported profits for the third quarter ended Sept. 30 of $169,000, or 19 cents per share, up from $8,000, or 1 cent per share, a year ago. Revenues were $8.9 million, up 72% from $5.1 million for the same quarter one year earlier.

■

Cray Research, Inc. announced revenues for the third quarter ended Sept. 30 were $71.6 million, compared with $31.3 million in the same period a year ago. Profits were $19.5 million, or $1.32 per share, compared with $2.8 million, or 19 cents per share, for last year's quarter.

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XEROX

from page 73

IBM has chosen to set the hardware standard in manufacturing systems, with a technical hardware umbrella covering everything from the 4361 to a serial OEM interface to a workstation adapter for factory robots.

Personal computer spreadsheets and vertical agricultural programs are easier niches for IBM to target than complex factory automation programs like material requirements planning, he said, which require support from processing, routing, production, inventory control and purchasing systems.

IBM presently offers only a skeleton of a modern manufacturing system, Fello said. XCS' manufacturing software has two advantages over IBM's, he claimed: It takes up half the space on the mainframe and is easily upgraded, which allows small companies to upgrade with hardware that ranges from networked terminals to IBM's 3084 turnkey system.

IBM's factory automation strategy will use its Personal Computer as a basic building block, Fello predicted. "IBM will corner the market with [its] 370 architecture on single- and multiple-station desktops," he said.

XCS' relationship with Xerox offers the best of all possible worlds, Fello said. The disadvantage to the relationship, however, is XCS' close connection to Xerox Corp.'s copier image, he added.

SUPER

from page 66

Bolt, Beranek and Newman, Inc. (BBN) reported its **BBN Communications Corp.** subsidiary has received a contract for a private wide-area data communications network from **Olivetti, S.P.A.** for their customer **Snam.** Snam is a unit of the ENI Group, Italy's $25 billion energy corporation.

The contract is for packet-switching hardware and software. The network will link terminals in 180 cities throughout Italy with 26 ENI computer centers.

■

VLSI Technology, Inc. (VTI) and **Lattice Semiconductor Corp.** jointly announced the signing of a technology and product cross-licensing agreement.

Under the agreement, VTI will receive alternate sourcing rights for very high-performance, electronically erasable programmable read-only memories, static random-access memories and programmable logic devices in development by Lattice.

In exchange, VTI will provide Lattice with wafer fabrication, assembly and test capacity, product engineering and equipment leasing support. Both companies will support joint product development and future product cross-licensing.

■

Matsushita Electric Corp. of America has named Stephen S. Ingersoll, former U.S. ambassador to Japan, as the chairman of a new $10 million foundation to promote education in the U.S.

The foundation will rank in the top 25% of U.S. corporate foundations, according to the "Foundation Directory," and is the largest foundation established by a Japanese company in the U.S.

■

Philon, Inc. has acquired rights to a data base management system developed by the California-based **MAG Software, Inc.** This agreement also includes the development of proprietary enhancements for future Philon product offerings.

■

National Intergroup, Inc. announced that it has formed a wholly owned information services subsidiary named Genix. Genix will offer software sales, computer consulting services and remote computer services from National Intergroup's modern computer data center in Pittsburgh.

The subsidiary will be operated by Raul Pupo, president; Joseph Murphy, vice-president of operations and technology; and John Kelly, vice-president of finance.

■

Verbex, a division of Exxon Corp., and **Lear Siegler, Inc.'s** instrument division announced that they have signed a license agreement that transfers Verbex's continuous speech recognition technology to Lear Siegler.

Under the terms of the agreement, Lear Siegler has access to Verbex's Model 3000 proprietary continuous speech recognition technology. Lear Siegler's license permits it to use the Verbex technology to supplement its extensive development in voice recognition products for military and commercial aircraft instrument/avionics systems as well as military land and amphibious vehicle controls.

■

The **Paxnet** local-area network software system, introduced last year by **Phoenix Software Associates, Ltd.,** has been sold to **Vianetix, Inc.** of Boulder, Colo. Vianetix will market the software under the name Vianet.

■

Scientific Micro Systems, Inc. (SMS) has announced a second-source agreement with **Data Technology Corp.** (DTC). The agreement licenses DTC to manufacture and sell the SMS Omti Series 5000 and Series 6000 SCSI controller boards and to purchase and resell the SMS Omti Series 5000 controller chip sets.

■

NEC Telephones, Inc. and **Compath National** announced the signing of a two-year agreement in which Compath has been awarded nationwide distribution rights to market the Neax 2400 information management systems product line.

■

Micronix Corp. announced it has signed a patent cross-licensing agreement with AT&T.

The agreement states that Micronix and AT&T may each use present and certain future patents relating to lithographic manufacturing equipment. It includes patents developed by AT&T and Micronix for implementing x-ray lithography.

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- **CICS** - This individual will assist the CICS team to develop new enhancements to our current products and maintain these systems. A thorough understanding of CICS is necessary.
- **IMS-DC/VTAM** - This person will provide our group with the expertise in VTAM or IMS-DC to bring a new product to market.
- **File-AID** - This individual will contribute to the File-AID team by assisting them to develop and maintain the File-AID product line. A good understanding of OS and MVS systems, data management and file systems is necessary along with a thorough comprehension of ISPF/PDF.

PRODUCT SPECIALISTS

The Product Specialist is the sales/technical interface of the Products Division. Their primary responsibility is to provide the sales staff with the tools that are necessary to sell our products and to provide our customers with the training and support they need to use our products. Indepth knowledge of programming environments and our products is essential. Specific areas of concentration are:

- **DOS** - Our involvement in the DOS marketplace is always increasing. Due to this expansion, we require an individual that understands the DOS environment to assist our sales staff and development team market our products and further improve our presence in the marketplace.
- **File-AID** - This product has expanded so rapidly that we need to add another Product Specialist to our staff. This individual will possess excellent presentation skills and a thorough knowledge of ISPF/PDF.

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- **GENERAL SYSTEMS** - This individual will provide support to our customers in a variety of areas. We are looking for an individual with a good systems background.

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Programmers/Analysts: Candidates must have a minimum of 3+ years experience programming in COBOL with CICS (COMMAND or MACRO levels). Exposure to ADABAS, NATURAL, FOCUS, RAMIS, or MARK IV helpful.

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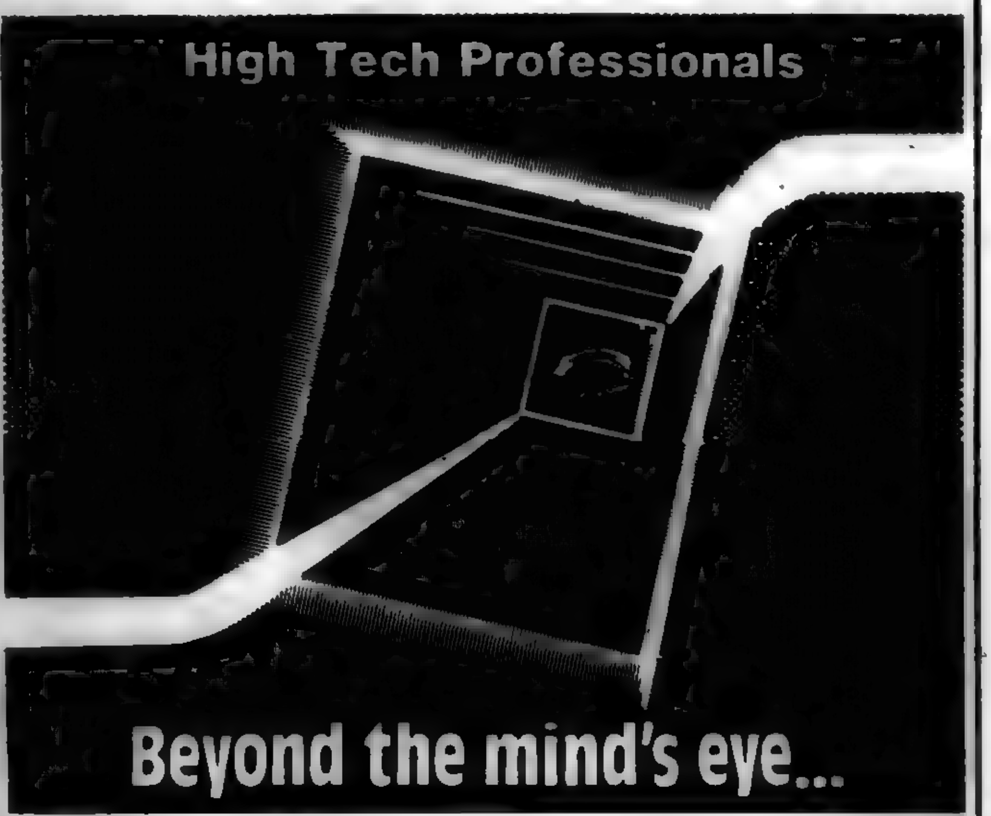

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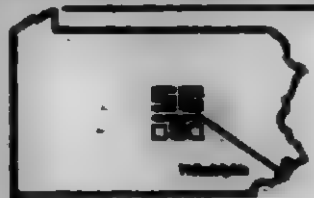

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ENGINEERING - Assistant to Dean Engineering Computing. Position carries responsibility for the operational status of the computing system; assist faculty with the development of computer programs for educational and research applications, provides faculty with information related to computer software and hardware availability, and advises on such acquisitions in liaison with computer services. Additional duties include scheduling usage of the computing system, coordinating engineering college computing needs with the university computer services department. Minimum qualifications: PhD degree in Engineering or related area, strong background in minicomputer operations and engineering applications programming. Preferred qualifications: operating systems experience; real-time computing experience; college level teaching experience. Send resume and reference information to: Anthony B. [illegible], Dean, College of Engineering, CLEVELAND STATE UNIVERSITY, 1983 E. 24th Street, Cleveland, Ohio 44115. An equal opportunity employer, m/f/h.

Gold Circle

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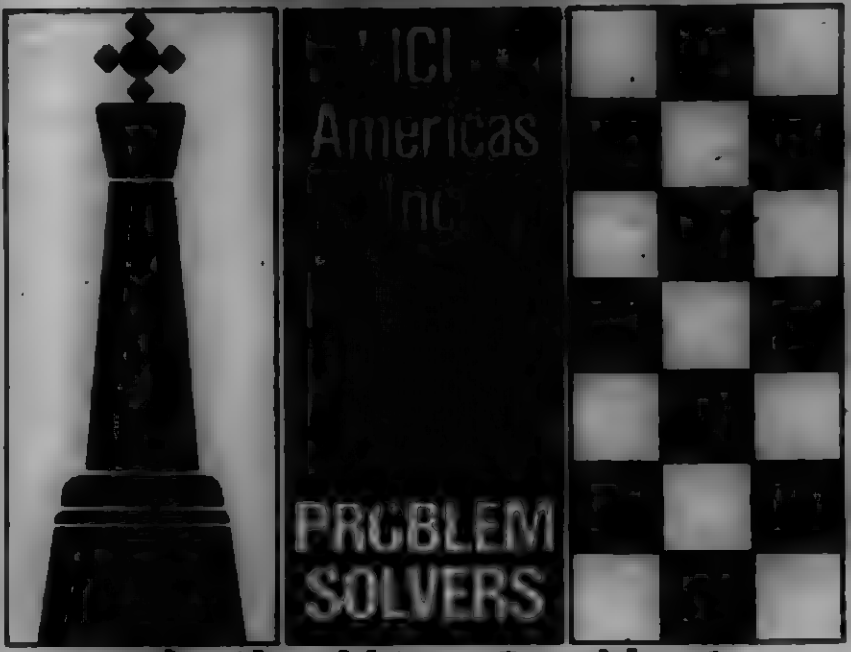

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Contact:

Julie Halladay, Employment Mgr.
SUTTER COMMUNITY HOSPITALS
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ANNOUNCEMENT OF POSITION VACANCY

Ball State University
Muncie, Indiana
Director, Center for Information
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Ball State University invites applications and nominations for the position of Director, Center for Information and Communication Science available July 1, 1985. The Director reports directly to the Provost and Vice President for Academic Affairs and directs all aspects of the operation of the Center for Information and Communication Sciences, including the academic programs, research and service activities, production, and faculty development connected to the Center.

Qualifications: baccalaureate degree from an accredited institution; a combination of post-baccalaureate education, media experience, knowledge of computer applications and of information and communication science technology; connections with external funding sources; demonstrated abilities to communicate; higher education experience, and administrative experience that will enable the individual to provide leadership and vision for the diverse activities of the Center.

Applications, current Vita and the names, addresses, and telephone numbers of at least three references should be addressed to: Center Director Search, Office of the Provost, AD-105, Ball State University, Muncie, IN 47306, phone (317)285-1333. The position is open until filled; however, review of credentials will begin on December 15, 1984.

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This position requires good communication skills, including the ability to communicate technical information in writing to non-technical users. U.S. Citizenship or permanent resident visa required.

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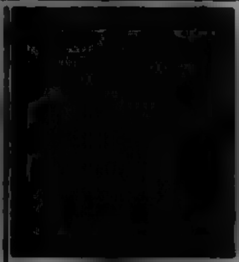

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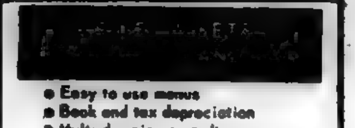

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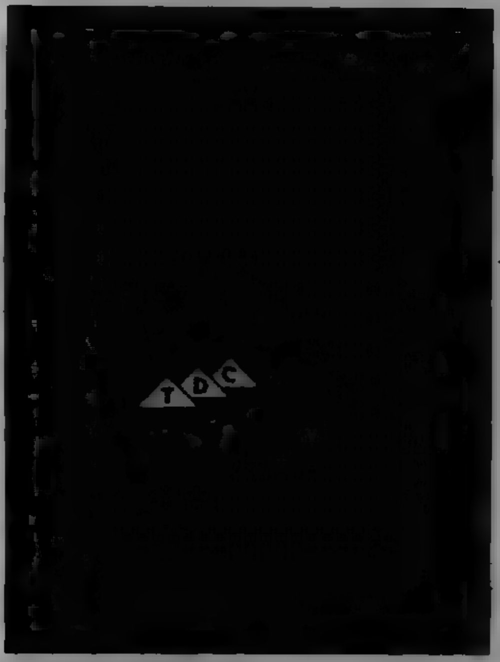

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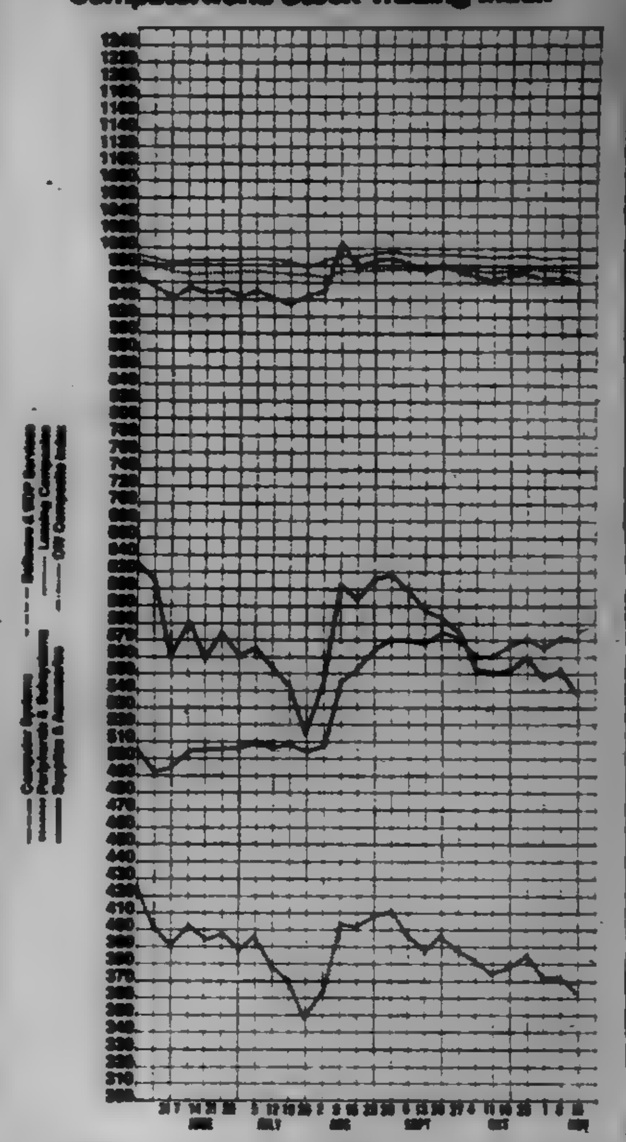

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LEASING COMPANIES

E X C H		1983-84 RANGE (1)	CLOSE NOV 14 1984	WEEK NET CHANGE	WEEK PCT CHANGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOFTWARE & EDP SERVICES

E X C H		1983-84 RANGE (1)	CLOSE NOV 14 1984	WEEK NET CHANGE	WEEK PCT CHANGE
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PERIPHERALS & SUBSYSTEMS

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SUPPLIES & ACCESSORIES

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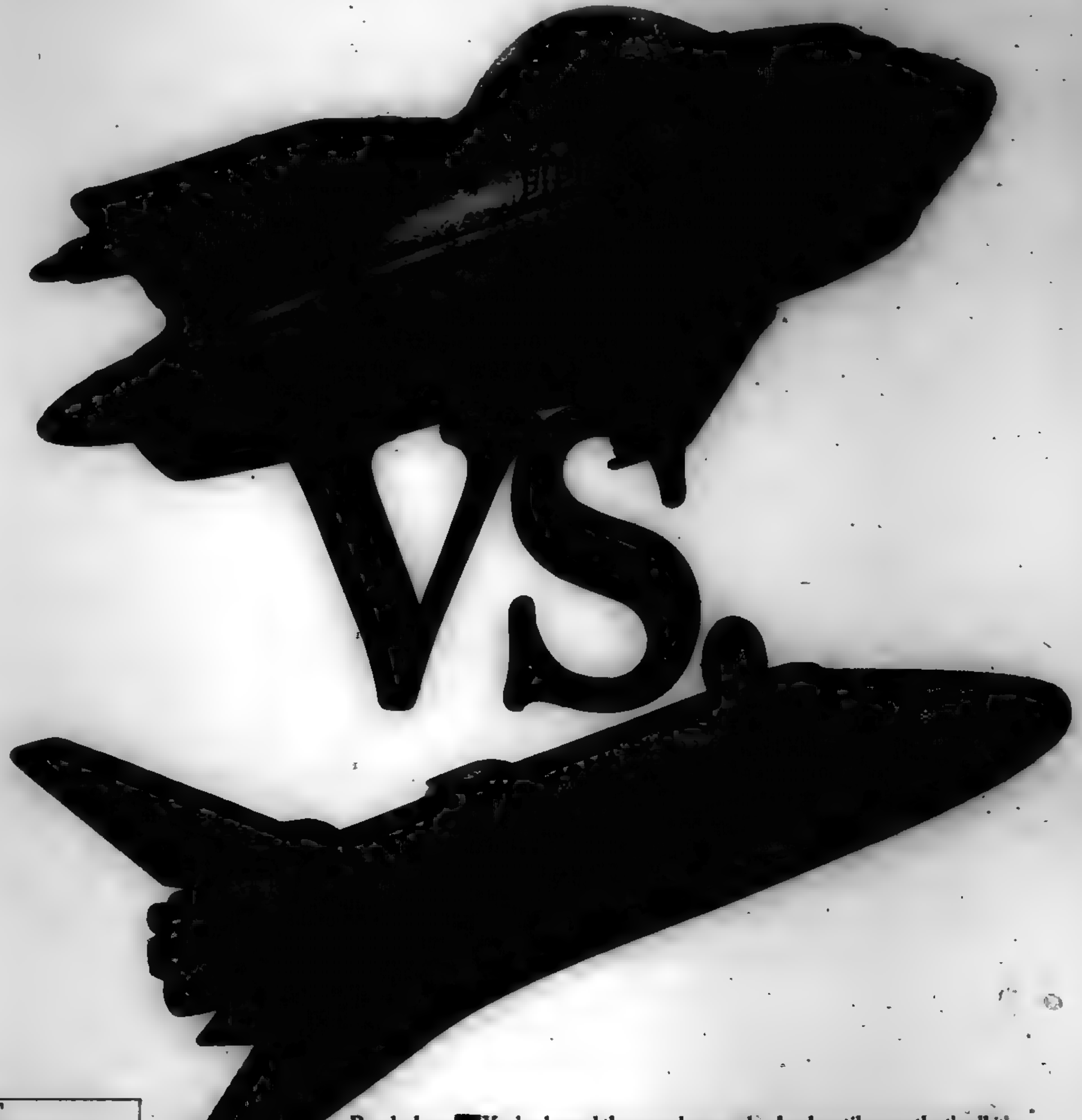

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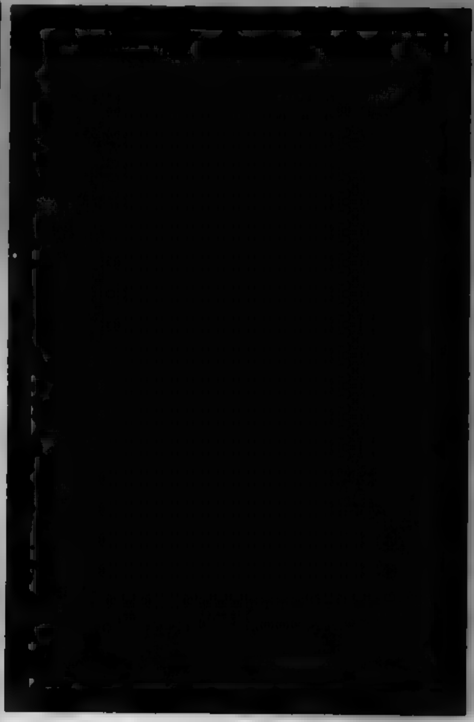


IBM Cabling System falls short of mark, user says

University calls prototype system costly, bulky, considers scrapping campuswide installation

By John Six
CW Staff

PITTSBURGH — An early user of the IBM Cabling System has found the building wiring scheme to be overly space-consuming and expensive — factors that may lead it to abandon plans to use the system in 30 other buildings on its campus.

Carnegie-Mellon University here installed a prototype Cabling System approximately a year and a half ago in a building it was constructing to house its computation center, administrative programming group and information technology center. The last is a joint venture between the university and IBM to develop workstations for educational and research environments.

The four-story structure was wired to Cabling System specifications with cable that IBM donated, said Tom Bajzek, interim director of the computation center. Following the configuration plans, each of the roughly 100 offices in the building was equipped with an outlet that provides separate interfaces for voice and data devices. The outlets are wired in a star topology to wiring closets on each floor, which are, in turn, wired to a central distribution frame in the computer room.

As a prototype, the cable used in Carne-

See CABLING page 4

TOP OF THE NEWS

It's a deal. IBM cleared the final hurdle in its $1.26 billion acquisition of Rolm Corp. when both companies agreed to a U.S. Department of Justice mandate to divest Rolm's military computer business. Justice also said it sees no antitrust implications in the remainder of the proposed acquisition. Page 2.

■

View from the top down. To head off a crisis where time and money would have gone into incompatible systems and duplicate data, the U.S. Nuclear Regulatory Commission took a top-down approach to reorganizing its DP operations. Page 6.

■

Where's the disk? That's what the U.S. Geological Survey has been asking about an optical disk system it has been expecting for more than a year from troubled Storage Technology Corp. Page 13.

■

One-fourth of large software systems under development will be canceled before completion, and three-fourths will experience serious operational difficulties, according to statistics gathered from 200 Fortune 1,000 companies. Page 14.

■

Harris Corp. has unleashed a pair of 32-bit AT&T Unix-based workstations said to deliver more than one-half million instructions per second of processing power and aimed at engineering and software development applications. Page 81.

Users eyeing MVS on 4381 processor

Shops try various paths around virtual storage roadblocks

By John Desmond
CW Staff

PARMA, Ohio — To convert, or not to convert: That is the question for David A. Seman, who, as DP director at Parma Community General Hospital here, has been agonizing over whether to migrate to the MVS operating system when his IBM 4381 mainframe is installed in February.

MVS would free up some precious virtual storage on the hospital's 4341 Model Group 2 running on DOS/VSE under VM, but it costs more. Meanwhile, Se-

See CONVERT page 8

FYI

Prototype net ties Defense systems

By James Connolly
CW Staff

WASHINGTON, D.C. — Five miles of cable running along the walls and through the steam tunnels of the sprawling maze known as the Pentagon are linking U.S. Army office systems produced by seven different vendors.

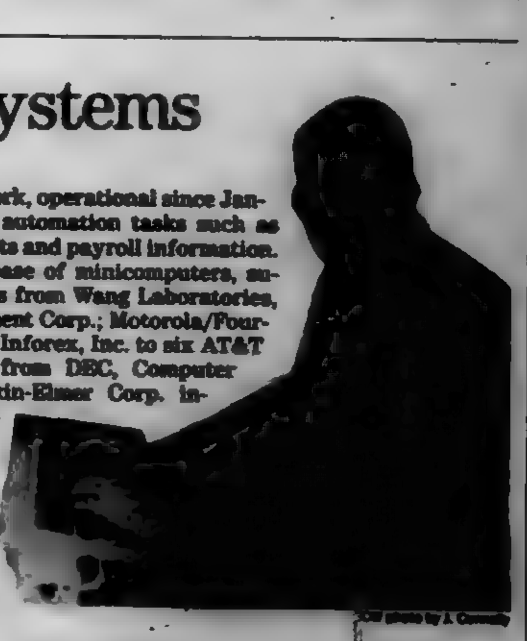
Army officials hope the prototype, a mongrel local-area network, will set a de facto office communications standard for other Army commands and branches of the U.S. Department of Defense.

"We are looking to provide a totally integrated office system for the headquarters of the Army. We want to provide more accurate communications, to move information faster, to improve the efficiency of mid-level officers and to better process secure, classified materials," said Lt. Col. Patrick C. Lanpher, project manager for the Headquarters Integrated Office System. The network, operational since January, is used for office automation tasks such as handling personnel reports and payroll information.

It links an installed base of minicomputers, superminis and mainframes from Wang Laboratories, Inc.; IBM; Digital Equipment Corp.; Motorola/Four-Phase Systems, Inc.; and Inforex, Inc. to six AT&T Unix-based superminis from DEC, Computer Consoles, Inc. and Perkin-Elmer Corp. installed under the prototype project.

But in addition to connecting normally incompatible systems from varied vendors, the Army brought in two different local-area

See ARMY page 8



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NEWSPAPER

IBM, Rolm OK sale of unit

Justice Department approval of IBM's Rolm acquisition contingent on divestiture of Rolm military computer business

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The Department of Justice last week said it would not oppose the acquisition of Rolm Corp. by IBM, provided that the two companies consent to the divestiture of Rolm's military computer business.

Reacting to a civil antitrust suit brought by the Justice Department and to a proposed settlement of the action filed simultaneously Nov. 20 in U.S. District Court here, IBM and Rolm agreed to the divestiture terms specified by the government.

The Justice Department said it reviewed other aspects of the proposed acquisition announced in September, particularly IBM's acquisition of Rolm's private branch exchange business, and concluded that there was insufficient legal basis for challenging those aspects of the acquisition.

IBM to find buyer for Rolm division

As part of the divestiture settlement, subject to a 60-day public comment period, IBM will have six months to find a buyer for Rolm's Mil-Spec Computer Division, which reportedly accounted for 15% of Rolm's $660 million in revenues last year.

The Department of Justice said the challenge to IBM's $1.26 billion takeover of Rolm, brought about two days before Rolm stockholders were to vote on the takeover issue last Wednesday, was prompted by concern that the acquisition would "substantially lessen competition" in the military specification (mil-spec) commercial market, where the manufacturing and sales "are highly concentrated." Rolm had $75 million in mil-spec sales in 1983, which accounted for 50% of total mil-spec sales, according to the suit.

Meanwhile, Rolm stockholders at the company's annual meeting voted overwhelmingly to approve the takeover by IBM, depsite the Justice Department's consent decree forcing the divestiture. The vote, IBM said, consummated the merger, adding that Rolm is now a wholly owned subsidiary of IBM.

Assistant Attorney General for Antitrust J. Paul McGrath said in a prepared statement that between 1980 and 1983, Rolm and Norden Systems, Inc., a subsidiary of United Technologies Corp. of Hartford, Conn., accounted for 80% of total annual domestic sales of mil-spec computers, which are manufactured to withstand the rugged environments of military use.

The antitrust suit said there were "substantial barriers" to entry in the mil-spec commercial-based market and that IBM "was by far the most significant of, at most, a few potential entrants" into the market. Additionally, Justice Department lawyers, reviewing the proposed acquisition, found IBM "intended to enter this market and to commence taking orders in 1985."

Other reasons cited in the Justice Department suit noted that many of IBM's commercial products are currently used by the military and that its own mil-spec business, while not based on commercially available architectures and software designs, would give it "unique and significant advantages" in the commercial mil-spec market.

Rolm manufactures mil-spec commercial computers under a series of licenses from Data General Corp. of Westboro, Mass., that are software-compatible with commercially available DG products [CW, Oct. 15].

The Justice Department complaint challenging the Rolm acquisition noted, "it would be unrealistic to expect meaningful competition to exist between IBM and the [Rolm] Mil-Spec Computer Division. Instead of gaining a new competitor, the military would still have only two major firms to vie for its business," the department brief said.

Following the announcement of the proposed divestiture settlement, IBM said, "IBM and Rolm disagree with this contention but have agreed to divest so that the companies might proceed. IBM believes the divestiture in no way diminishes the value of the [Rolm] acquisition to IBM."

If IBM is not able to complete the sale of the division within six months, the proposed final judgment provides that a trustee appointed by the U.S. District Court will be responsible for finding a buyer, which IBM will have to accept.

McGrath said the object of the Antitrust Division was the preservation of the Rolm Mil-Spec Computer Division or its successor "as a significant participant in the market for mil-spec commercial-based computers."

Phillip Verveer, a former Justice Department official who served in the Antitrust Division when it was pursuing its monopoly antitrust suit against IBM, called the department's action "not so surprising, because the department has shown it is amenable to negotiated arrangements where spin-offs of certain assets are required as a condition of approval.

"This action will probably not diminish the department's willingness to let IBM compete aggressively in the markets it decides to enter, and it sounds like in this instance [the department] expects IBM to enter the military computer market," Verveer added.

CW West Coast correspondent Jeffry Beeler contributed to this report.

CORRECTIONS

The correct address for American Business Computer [CW, Oct. 31] is Suite 418, 16000 W. Nine Mile Road, Southfield, Mich. 48075.

"Trends in Information Technology: 1985," a handbook for executives from Arthur Andersen & Co., [CW, Nov. 19] will be updated annually, not monthly as previously reported.

Mark Williams Co.'s C Programming System, a C compiler and source debugger for Microsoft Corp. MS-DOS 2.0 environments [CW, Nov. 5], is distributed by Control-C Software, Inc. of Portland, Ore., but is also available directly from the supplier for $495. Mark Williams is located at 1430 West Wrightwood, Chicago, Ill. 60614.

You tell us

[illegible]

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CW 11/26/84

Access charge OK may prompt AT&T rate cut

WASHINGTON, D.C. — A 6.5% long-distance rate reduction by AT&T Communications is expected next year following disclosure of the latest federal and state plan to levy a residential access charge of $1 per month that will help defray the local rate subsidy currently paid by carriers.

Additionally, state utility commissions may be empowered to levy an additional 35 cent fee on top of the residential access charge if it can be shown that large communications users have plans to bypass the local telephone company. Also the plan contains provisions that would permit state public utility commissions to grant "discounts" on the $6 multiline business access fees currently in effect for large businesses if it can be shown they are constructing bypass facilities.

These features of a federal and state plan were approved by a specially convened joint board Nov. 15 and sent to the Federal Communications Commission, which is expected to approve them Dec. 19.

Charge to raise estimated $2 billion annually

Ronald Choura, a Michigan public utility commission employee, estimated that the $1 a month residential access charge, which will also be applied to single-line business customers, will raise $2 billion annually, of which $1.8 billion could be applied toward "dollar-for-dollar" reductions of AT&T Communications' costs of $28 billion, or approximately 6.5%.

FCC Chairman Mark Fowler asked that the proposed plan be given a fair hearing by Congress, which in the past has raised objections to any access fee levied on consumers.

Originally, the FCC proposed a $2 monthly fee for residential customers that would have risen to $4 maximum.

The new joint board recommendation to levy a $1 monthly fee, if approved by the FCC, would go into effect June 1985 and rise to $2 in June 1986, where it would be frozen. The joint board also recommended that the access fee for Centrex customers who were using the service before July 27, 1983 be retained at $2 per line per month.

CABLING

from page 1

gie-Mellon's system varies slightly from the commercial version now available. Bajzek said their version has only three pairs of twisted-pair wire for voice applications, rather than the four now included. The director believes IBM increased the number of pairs in the commercial cable — which also contains two shielded twisted-pair wires for data applications — to accommodate AT&T's System 85 private branch exchange (PBX).

The university does not presently use the voice copper pairs in its cable for that application. The reason, Bajzek said, is because the university is a Centrex customer and the Cabling System was installed before it became legal to own internal telephone wiring. Carnegie-Mellon's voice pairs are currently used to support RS-232 connections but probably will be retrofitted for voice when the university turns out Centrex for a PBX.

While the Cabling System in this building has performed admirably and provided flexibility in the installation and relocation of equipment, lessons learned here have made the university think twice about using the system throughout its campus.

The cable itself is inflexible and bulky, Bajzek said. It is similar in size to a 25-pair key set wire, or roughly ¾ in. in diameter. On floors with many offices, "this amounts to a massive load of cable running back to the wiring closet," he noted.

The bulk of the wire and the need for wiring closets creates a space problem. To wire the campus with 10,000 outlets to support roughly 6,000 to 7,000 workstations would require the university to convert about 40 offices and dormitory rooms into wiring closets, Bajzek estimated.

The wire's bulk also contributed to installation expenses. It cost about $100,000 to wire Bajzek's building as it was being built, or roughly $400 per outlet. Extrapolating these figures, taking into consideration the fact that it will cost more to wire existing campus buildings, Bajzek projected it will cost roughly $7 million to $9 million to wire the university with the Cabling System, or about $700 per outlet.

This is two to three times what Carnegie-Mellon had initially predicted it would cost to wire the campus with wide bandwidth communications facilities, an estimate that was made before the Cabling System was announced. The cost is so high, in fact, that the university is now considering alternatives.

One option is to install an Ethernet local network for data and to wire separately for a voice system. Bajzek thinks this alternative would be cheaper but not substantial enough to make the decision simple. In either case, telephone wire throughout the campus will have to be replaced because its placement is poorly documented.

A technology that was not considered as an option was combining voice and data support on a PBX. Bajzek said he did not believe that a PBX could deliver the megabit speeds that he anticipates will be needed in the future. Diskless workstations, for example, may require such high-speed network connections, he said.

The fact that future bandwidth requirements are unknown is an important thought in a plan of this sort, Bajzek noted. "This is a long-term investment, and one thing we don't want to do is sell ourselves short and buy a network that doesn't have enough bandwidth for the things that we might want to do later."

In the Cabling System's favor is IBM's statement of intent to build a token-passing local network that will be based on the wiring scheme. "I don't think that we would have considered the Cabling System if IBM hadn't said that this is where IBM networking is going," Bajzek said. In the interim, the university is using a Proteon Associates, Inc. Pronet token-ring network on the Cabling System installed in its first building.

The Pronet is used mostly in a Digital Equipment Corp. Decnet to support six of the computing center's Decsystem-20s and VAX-11/780s for host-to-host communications. Bajzek said that Proteon has assured him that it will be compatible with IBM network products when they are announced. He anticipates, however, that initially the networks will have to be operated separately and connected by drivers.

> *'I don't think that we would have considered the Cabling System if IBM hadn't said that this is where IBM networking is going.'*
>
> — Tom Bajzek, Carnegie-Mellon University

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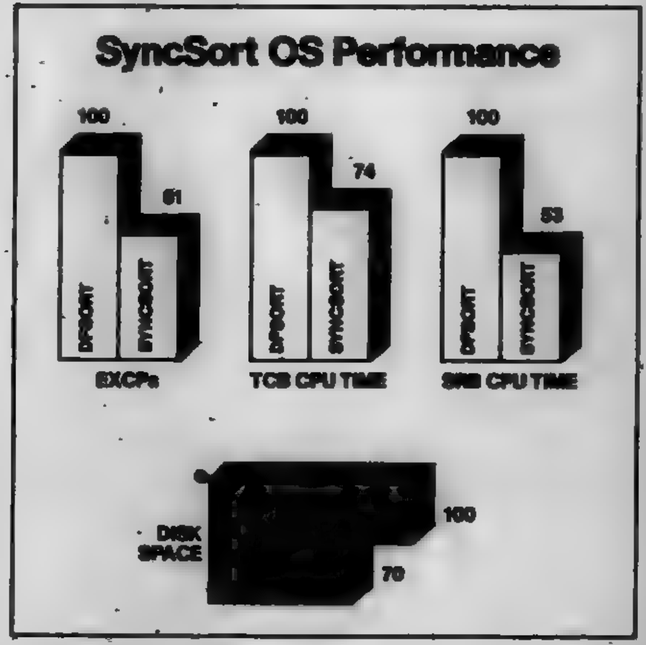

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Shake-up streamlines NRC's DP functions

By James Connolly
CW Staff

BETHESDA, Md. — An agency that licenses nuclear power plants could not afford to stow potentially life-saving information in local computers, where those who needed it did not know about it or could not access it through their own systems.

By reorganizing with a top-down management approach, the U.S. Nuclear Regulatory Commission (NRC) headed off a crisis where time and money would have gone into incompatible systems and duplicated data. Now, the NRC has started work on an agencywide shared data base, has limited redundant programming and is directing microcomputer spending at approved equipment and software.

The agency, with 3,400 employees spread throughout the Washington, D.C., area, five field offices and about 60 nuclear power sites, has 50 data processing workers to maintain equipment, train users and coordinate time-sharing services and contracted software development.

In 1982 the NRC reorganized its DP operations, replacing a system where individual users too often called the shots for equipment purchases and program development.

"Before all of this, all system development was from the bottom up instead of from the top down. We would go into an office, and everything would be office-specific. We were too customer-specific," reported Harold S. Bassett, director of automated information services.

NRC formed a steering group to cope with limited resources, technological advances and end-user computing. The committee, made up of executives and DP managers, advises management on computer purchases and policies.

Bassett said that in 1982, the NRC was like other agencies and corporations — plagued by a yearlong backlog for application development and subject to demands for microcomputers. The agency imposed a limited moratorium on application development, allowing only what Bassett termed "very, very important" programs.

But the agency, spun off from the Atomic Energy Commission in 1975, had no mainframe, and thus, no central data base. Developing that data base, whether on a purchased, time-shared or service bureau mainframe, is one key to the ongoing reorganization.

The bulk of the NRC's processing is done on Data General Corp. minicomputers located throughout the U.S., handling administrative tasks such as personnel and payroll. One machine does small-scale scientific modeling, and another is being installed in an operations center that was inspired by the 1979 emergency at Pennsylvania's Three Mile Island facility.

"Back then, we were in the 3- by 5-in. cards tacked to the wall era. We were somewhere between the Pliocene and Miocene ages then," said Bassett of the Three Mile Island crisis. During an emergency or test, the operations center's DG MV6000 will track information such as weather conditions, radiation dose assessments and construction details about the specific plant.

The agency maintains two time-sharing agreements, one for complex scientific projects running on the U.S. Department of Energy's Control Data Corp. Cyber 205 supercomputers and another for management applications on the National Institutes of Health's IBM 3084 mainframes.

The institute's system will host a pilot project giving the NRC commissioners executive-level tools such as vote-tracking and scheduling.

The agency also has developed a network of 21 IBM 5520 office automation systems that access the institute's mainframe and handle word processing and document transfer tasks. In the field, plant inspectors write reports on personal computers and transmit them to the 5520s for editing.

Like other organizations, the NRC was faced with controlling the proliferation of microcomputers.

"At the end of fiscal year 1983, we had two personal computers in the agency. By the end of calendar year 1984, we will have more than 200, and by the end of next year we will have 300," Bassett said.

But to ensure compatibility, the agency now supports only micro software approved by the steering group. The agency is testing or has approved project management, spreadsheet, data base management, word processing and communications packages for various types of users, most of whom use IBM Personal Computers and compatibles.

Hands-on training on those packages, the 5520s, personal computers and the other NRC systems is being handled in a training laboratory run by the U.S. Department of Agriculture and in a support center recently opened here. More than 450 employees applied for 200 seats in the classrooms.

"Recognizing that a service organization's work never ends, our plans for the corporate information environment see about three to four years into the future. We conservatively estimate that by that time NRC will have a workstation-to-staff ratio of roughly 1:2. In a phased fashion between [fiscal year 1985] and [fiscal year 1989], our users will be able to access and share information from all our major data bases utilizing marketplace technology," Bassett said.

CW photo by J. Connolly

Harold Bassett (left), director of the NRC's automated information services, and James Shields, chief of the NRC's systems support branch.

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from page 1

man has been able to delay his decision with some imaginative moves to give himself more virtual storage, deflecting some "very aggressive" marketing by IBM in the process, he said.

"IBM has a big push on to get users into the 3083 and MVS. That's across the country. Everywhere I've been going, I've been hearing that," Seman said. But because he suspected that a dual-processor 4381 would be released, Seman has been reluctant to go to the 3080 series. His intuition proved correct, since IBM announced the 4381 Model 3 in October [CW, Oct. 29]. "It doesn't make sense for me to go to a 3083, with the 4381 dual processor coming out," he said.

For many mid-range IBM shops, the recent announcement of the high-end 4381 presents an option that previously was not attractive. The Model 3's high performance now makes it practical for 4300 series users to convert to the MVS operating system without having to buy into the bigger and more expensive 3080 series mainframes. However, the choice presents both advantages and disadvantages to users.

Analyst Dave Moschella of International Data Corp. (IDC), a market research and consulting firm located in Framingham, Mass., said prior to announcement of the 4381 Model 3, "running MVS/XA on the 4300 series was not a good idea," because the operating system occupied so much of main memory. IDC is predicting that IBM will cut prices on the 3080 series X models before year's end to counteract the price-performance gap with the 4381 Model 3, Moschella said.

The cost of MVS is the main disadvantage. Seman said it would cost him $6,000 more per month in licensing fees to run MVS and $16,000 more per month to run MVS/XA, which, he said, IBM is advising him he needs. An advantage of MVS for Seman would be added virtual storage. "We keep running out of virtual storage," he said. "I don't know if we can stay where we're at. But every time we go to make a conversion to MVS, we find a way around it." For example, he recently acquired a data base management system from an independent software vendor that takes the place of his Vsam files, freeing some virtual storage and buying him some time.

John Sawilchik, technical support manager in the DP department at the Robert Bosch Corp. of Broadview, Ill., an automotive replacement parts seller, is trying to weigh the greater performance of MVS against its cost. He was told by IBM that his 4381 will operate at only 80% efficiency without MVS. "You have to balance that with higher software costs," he said. The software costs, though he did not have specific prices, would be 10% to 15% higher than what he is paying now, in addition to the cost of converting his applications.

> *'The biggest fear everyone has is being left out of the mainstream of operating system development. You don't follow the trunk of the tree, but you don't get too far out on the limb either.'*
>
> — Tom McGinley, Epsilon

Sawilchik, whose shop installed a 4381 Model Group 2 in October, is leaning toward a move to MVS from DOS/VSE under VM. At a recent seminar in Chicago, he said IBM was offering the first six months of MVS free if the system was bought in 1984. "If you were on the verge of making a decision, that might push you over," he said.

For another user who has already decided to move to MVS software, the 4381 Model 3 announcement resulted in hardware savings. Tom McGinley of Epsilon in Burlington, Mass., a marketing and data base firm serving Fortune 1,000 firms, recently decided to upgrade to a 4381 Model Group 3 instead of converting to the 3083 EX model. The firm currently has four 4341s and two 4381s powering 300 terminals serving clients in the field and 100 terminals running IBM's CMS internally.

Epsilon needs room for expansion, McGinley said. The 4381s now running OS/VS1 will be converted to MVS/SP in the spring. "It was something we recognized we had to do," because OS/VS1 was no longer being updated by IBM, McGinley said.

But when converting from National Advanced Systems, Inc. mainframes last spring, Epsilon opted for IBM 4381s instead of a 3083 series X model, in a gamble that IBM would announce a higher end 4381. The gamble paid off when the Model 3 was announced because that CPU provides an estimated millions of instructions per second rate equivalent to the low-end 3080 series. "The savings was $600,000 per processor," McGinley said.

Epsilon was attracted to MVS for its greater power, although McGinley said he has some doubts. "Are you just pushing data around or are you getting processing done?" he asked. But staying current is an overriding concern for Epsilon. "The biggest fear everyone has is being left out of the mainstream of operating system development. You don't follow the trunk of the tree, but you don't get too far out on the limb either," McGinley said.

Another analyst says the decision on whether to convert to MVS or MVS/XA depends on a user company's long-term plans. Michael Geran, vice-president of research at E.F. Hutton, Inc. in New York, said, "MVS/XA is where IBM is going. Users will have to convert eventually, but a number of interim steps can be taken" to delay conversion. Users who are processing their applications on time and who have enough virtual storage can delay the conversion to MVS, he said.

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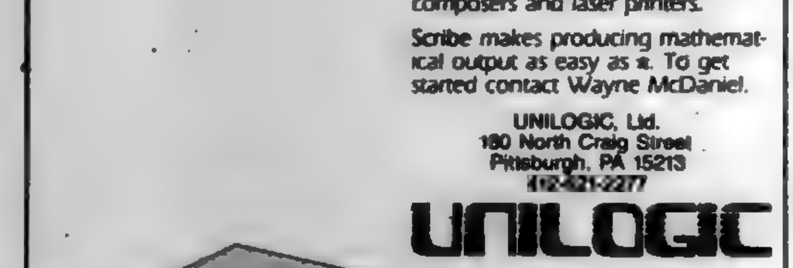

ARMY

from page 1

networks.

Personal computers, terminals and printers are linked to each other and to individual hosts through a Sytek, Inc. Local Net broadband local-area network. The hosts are connected to each other through a 5M bit/sec Ungermann-Bass, Inc. Net One local-area network.

Lanpher noted that the Army saved $300,000 on the 450-terminal prototype by having its own personnel run the cabling last year.

"The majority of the work was in developing software for the interfaces," he added. The networking software, including a virtual circuit handler for each terminal, and the networking configuration were developed by the Johns Hopkins University Applied Physics Laboratories. But little of the other equipment and software was customized.

Throw out baby with bathwater

"We are using off-the-shelf products wherever possible and are retaining our installed base wherever possible. The last thing we want to do is throw out the baby with the bathwater by developing a system that requires all new equipment. We had the basic concept, and we said we wanted to use standard, off-the-shelf equipment and software," Lanpher noted.

He said the prototype concept with generic products is more flexible than the Army's traditional DP approach, where it would have contracted for a complete system based on expected needs, such as the tolerable number of packet collisions, speeds and capacities. He noted that the traditional approach would have meant several years of installing a complete network and then analyzing the functionality.

Analyses of the prototype — one of which is now being completed by Control Data Corp. — can be used to define more clearly the Army's functional needs, such as a payroll application, which may not be as clear-cut as those of a corporation, Lanpher said.

Hios sent 1,100 questionnaires to users in eight Army agencies. "We got back 700, with 400 of those saying they used Hios often. This whole process of evaluation is very complex, but we were very pleased to get such a good response to a questionnaire," Lanpher said.

"We not only asked the users which applications they were using but which ones they weren't using," he added. "What we know already is that we need to do a better job in getting them up and running. We are developing an application team — people who can go around and say to the user, 'OK, you know how to use it as a basic tool. Here is how you can use it to do your job better.' " Users cited some technical problems but said they would be highly satisfied with Hios if those bugs were removed, according to Lanpher.

Hios, which follows the International Standards Organization's Open System Interconnect model up to the Level 4 transport layer, could grow to 1,200 terminals if made permanent next year, but it also could lead to Army posts around the world setting up compatible office networks linked to each other through the Pentagon's Defense Data Network.

Lanpher said developers of Hios have consulted with U.S. Navy and Air Force systems developers in the hope of establishing interservice systems compatibility.

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ISN

from page 1

network across its campus, according to Paul Stieman, director of the university computer center.

When completed next September, the ISN will include eight nodes and 29 concentrators, providing host support for roughly 450 remote asynchronous terminals and personal computers. End-user devices will be attached to the network through RS-232C interfaces using copper twisted-pair wire. Network components will be interconnected through a fiber-optic backbone network the university is installing (see related story above) and T1 microwave facilities.

The basic design objective, according to Don Salvin, data communications supervisor at the university, is to provide the school's terminals with increased connectivity to their host processors while reducing the complexity of the network configuration. The university has two triprocessor Digital Equipment Corp. Decsystem-10s, a uniprocessor Decsystem-10, two DEC VAX-11/780s, a VAX-11/785 and a National Advanced Systems Corp. (NAS) 8050.

Terminals in five centers

To complicate matters, the terminals on campus — most of which are located in five centers but some of which are scattered over the campus — are six miles away from the university's computer center. These locations are connected with a 12-GHz Sanbar CE-1130 microwave radio system that provides a T1 digital link operating at 1.54M bit/sec.

Today, the T1 radio capacity is divided into multiple channels with General Datacomm Industries, Inc. Megamux multiplexers. These channels are used to connect communications processors and multiplexers at the computer center with complementary processors and multiplexers on campus.

The university's two academic Decsystem-10s, for example, share a DEC PDP-11/50 set up as a front-end processor, which, through the T1 link, supports four remote PDP-11/34s to which terminals are attached. The school's three academic VAX systems, on the other hand, are multiplexed through a Rixon, Inc. DCX 850 statistical multiplexer to three remote Rixon systems that provide terminal interfaces.

The administrative Decsystem-10 is configured like its counterparts — with a PDP-11/50 front end supporting terminals through two remote PDP-11/34s — but the administrative NAS 8050 is unique. This IBM-compatible mainframe sits behind an NCR Corp. Comten 3690 communications processor that supports, through bridges and the T1 radio, a remote Ungermann-Bass, Inc. Net/One local net.

The front-end Comten is loaded with protocol conversion software enabling the use of asynchronous terminals with the NAS. Because the Net/One has a gateway to a local PDP-11/34 — as well as a direct connection to the NAS — users on campus can use the same terminal to access either administrative system.

Initially, the Net/One was installed as a test system with the idea that it might be used throughout the campus. Salvin said those plans were abandoned in favor of the AT&T system because the ISN "is more functionally capable than Net/One." While initially satisfied with the local net, Salvin reported that at higher speeds he was losing connections from board lockouts. He also noted that resetting communications parameters for a single terminal required taking down an entire board, which disrupted other users.

Those problems have not arisen with the AT&T ISN. The single-node ISN was installed in September in one day, cut over within three days and has not since experienced any hardware or software failures, Salvin said.

This ISN node is presently being used as a terminal switch within the computer center to supplement the systems previously outlined. Eventually this site will be connected through three T1 microwave radio links to the campus, where roughly seven additional nodes will be placed. Campus nodes will be interconnected with the school's fiber-optic backbone network, which will also be used to link the nodes with roughly 29 concentrators. The concentrators can extend the reach and the number of devices supported by a single node.

See ISN page 11

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Completed AT&T ISN to tie campus systems

The University of Pittsburgh's computer systems, housed in a center in an office park six miles from the campus, are connected to the school by a 12-GHz 1.54M bit/sec microwave link. The diagram shows how the network is currently configured and how it will look when the complete AT&T Information Systems Network (ISN) is installed.

Today, the capacity of the microwave system between the two locations is divided into lower speed channels — from 19.2K to 56K bit/sec — using a General Datacomm Industries, Inc. (GDC) Megamux.

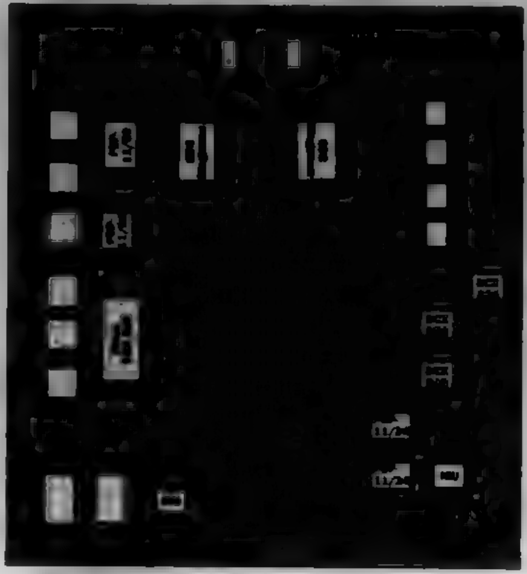
The Digital Equipment Corp. PDP-11/50, set up as a front end for the two uppermost academic Decsystem-10s, supports four remote PDP-11/34s that have multiple 1,200 bit/sec asynchronous ports. The other academic systems, the two DEC VAX-11/780s and the VAX-11/785, are connected to a Rixon, Inc. DCX 850 statistical multiplexer. The DCX 850, DCX 840 and DCX 836 on campus provide 2,400 bit/sec asychronous terminal support.

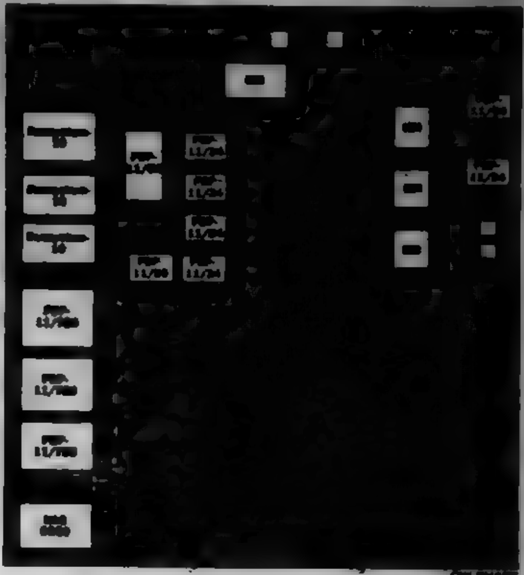
The administrative systems include the remaining Decsystem-10 — configured like the others — and a National Advanced Systems, Inc. (NAS) 8050. The 8050 sits behind an NCR Comten, Inc. 3690 communications processor loaded with protocol conversion software, enabling asynchronous terminals to be used on this IBM-compatible mainframe.

Those terminals are supported on campus through bridges by an Ungermann-Bass, Inc. Net/One broadband local-area network. The Net/One is also connected to the VAX-11/34 serving the administrative Decsystem-10 through a network interface unit (NIU), meaning local net users can access either system.

Use of the ISN will enable the GDC and Rixon multiplexers, as well as the Net/One, to be turned out. Four of the six PDP-11s configured as front ends will be moved back to the computer center as these machines are retired. Instead of the single T1 facility currently used to connect the locations, the ISN will use three 1.54M bit/sec links.

When completed, the ISN will enable terminal users on campus to access any system to which they have clearance.





CW CHART

ISN from page 10

As the ISN is being completed, the General Datacomm and Rixon multiplexers will be turned out, as will the Ungermann-Bass Net/One, and four of the five front-end PDP-11/34s will be brought back to the computer center.

This will simplify the entire network configuration and its management, according to Salvin.

For the near future, hosts will be hard-wired to the ISN, but Salvin said that they are considering writing a VMS driver to support a host interface that would reduce both the hardware and the number of wires needed to connect the machines.

The completed ISN will be functioning like a data switch, similar in manner to the way the Rixon DCXs are currently used, Salvin said. The advantage is that the ISN is more expandable and can support high-speed host-to-host file transfers, the supervisor noted. The maximum speed supported on a DCX trunk is 56K bit/sec, he said, whereas the ISN can interconnect machines at 8.64M bit/sec, the operational speed of the short bus in each node.

Costwise, Salvin said, the ISN is comparable to competitive devices. David A. Forejt, associate vice-president for computing and telecommunications, put the figure at $350 per port.

The major complaint Salvin has with ISN is that its software is "relatively primitive."

For example, in the initial release "there is no way of determining what sites are busy, [and] which aren't," he said. Software that would provide site usage data is expected to be included in the multinode release, which AT&T has promised will be available shortly to meet the university's plans.

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Factory nets to be topic of sessions

WALTHAM, Mass. — C. Kenneth Miller, president of Concord Data Systems, Inc., based here, will be the featured speaker on local-area networks for factories at the Yankee Group's annual briefing sessions, "New Technologies; New Solutions."

Miller will discuss his company's Token/Net local-area net in a session titled "Factory Networks in Chaos."

The Yankee Group sessions will be held Dec. 4-5 at the Plaza Hotel in New York and Dec. 11-12 at Rickey's Hyatt in Palo Alto, Calif.

The registration fee for the briefing sessions is $875.

Information is available from the Yankee Group, 89 Broad St., Boston, Mass. 02110.

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WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

Carnegie-Mellon site of DOD software center

WASHINGTON, D.C. — Carnegie-Mellon University in Pittsburgh recently won a high-stakes competition among universities vying to be the site of the Department of Defense Software Engineering Institute, which will develop and promote techniques for automated software production [CW, Sept. 24].

The Pentagon's selection of Carnegie-Mellon for the five-year, $103-million contract followed an intense lobbying campaign by the bidding universities and their political representatives. The bidders hoped the institute would attract high-technology industries to their locales.

The Pentagon said the institute will study automated software development tools that will help military software vendors lower their costs. Also, the institute is likely to develop interface specifications for advanced communications networks that permit assembly of reusable code modules developed at dispersed locations and develop criteria for the evaluation and validation of programming environments.

Board rules against bias in airline reservations

WASHINGTON, D.C. — The Civil Aeronautics Board (CAB), continuing its assault on bias in computerized airline reservation systems, recently ruled that the systems must be able to display up to nine connect points, or "hubs," for connecting flights.

The CAB said it acted because an airline-owned computer reservation system can limit the display seen by travel agents to the hub airports favored by that airline.

The final rule, effective Nov. 14, was opposed by Delta Airlines. Delta said that expanding the capacity of its Datas II system from five to nine points would require expensive hardware and software changes, because the system features on-line construction of connecting flights, rather than prestored connecting flights.

The CAB acknowledged that its rule may have a "chilling effect" on the innovative system, but said the rule was needed because of the anticonsumer and anticompetitive effects of the systems.

Board member Barbara E. McConnell dissented, calling the rule premature, arbitrary and burdensome for the airlines.

Panel urges government to raise research budgets

WASHINGTON, D.C. — A high-level science panel is urging the federal government to increase research budgets for supercomputers and educational hardware and software.

The National Academy of Sciences' Committee on Science, Engineering and Public Policy made the recommendations to both the White House Office of Science and Technology and the National Science Foundation, according to a recent announcement.

Supercomputers are critical to technological leadership in a range of applications from aircraft design to basic chemistry, the panel said. Specific recommendations included the following: continued support for development of parallel processing, appropriate software and new programming language concepts; strong support for artificial intelligence and efforts to speed the transfer of supercomputer research results into commercial production; and teaching U.S. specialists to read Japanese technical literature.

In addition, the committee said additional research is needed, particularly in artificial intelligence, to develop "integrated [computer] systems capable of interacting intelligently and sensitively with students."

FCC approves protocol service

WASHINGTON, D.C. — The Federal Communications Commission last week granted the divested Bell operating companies permission to perform X.25 and X.75 protocol conversions for asynchronous terminals as part of their tariffed local service functions.

The FCC said the divested Bell operating companies would not have to offer protocol conversion — considered an enhanced service — through a separate subsidiary, which current FCC rules require for services not considered basic. The carriers argued that it was "not economically feasible" to establish a separate subsidiary when protocol conversions are priced out of reach for low-volume users.

FCC Chairman Mark Fowler commented after the action that the divested operating companies will be permitted to offer "more efficient" use of their local-area facilities with the protocol conversions and that "rigid interpretations of the rules" should not be used to prevent new service offerings.

The divested Bell operating companies seeking to offer protocol conversion are Northwest Bell, South Central Bell, New Jersey Bell, New England Bell, Southern Bell, Southwestern Bell and Pacific Northwest Bell telephone companies.

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STC fails to deliver beta-test storage system

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Financially troubled Storage Technology Corp. (see story, page 97) has repeatedly failed to deliver optical disk storage equipment sought by the U.S. Geological Survey (USGS), a large federal agency that is eager to beta test the equipment.

"We have been expecting the equipment for over a year, but it has never been shipped," Theodore M. Albert, chief of the USGS office of data administration, told *Computerworld* last week. He said that Storage Technology Corp. (STC) and USGS had a verbal agreement that STC's 7600 Optical Storage System would be shipped in October 1983 so that USGS could be a beta test site for the 4G-byte storage system.

Albert said USGS is "extremely interested" in the system because STC's 14-in. disks are the only affordable, high-density optical storage devices now on the market. "We need that kind of technology," he said, particularly for high-volume backup and archival storage.

Asked about the delay, Jack Scott, vice-president of STC's worldwide marketing, said, "We were behind schedule because there were a number of integration and design issues that had to be resolved. They are now being resolved."

Scott said STC is now shipping subsystems to customers for alpha tests and predicted the volume of shipments will increase in the second quarter of 1985.

For the USGS, Albert said delivery had been scheduled for September, was delayed to October, then December and now is tentatively scheduled for early spring. "Hell, I've got data sets sitting here. I've got people trained to do it. We still want to test the equipment, and we will do so if [STC] ever ships it," Albert said in a telephone interview from his office in Reston, Va.

"We've been looking at the technology for five years, kicking the tires, and we're pretty sure we want to go with it for our mass storage needs," he said. "The question is, can we get the technology in-house and start using it?"

Albert said the USGS is exploring optical disk technology for digital storage of scientific and engineering data — such as cartographic, geologic, hydrologic and Landsat satellite data — as well as for scientific and administrative records.

In addition, he said, USGS wants a digital image-scanning system for storage of the agency's massive files of maps, charts, graphs and other [illegible]

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Cost, cancellations impair software quality

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — Up to 25% of large software systems (those with over 64,000 lines of source code) currently under development will be canceled before they are completed, and up to 60% will experience significant cost and schedule overruns, according to T. Capers Jones III.

Jones, general manager of the Nolan Norton Co., painted a pessimistic picture of domestic software quality and programmer productivity at a seminar held recently at the Enterprise Information Systems Forum here. Jones said a recent study found that along with the cancellations and overruns, approximately 75% of the large systems under development will experience serious operational difficulties.

Today, the average large system software project runs more than a year behind schedule and costs almost twice as much as initially estimated, Jones said.

Factors slowing development

Armed with statistics gathered from his study of 200 major U.S.-based corporations, Jones said that several key factors caused the development slowdowns — variations in productivity related to program size, the complexity and originality of the program and changing program development models.

· Program enhancements in a large program (250,000 lines of source code) usually require twice as much time and money to develop as first-time, stand-alone programs, Jones said, due to increasingly complex requirements for base code analysis, program recompilation and configuration control.

Jones' study showed that, on the average, it takes 48 to 60 months to develop a very large program (with over 512,000 lines of code), 15 to 36 months to develop a medium-size program (with up to 64,000 lines of code) and five to 15 months to develop a small program (up to 2,000 lines of code). To avoid significant cost and schedule overruns, he said, companies must use realistic development schedules based on these projections.

In very large programs, defects in coding, documentation and incorrect bug fixes result in an average of 300 serious errors per 1,000 lines of code, Jones said. To correct this, the development model is emphasizing longer design times, high-speed prototyping and a shorter debugging phase.

Another problem facing software developers is the rising cost of software maintenance, a cost that has skyrocketed to as much as 80% of the total development budget. IBM maintains over 30,000 application programs, he said, adding, "Maintaining 30,000 programs can get as expensive as maintaining a fleet of 30,000 Cadillacs." According to Jones' figures, a program with 250,000 lines of source code used by 1,000 international users will cost $79,000,000 to maintain over a five-year period.

Recent studies conducted internally by IBM, TRW, Inc. and Nippon Electric Co. of Japan showed that maintaining "error-prone modules" (those portions of programs with clustered errors) is the most expensive single task in the industry, Jones said. If error-prone modules of programs can be isolated and recoded, companies can realise considerable cost savings, Jones claimed, because only specific program areas need to be reworked.

Baseline software quality and productivity can be increased and maintenance costs reduced by as much as 75% by using structured code, program generators and high-level programming languages, Jones said. Another productivity enhancer catching on with U.S. and Japanese corporations is the development of standard libraries containing blueprints of reusable code. Code blueprints can lower development time by 80% and decrease program defects by over 20%.

PTC conference set for January

HONOLULU — Representatives from four Asian and Pacific nations will review the development of telecommunications in their countries at the Pacific Telecommunications Council's (PTC) eighth annual conference Jan. 13-16 at the Sheraton Waikiki here.

Case studies of Korea, Taiwan, New Caledonia and New Zealand will be presented during afternoon sessions of PTC '85. Y. K. Chen, director of telecommunications for the China, will review his country's move toward a digital environment. Registration fee is $395 per person.

More information is available from PTC at Suite 308, 1110 University Ave., Honolulu, Hawaii, 96826.

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WHO?
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IBM policies said to push DP centralization

Analyst cites company's software fees as example of bias against distributed processing

By John Desmond
CW Staff

NEW YORK — While IBM appears to have taken a neutral stance on the issue of centralized vs. distributed information networks, the company continues to encourage users to adopt as much centralization as it can, according to consultant, author and lecturer Fred Lamond.

Speaking at a seminar on IBM strategy here recently, the specialist in analysis and evaluation of IBM cited the following IBM strategies that encourage centralization:

- Software license fee policy.
- The IBM Network Communications Control Facility (NCCF) and Operator Communications Control Facility (OCCF) programs.
- Instant data base updating.

IBM "fought for a long time against distributed processing," Lamond said, defining distributed processing as systems in which processing is shared between remote and central CPUs. (In contrast, in dispersed processing the remote CPUs have no communication with the host.) According to Lamond, since 1979 IBM has formally announced a more neutral position concerning centralizing networks.

Users who have multiple 4300 series CPUs as satellites, who may want to run an electronic mail program on each one, run up against IBM's policy on licensing.

IBM software licensing policy

The policy requires that a software license fee be paid for each CPU running a program, regardless of CPU size. A 4361 Model 3 processing 100 transactions per day will pay the same fee as a 3081 Model KX processing 10,000 transactions per day, Lamond said.

"The flat rate per CPU license fee encourages users to run programs on the smallest possible network of CPUs," Lamond said. He added that IBM usually raises its software license fees when it announces hardware price reductions. "The more you distribute program products, the more your software license costs will go up in relation to your hardware. This is an important tool IBM uses to encourage you to centralize," Lamond told his audience of DP professionals.

IBM's NCCF and OCCF programs encourage DP professionals to be physically located at the host site, "so that no systems programmers are required at a distributed site," Lamond said.

When systems programmers themselves become distributed, "mini DP departments" may rise and a loss of control could result, Lamond suggested.

With NCCF, any workstation becomes a control console, and the remote site needs only an operator. The OCCF preserves a system dump of a program stopped by a programming bug on disk at the remote site, instead of printing it out. The dump pages are forwarded one at a time to the host.

Lamond said that in IBM's image of a typical computer network in the mid- and late 1980s, the host mainframe runs MVS, and data is archived to magnetic tape only from the host. "All DP professionals are at the corporate host site, responsible for all data archiving and for upkeep of the corporate data base," Lamond said.

The local satellites are equipped only with disk drives — no tape drives — and the data on disk must be moved upstream to the host for updating.

'IBM pushing a bit too far'

Although Lamond said he likes the system, there is one aspect that he said "IBM is pushing a bit too far."

That aspect is requiring updating of the corporate data base simultaneously with transactions at the remote sites, which is a communications expense as well as a processing demand. "You may have applications where you need that instant, on-line communications, but for most users, the corporate data base as a backup for the local [data base] is a good idea," Lamond said.

"I do not believe the corporate data base always has to be brought up simultaneously." Once or twice a day would be adequate, he added, noting that with such a practice, "You will probably be able to do with a much lighter host."

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Nursery's ordering system cuts wilted sales

By Paul Gillin
CW Staff

SAN DIEGO — Order processing and billing at Santa Ana, Calif.-based Hines Wholesale Nurseries are a little different from most wholesale businesses. If Hines misses a shipment by even a few days, it could mean canceling the whole order or even scrapping the product.

That is because Hines deals in an especially fragile product — ornamental plants. Its 420-acre Santa Ana nursery grows 20 million plants annually, 800 varieties in all. That makes Hines one of the top three producers of container-grown plants in the country. The company also operates nurseries in Houston and Vacaville, Calif.

To process orders in 24 hours or less, Hines uses an IBM System/38 with 4M bytes of main memory and a line of integrated financial software from Professional Computer Resources (PCR) of Oak Brook, Ill. The two sister nurseries, located in Houston and in Bacaville, Calif., and the Hines sales staff are kept on-line to the Santa Ana nursery through four dedicated communications lines, according to Jim Wapelhorst, director of management information systems. Wapelhorst was interviewed at PCR's Fall User Conference, held here recently.

The perishable nature of Hines' products makes on-line processing a necessity, Wapelhorst said. The company's 30 sales representatives use Applied Digital Data Systems, Inc. Viewpoint portable terminals to enter orders from around the country. Sales representatives can also log on to the System/38 to check the status of nearly any order at any time.

CW photo by P. Gillin

Wapelhorst

When an order is entered into the system, it passes through a credit check and is either put on hold or cleared for shipment. The order pops up on the shipping managers' screens at any combination of the three locations that will fill the requirement. The manager decides in which truckload the order will be shipped and enters that number into the computer.

The software then calculates the size, weight and shipping charges of the load and also factors in extra charges like boxing costs. It also assigns a dock number where the plants should be loaded.

Picking labels then come off the printer, detailing the pertinent information for loading. The picking orders are sorted by variety of plant so that tractors can bring back fuller loads and spend less time traversing the fields to pick up bits and pieces of an order, Wapelhorst explained.

A quality assurance (QA) inspector has a last chance to modify the order prior to shipment. "Because we're dealing with perishable products, customers may want only a bud or a bloom on a plant," Wapelhorst said. "QA people can modify the orders and include explanations why a product wasn't shipped. When the shipper is just about to send out a truck, he hits a button and prints out a bill of lading for that shipment."

Hines plans to install PCR's manufacturing software next year, Wapelhorst said. "The whole idea is to know what our costs are and to have the plants in stock the shortest period of time after [they are] ready for sale," he said. "Unlike a lot of operations, when our inventory is on the shelf, we have to water it, prune it and take care of it."

Productivity meet slated

TUCSON, Ariz. — The Sixth Annual Conference on EDP Performance Management, sponsored by Applied Computer Research, Inc., will be held at the Doubletree Inn here March 11-15.

The conference will focus on the productivity of human and machine resources in serving user needs, with primary attention to managerial aspects. Specific topic areas will include the integration of business and data processing planning, capacity management, peformance management, human factors, costing and pricing and communicating with management. A one-day tutorial on "Improving the Data Center Function" will be held Monday, March 11.

Prices for the conference are as follows: for the one-day tutorial held March 11, $100 for either subscribers or nonsubscribers to Applied Computer Research publications; for the entire conference, March 11-15, $500 for subscribers, $575 for nonsubscribers; and for both the tutorial and the conference, $575 for subscribers and $650 for nonsubscribers.

More information is available from Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

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Softfair '84 recruiters emphasize experience

Companies seek senior software, scientific engineers, communications managers

By Maura McEnaney
CW Staff

WALTHAM, Mass. — Senior software engineers, communications managers, scientific engineers and program analysts were all in demand at Softfair '84, a job fair held here recently for software professionals.

For the 50 companies exhibiting at the job fair, employment needs ran the gamut, but for those without prior experience, one factor was evident: Entry-level job seekers need not apply.

At the well-attended Digital Equipment Corp. booth, signs calling for telecommunications professionals, software engineers and MIS professionals decorated the exhibit. In the center of the display was a sign reading "no entry-level positions."

"We do our entry-level recruiting on college campuses," said Bill O'Connor, manager of technical support.

At the Foxboro Co.'s booth, staffing specialist Fred DelGizzo said his company, a manufacturer of process management and control systems, had 30 technical positions available. The company was looking for software specialists in AT&T's Unix, C, Pascal, applications software, communications software as well as graphics and diagnostics. The average salary offered for these slots is $30,000 to $40,000, he said.

Range of visitors

Visitors to Softfair ranged from programmers who wanted to switch concentrations to technicians curious about current employment opportunities. Because of the sensitivity involved with job hunting, *Computerworld* agreed to use only the first names of the attendees.

Larry is a project manager with four years of experience at one company. After a career switch, Larry believes he entered his current position "at too low a salary. . . . It's been a good learning experience, but I have to make up for some salary," he said. As a project manager, Larry is looking for $50,000 a year. "I don't know if I'll get it; if I don't, I'll be happy where I am."

Shirley is a Cobol program analyst and a software consultant with three years' experience in Cobol programming. She said she is looking to spend less time in front of a computer terminal dealing with accounting problems. She said she was at the fair exploring opportunities in marketing support or technical writing. But she found her reception somewhat cool. "[The exhibiting companies] are hoping Mr. or Ms. Right will walk through the door knowing everything about Cobol, C, Unix and CICS . . . and be a living doll," she said. Shirley is now making $28,000 a year. "If I can match it and get into a situation I like, that will be even more important to me."

With four years of experience in Cobol programming for business applications, Chris is looking to switch her concentration. "The market is changing, it's going away from mainframes and into micros," she said. "I'm interested in a job where I can keep up with what's happening." Chris now makes $28,000 a year, but said that if she switches jobs, she would be looking for $32,000. But, she said, "Money is not a major consideration."

OIR publishes summary of '82 users meeting

WALTHAM, Mass. — The Organization for Industrial Research (OIR) is making available the summary of the 1982 OIR Users' Meeting, documenting the experiences of users of group technology, classification and coding and computer-assisted process planning.

"The 1982 OIR Users' Meeting Summary" contains case histories documenting the application of OIR's computer-aided design and manufacturing and group technology manufacturing software products.

Articles cover topics such as implementation procedures, benefits, human factors, hardware requirements, time standards, computer-aided process planning and computer graphics.

OIR currently publishes four software packages for the manufacturing industry. They are Multigroup, for group technology analysis; Multicap, a computer-aided process planning package; Multitreeve, a design retrieval system; and Multiclass, a classification and coding package.

The book costs $30.

More information is available from OIR, which is located at 240 Bear Hill Road, Waltham, Mass. 02164.

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High-tech firms hire pros, lower costs at job fair

By Maura McEnaney
CW Staff

WALTHAM, Mass. — At a function center adjacent to this state's self-proclaimed "Technology Highway," Route 128, local companies gathered with aspirations of hiring the best and the brightest of the area's software professionals.

Inside, specialists clad in business suits and bearing resumes drifted down aisles of booths boldly displaying company logos and in-house brochures. When they stopped to look, smiling personnel would extend a hand and begin their pitches.

This was Softfair '84, a two-night exhibition of corporations in the market for trained technological help.

Aids market exposure

Job fairs like this one are becoming increasingly popular, both among corporations looking to reduce hiring costs and professionals seeking exposure in the job market, according to David Callahan, manager of Software Career Link, sponsor of Softfair.

That popularity is evident in the number and names of participants. This year, Software Career Link sponsored seven job fairs in the Boston area. Next year, the company is taking its show on the road, planning 42 fairs for 13 cities, including Atlanta, Chicago, Dallas and Anaheim, Calif.

More than 1,000 attendees

At this month's fair, more than 50 companies paid about $2,700 a piece for booths at Softfair, which was attended by about 1,050 professionals. This year's roster included some heavy high-tech hitters, such as Adage, Inc., Cincom Systems, Inc., Cullinet Software, Inc., Digital Equipment Corp., Hewlett-Packard Co. and McCormack & Dodge Corp. For many firms, it was a new experience.

Softfair and other similar job fairs are "a godsend" according to Frank Emro, senior technical recruiter at Cullinet. The average cost of hiring a professional can range between $4,000 and $10,000 or more if an employment agency is used, Emro said. "If you take out a full-page ad in the *Boston Globe*, that cost can be $18,000 to $20,000, and you spend a week going through resumes." According to Emro, "Job fairs are a very inexpensive way to talk to a large number of very qualified candidates."

Reduces hiring costs

Hiring is almost continuous at Cullinet, which nearly doubled its work force over the past 16 months, Emro said. In addition, the company expects to hire another 700 workers over the next year and a half, he said. The company hires an average of between seven to 10 people as a result of each fair, which significantly reduces the cost per newly hired employee to about $100 per person, according to Emro.

For DEC, job fairs give department managers the opportunity to meet applicants face to face and immediately begin assessing the needs of the prospective employees, according to David Bausch, personnel recruiter at the DEC office in Merrimac, N.H. "If you can hire one person from the show, it's worth it," he said.

Although she is not convinced that it is the only way to hire qualified candidates, Robin Schwartz, group personnel manager at McCormack & Dodge, agrees with her colleagues. This year, the software company participated in about 10 job fairs, including five Softfairs, Schwartz said.

At each fair, the company expected to hire three or four candidates (about the average, according to Softfair's Callahan), bringing down the cost of hiring to about $500 per person, she said.

In addition to computer-related companies, general industry is beginning to be a big participant in the Softfairs, Callahan said. This year, Stop and Shop supermarkets, John Hancock Insurance Co. and retail store chain Zayre Corp. were among exhibitors. "Because these firms employ sophisticated computer systems, they are joining the high-tech crowd," he said.

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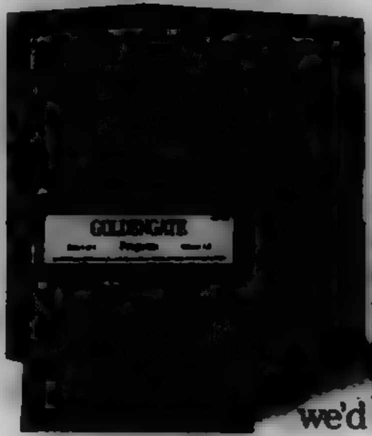

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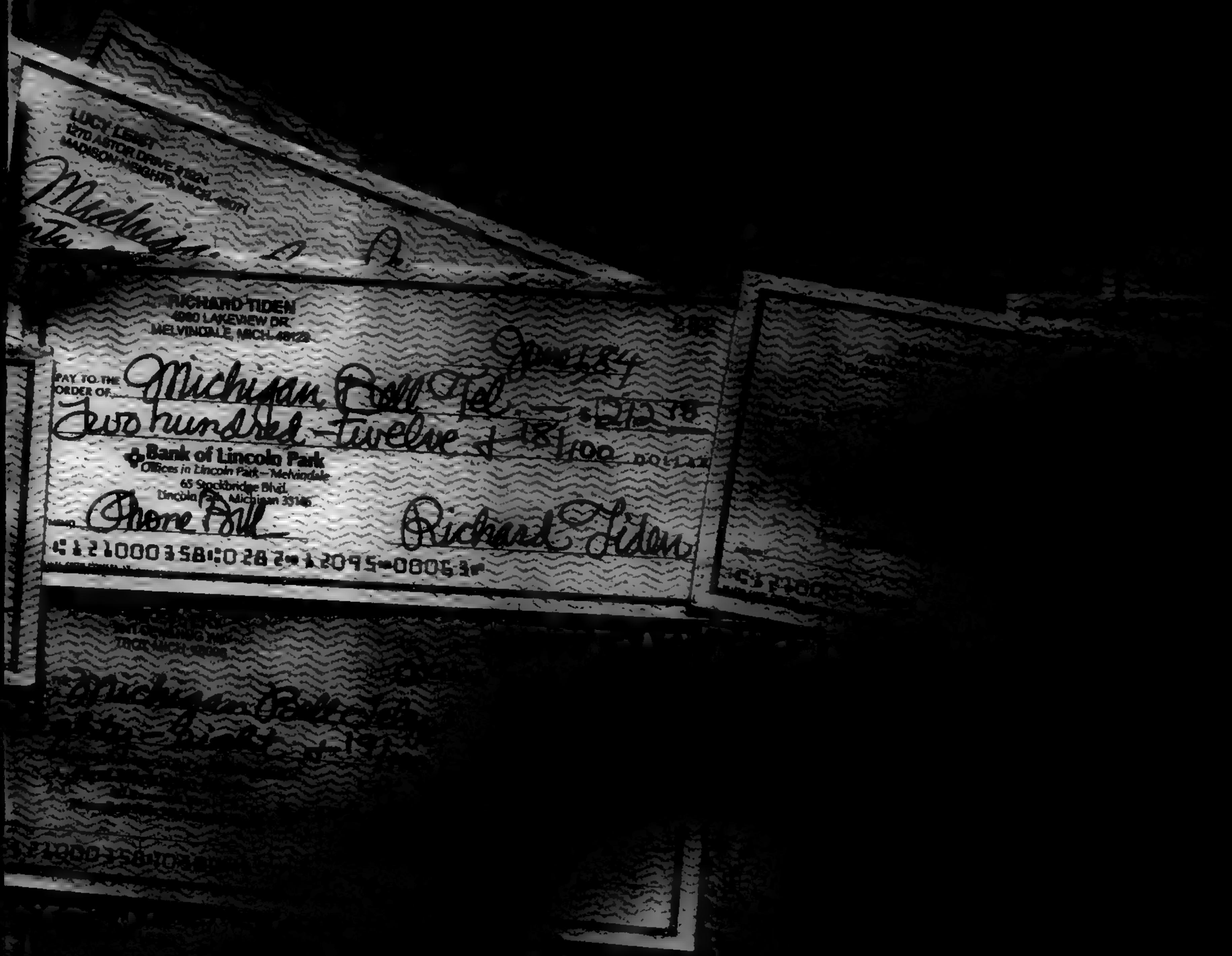

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Strategic planning vital to computer security

By John Gallant
CW Staff

ROSEMONT, Ill. — Q. How do you eat an elephant?

A. One bite at a time.

According to Martin Silverman, a partner in the Management Consulting Services Division of the accounting firm of Coopers & Lybrand, that riddle holds in it the key to successfully securing an organization's computer systems. Silverman, who spoke last week at the 11th Annual Computer Security Conference here, told attendees that quick fixes and easy solutions to security were not the answer. Security must be approached one bite — or step — at a time. And planning, especially strategic planning, should be relied upon as a guide.

"[GTE Telenet Communications Corp.] and other public networks have been unfairly accused of providing illegal access to supposedly secure systems," Silverman said. "But we cannot assign blame to Telenet and the others. Like Shakespeare said, the fault lies with ourselves. Examples of lousy security and poor planning abound. Strategic planning is the missing link in security today."

One characteristic of such poor planning, Silverman said, is that security has historically been considered a burden for users; security is often traded for so-called user friendliness. He said security has been a nonconcern for management, who either did not understand or care about its importance. In addition, security has been handled as merely a procedural issue for DP auditors who performed some perfunctory security checking, and it has been little more than an after-thought for DP.

Those factors have led to security mechanisms that are superimposed on applications once the system is already designed, developed and implemented and that are limited by convenience because designers fear users simply will not put up with strict security. Once in place, Silverman said, those mechanisms are thwarted by practice and a basic lack of understanding.

What's more, Silverman said, the security problem is worsening. Minicomputers and microcomputers, in addition to mainframe-connected terminals, are proliferating, and user sensitivity to security concerns is dropping as desktop capabilities increase.

"Despite the publicity surrounding the hackers," Silverman said, "we are not gaining any ground, whatever their motives. The rats are getting smarter while the trap makers fall behind, and the owners cannot be bothered."

"At the same time," he continued, "we are being told that the effective utilization of corporate data through efficient information systems will improve profitability and provide a competitive advantage. We are told that data is a major asset that can give you an edge. We are not being told that inappropriate security can destroy such an edge, and that is the clearer reality."

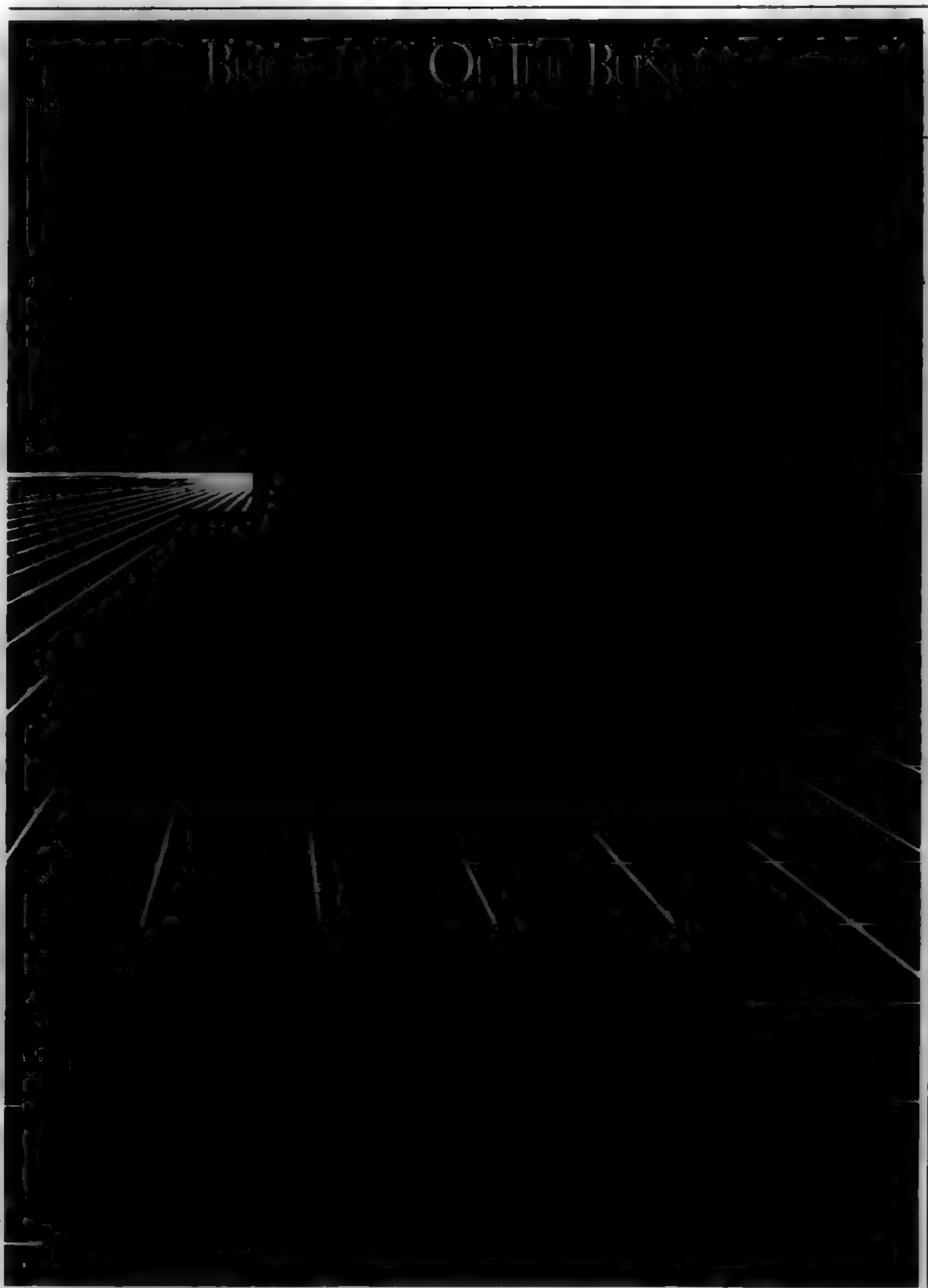
Silverman described a Coopers & Lybrand study based on interviews with top-level managers in major U.S. corporations. According to the findings of that study, more than 50% of the senior managers queried said they believe their businesses and industries are mature or declining. Thus, marketing and increased productivity are seen as more important than new strategic directions.

The findings, according to Silverman, indicate that accurate data and its protection are vital to American business today.

"Information integrity, communication, manipulation and analysis outside the traditional DP shop are critical success factors in modern American business. Security is a key element in ensuring the first three, and the fourth is impossible without security. We simply must convince senior management that security is vital to the mission of business today," he said.

In order to do that, Silverman said, security coordinators must "shed their mechanic's overalls" and take a seat at the corporate planning table. Security personnel must act as catalysts, bringing functional groups within the organization together to work out security guidelines and projects. Organizations must adopt a new approach to MIS development — an approach in which security becomes a basic component of system design from the beginning. In addition, senior management must become more involved in security planning and must understand the vital nature of information integrity.

Silverman suggested that security coordinators begin by constructively stating the case for a strategic approach to security. That includes stating the facts about security without relying on "fear tactics" and outlining reasonable costs and goals. Security personnel should also include in the management presentation a first project plan — what he described as the first bite of the elephant. Finally, he urged coordinators to document objectives to provide landmarks against which future progress can be measured.



Standards key to small-scale systems security

By John Gallant
CW Staff

ROSEMONT, Ill. — Ironically, acquiring a small-scale computer system can make an end user acutely aware, often for the first time, of the security problems mainstream DP faces.

In a typical scenario, according to Evany Miller, an end user reads in a trade or business publication, such as *Computerworld*, about a revolutionary small-scale system recently made available that promises to solve a plethora of nagging problems.

Miller, a senior data security analyst with Rainier Bancorporation who spoke at last week's 11th Annual Computer Security Conference here, said the system offers the user an end to reliance on mainstream DP and spurs visions of increased productivity and capabilities. Thus, the small-scale system is brought in-house, and the user is off and running — sort of.

"But no one told the manager that there were some direct correlations between mainframe and microcomputer security," Miller said. "For example, the user has to pick a good password, and he or she has to see that there is no sharing of passwords among the users of the small-scale system. The manager is also faced with building in accountability, maybe even audit trails, to ensure data integrity. The user has to provide for physical device security and for the backup of data on diskettes, both on- and off-site.

"These were all DP responsibilities before," Miller continued. "Suddenly, they are all the managers' responsibilities."

Security coordinator's job

To prevent security chaos among the many users of small-scale systems within an organization, Miller said, it is imperative that security coordinators draft, maintain and communicate to end users specific, carefully established corporatewide policies, standards and guidelines. She said they should encompass everything, including the selection of hardware and software, the acquisition process, security responsibilities, information classification and physical security of small-scale systems. Miller defined small-scale systems as intelligent processing devices such as minicomputers, micros and office automation equipment.

"It is your responsibility as security professionals," Miller told the audience, "to provide insight to users on the protection, integrity and security of small-scale systems. They can be invaluable as tools for specific needs, but without orchestrated management, they can result in frustration and confusion."

According to Miller, such policies, standards and guidelines are essential to a proactive, rather than a reactive, approach to computer security. "Small-scale systems are with us to stay," she said. "But the random purchase and use of such systems may be setting your organization up for disaster. Good policies and procedures can make these tools the valuable assets they were intended to be."

Miller said policies and guidelines for selecting hardware and software offer such benefits as providing for compatibility of devices, potential price discounts for volume buying and improved positioning for working out maintenance agreements with vendors. Policies for acquisition can encompass guidelines for risk and cost/benefit analysis, provide control over requisition, approval and installation and encourage a complete inventory of all computing resources.

"Policies presuppose a corporate architecture for the future use of automation," Miller said. "They can serve as a means of communicating to people what their roles are in protecting company information."

As an example of a formalized set of policies, standards and guidelines, Miller exhibited Rainier Bancorporation's systems integrity policies. Rainier's documents include a description of the legal basis for computing security and controls, a statement of the company's data security policy, an in-depth summary of security responsibilities and information on data classification schemes and standards for the control of information and computing resources. Also included in Rainier's policies are standards for the physical security of systems.

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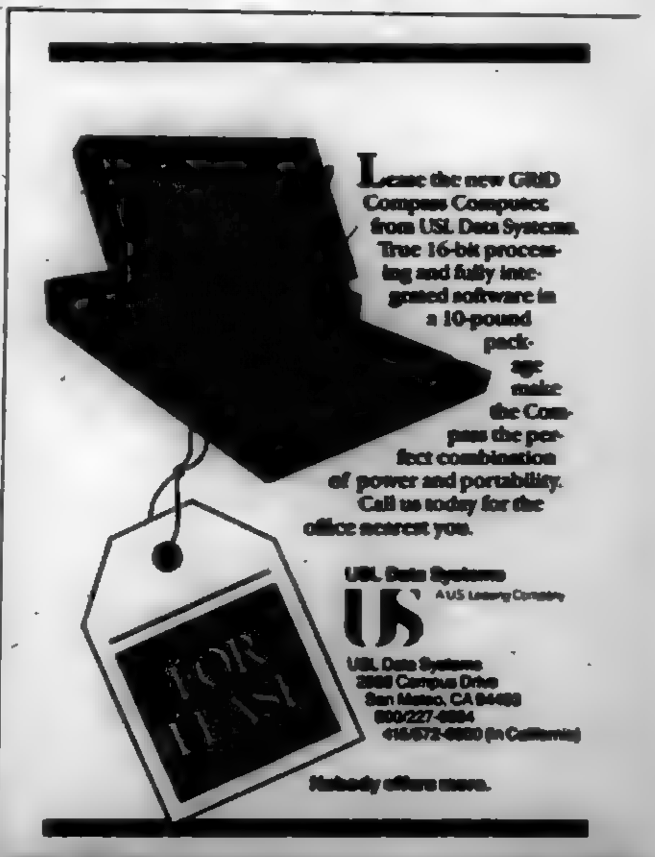
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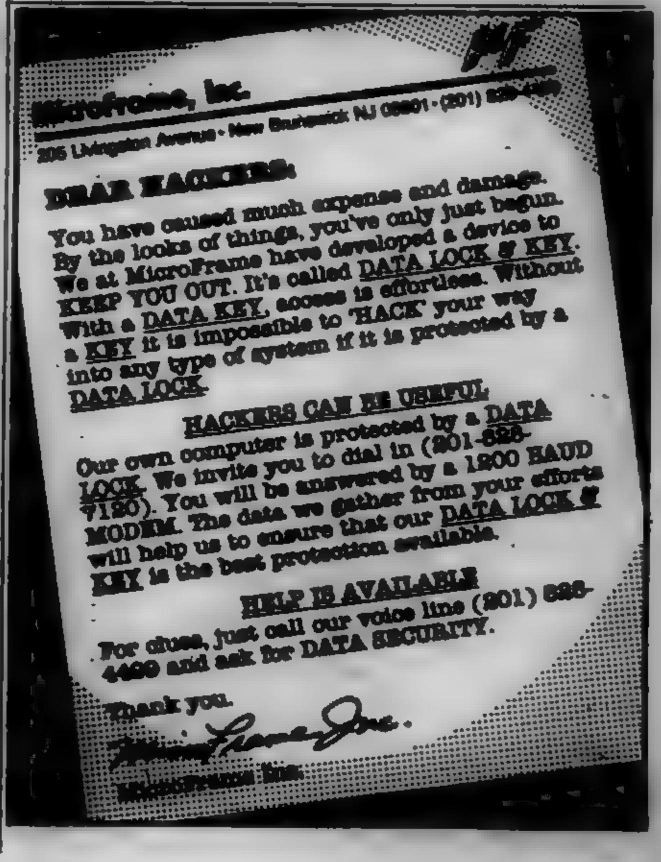
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Micro software TV ads play to mixed reviews

By Edward Warner
CW Staff

When Lotus Development Corp. ran a series of television commercials for its then-new Symphony integrated software during the 1984 Summer Olympics, the dealers were not the only ones beseiged by Symphony-hungry customers.

Ron Goldfarb's phone rang off the hook.

Goldfarb, manager of office automation systems for Pratt & Whitney Aircraft Group in Hartford, Conn., said he received dozens of calls after the series of ads aired, most of them from his firm's users of Lotus' 1-2-3 software.

Independent microcomputer support manager Karl May, meanwhile, said he found the magazine ads and television commercials from Apple Computer, Inc. sparked interest among the corporate users to which his firm, Complete Technology Corp., located in Elmhurst, Ill., provides micro support, peripherals and software.

Every available inch of advertising space, reportedly worth $3 million, in the November election issue of *Newsweek* magazine was devoted to Apple products.

Little or no impact

Other micro managers, however, have found the ads have had little or no impact on their users, and some, noticing greater brand awareness among users, attribute it not to advertising but to a continuing rise in user sophistication.

Surprisingly perhaps, several retailers also gave mixed reviews — at least on selling power — to the 1984 ad campaigns of firms such as Lotus, Ashton-Tate and Apple. The campaigns, which made heavy use of television, may have promoted name recognition for the firms but did little to improve product sales at the corporate level, said Tony Morris, whose New York-based Morris Decision Systems, Inc. sells micro hardware and software to corporate customers only.

Morris said he was in a "peeved mode, rather than an [enthusiastic] mode" because of the lack of success of any of the campaigns. Madison Avenue, he charged, has "hosed down" the personal computer industry, and "many of those moneys [spent on advertising] have been wasted."

Ralph Wagner, owner of Microsource Financial of Watertown, Mass., which retails hardware and software primarily to corporate accounts, said he, too, was not entirely pleased. The Apple ads, he said, were a success, but those for Symphony from Lotus "missed the mark not by a mile but by a light-year." Their biggest shortcoming, he claimed, was that they "did nothing for store traffic" and made no tie-in with Lotus dealers.

Uncertain of any impact

Many micro managers said they were uncertain that the ad blitz was having any impact on their users. While acknowledging that "I don't think you can watch an hour or so of prime-time television and not see commercials for hardware or software," said Gene Maiman, project manager for microcomputers at Columbia Pictures, Inc.'s New York office. "It's really hard to trace the original source of where the user got that product idea."

More and more users are coming to him asking for products by their brand names, but, Maiman said, this could be because users have become more sophisticated, an idea supported by Ron Jenks, director of information services at Touche Ross & Co., a New York accounting firm. Jenks said his firm's users were already knowledgeable about microcomputer hardware and software because micros have been in use there for between four and five years, and a personal computing newsletter has been circulating among the users for the past three years.

What may be the bigger concern for microcomputer managers, Pratt & Whitney's Goldfarb pointed out, is the question of what to tell the users when they ask for a product by name, only to find that it is not supported by the firm. This, he said, was exactly what happened when his phone was ringing off the hook with users who wanted Lotus' Symphony. Symphony, he said, had already been tested by his office and found to be too difficult to use. But what to say to the users who wanted to move up?

Goldfarb said he told them: "Trust me, guys, what you're using now is better."

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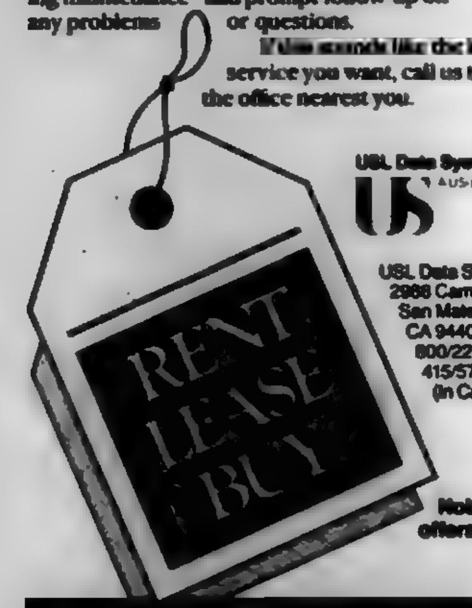

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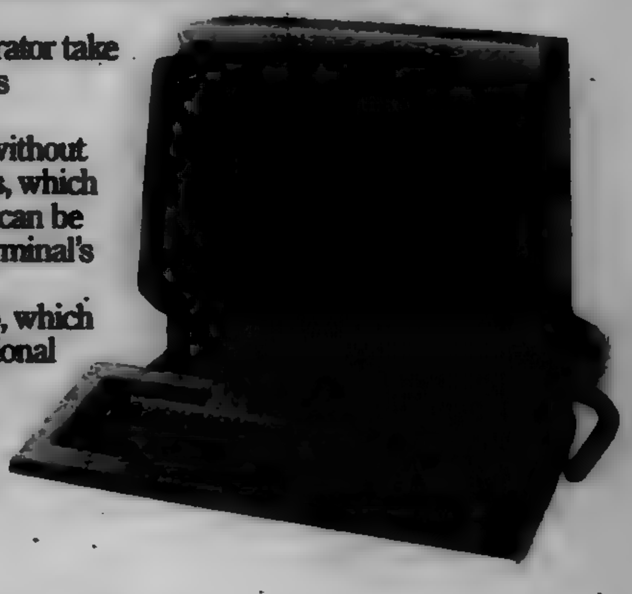

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OA not justified solely on investment return

Cost reductions that accrue, improved decision-making methods should interest execs

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — Justifying office automation by an economic return on the investment alone is myopic, said Tom K. Lewis, the White House director of automated systems. In fact, the intangible benefits of automating an office are almost impossible to measure before a system is installed.

"Return on Investment is probably one of the least significant aspects when you are considering OA," added Lewis, who successfully introduced OA to the White House in 18 short months, where now 10 top assistants to the President are devoted terminal users.

Lewis, along with Jeffrey Borrer, vice-president and manager of decision support at First Boston Corp. addressed a session at the recent Federal Office Automation Conference, and both agreed on the difficulty of accurately assessing what kind of economic return there will be on OA hardware, putting micros on managers desks and establishing communications links to mainframe data bases.

However, when a strategic planner is hard-pressed to justify to top management exactly what benefits will result from spending resources to automate, the two MIS strategists suggested similar approaches.

First is the probability that there will be cost reductions that accrue from automation. Automating can cut labor costs, reduce time expenditures, average equipment costs and ultimately save financial resources that would otherwise have been spent. Second, improving the methods of decision making through automation can also be another unquantifiable factor that will justify an investment in OA.

According to Lewis, the vast majority of benefits derived from OA cannot be quantified, since they vary according to each environment. However, "the benefits are more likely at the lower end of an organization than at the top or more strategic level," Lewis said.

In the long run, Lewis said, selling OA solely on its return on investment will not justify its costs. Rather, it is better to sell it as a strategic asset. "What will happen if I don't automate," is a good question to pose to financial management, he said.

Jeffrey Borror, First Boston's manager of decision support, recommended an approach to selling OA that is different from one that most managers working in the U.S. government could be expected to follow — akin to a guerilla approach.

"Go after the senior top executives first. Preferably the younger ones. Don't push, but pick a key target, someone who is interested in the technology for starters. Have some specific applications and solutions that the OA will address. Then you got credibility," Borror suggested.

Finally, Borror recommended that you supply an integrated OA system initially that pulls together the software, micros and mainframes.

Seromda '85 meet set for Nashville

NASHVILLE — The Southeastern Regional Office Machine Dealers Association, Inc. (Seromda) is holding its 1985 convention, Seromda '85, at the Opryland Hotel here using the theme "Keepin' the Tune" from Jan. 31 to Feb. 2.

Aimed at dealers and manufacturers, the convention will feature exhibits and seminars. The keynote speaker will be Tom Hopkins, author of *How to Master the Art of Selling*, who will address the concerns facing office sales representatives every day and techniques and strategies for meeting the concerns.

Other speakers include Richard Flint, who will address management philosophies, understanding and implementation and ideas on how best to work with employees; attorney Robert C. Goldberg, an authority on trade regulation who is affiliated with Schoenberg, Fisher & Newman, Ltd. of Chicago, who will address contracts, warranties, dealer litigation and employee relations; and Don Chilton, president and founder of Sales Developers of Smyrna, Ga., who will address how to establish a sales program for office machine dealers.

Advance registration is $100 for members and $150 for nonmembers. After Jan. 10, registration is $125 for members and $175 for nonmembers.

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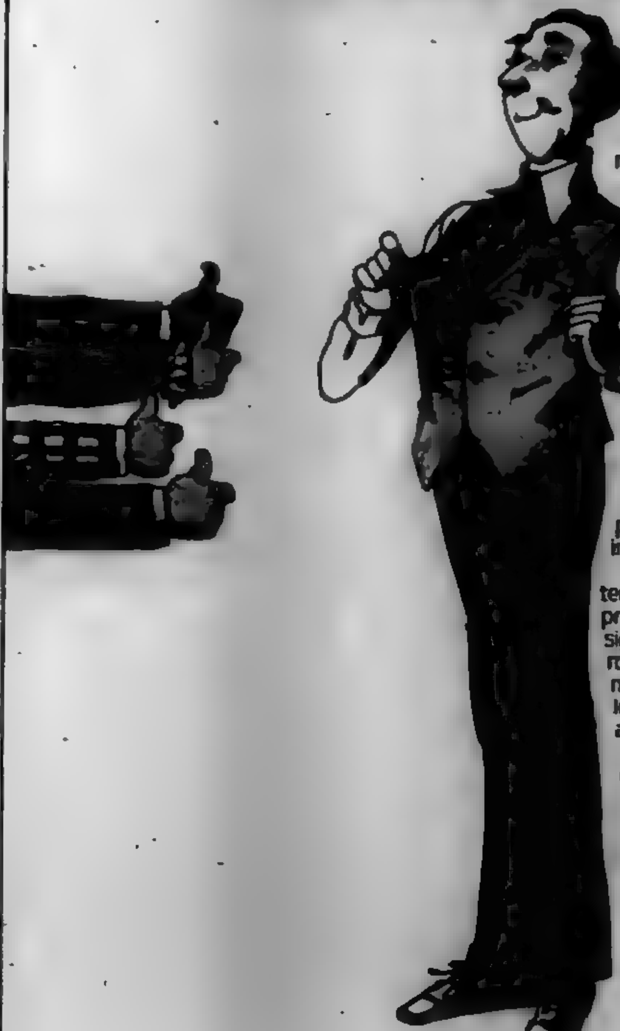

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Valid AI definition lost amid industry jargon

CW AT RPI AI MEET

FRAMINGHAM, Mass. — Artificial intelligence (n): the capability of a machine to imitate intelligent human behavior.

The above explanation, at least according to *Webster's Ninth New Collegiate Dictionary*, constitutes the strict definition of artificial intelligence. But as with any evolving and, unfortunately, overused high-technology buzzword, the term "AI" currently sports a widening variety of confusing and sometimes contradictory definitions.

"If you ask a number of people involved with AI for a definition of exactly what it is, you will probably get n-plus-one answers," Henry Eric Firdman explained recently to a gathering of computer industry and business executives. "There exists a lot of controversy and confusion about artificial intelligence today.

Firdman navigated the executives through a seminar here, sponsored by Rensselaer Polytechnic Institute, titled "Artificial Intelligence and Expert Systems: An Executive Briefing." Firdman is the president of Henry Firdman & Associates, an AI contracting and consulting firm.

What, then, does the term "artificial intelligence" really mean?

"I define an AI system as one that can do three things," Firdman said. "An AI system can acquire new knowledge by communicating to the external world and by inferring from its current knowledge. That communication could be facilitated through sensors, input devices or even another AI system.

"Second, an AI system can carry out goal-directed behavior if it is given a set of goals, strategies for achieving those goals and some adequate knowledge. Finally, it exhibits skill acquisition, meaning that it can improve its performance in certain problem domains based on its knowledge and previous goal-directed behavior experiences."

Firdman said current research undertaken in academia and industry has produced AI systems that exhibit partial capabilities in only one of those critical areas. But to date, he said, no system exists that can boast success in all three realms.

"If a system is truly an AI system," Firdman said, "it will be significantly different six months after you buy it. Thus, any AI product must, by its very nature, be sold as an unfinished product, so to speak."

To aid his listeners in understanding artificial intelligence, Firdman unraveled some of what he labeled the popular but incorrect definitions of AI. For example, he said, many researchers describe AI as the development of computer systems capable of mimicking human reasoning and perception.

"What is wrong with that definition," Firdman said, "is that we do not know much about the mechanisms of human reasoning and perception. In that light, AI is being explained through the unknown."

Others characterize AI as the processing of symbolic information such as concepts, knowledge and relations. "That definition lacks functionality," Firdman claimed. "It is also weak and overly broad. For example, word processing would fall into that definition because it is symbolic information processing. Also, concepts and relations are just particular cases of knowledge, and knowledge processing is by no means all that AI includes."

A third camp, Firdman explained, defines AI as the branch of computer science concerned with designing systems that exhibit the characteristics associated with intelligence in human behavior, such as understanding language, learning, reasoning and solving problems.

"What exactly does that mean?" Firdman queried. "Is solving partial differential equations an intellectual activity? Is human vision an intellectual one? What about driving a car?"

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AIM elects top officers, sets board of directors

MONTEREY, Calif. — A. Paul Cox Jr., president and chief executive officer of Data Systems Corp. of Richmond, Va., was recently elected president of the Association of Information Managers (AIM) for 1984-85 at a meeting at the Hyatt Regency here.

Harvey Wilson, senior vice-president of Honolulu Federal Savings Bank in Honolulu, was elected vice-president of AIM.

Other AIM members newly elected to the board of directors include: Hosie Maxwell, president of Comac of Oklahoma City; Lawrence B. Morse, president and chief executive officer of Northeast Datacom, Inc. of Wallingford, Conn.; David M. Tallcott, president of Mutual Thrift Service Center, Inc. of Albany, N.Y.; and Clyde Tew, senior vice-president of Frontier Federal Savings in Ponca City, Okla.

One-year term

The president and vice-president are elected for one-year terms, and board members serve three-year terms.

AIM, an affiliate of the Financial Managers Society, Inc., is a professional society for people responsible for information in federal institutions or financial institution service bureaus.

Additional information on the organization is available from Dick Yingst, Financial Managers Society, Inc., Communications Dept., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

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Speaker: Develop strategic plan for adopting AI

CW AT
RPI AI MEET

FRAMINGHAM, Mass. — Dr. Henry Eric Firdman likes to tell the story of the Soviet researcher who approached the Ministry of Research and Development seeking funding for his pet project.

After explaining the nature of his undertaking, the researcher was asked, "Has the U.S. done any research in this area?" After the scientist expressed his excitement over the fact that he alone was working on such a project, the minister of R&D flatly replied: "No funding. We will not appropriate any money if the U.S. is not interested in this technology."

The anecdote is more than just an insight into what Firdman described as the workings of the Soviet system. Too often, he told attendees at a recent seminar here titled "Artificial Intelligence and Expert Systems: An Executive Briefing," sponsored by Rensselaer Polytechnic Institute, that U.S. corporations take a similar approach to new technology: If the competition is not looking into it, why should we?

Firdman, president of the AI contracting and consulting firm Henry Firdman & Associates, said management would be unwise to adopt such an outlook toward the fledgling technology of AI. He told his audience that AI can help a firm solve its strategic problems through innovative solutions that can also provide leverage over competitors. But to make use of AI technology, management must first draw up a strategic plan.

Components of plan

What are the components of such a plan? "Define your strategic goals first, then determine how AI technology can help you achieve them," Firdman instructed. "Separate your long- and short-term goals, because AI will affect them differently. Do not get involved in the so-called 'most promising' areas of AI, unless you have a strong scientific or technological backlog and the proper resources to address such a backlog."

Firdman advised management to organize a special in-house task force, possibly assisted by an outside consultant, composed of people with a broad knowledge of AI and an understanding of the human factors, such as fear of job loss, that are involved in the adoption of AI technology. The task force should review the company's operations for major problems, or bottlenecks, that an AI application could solve. The team should then choose one or two of the bottlenecks as "test beds" and outline the resources needed to undertake the AI application and the expected results of the test project.

"Figure out the return on investment you expect from any test bed project chosen, then decide whether it is worth undertaking," he said. "If the answer is 'no,' you have at least acquired new, objective knowledge about your organization obtained from a specific viewpoint. If the answer is 'yes,' you will have avoided the situation of hiring people [AI consultants or researchers] needlessly."

Firdman said that his research into corporations that have undertaken internal AI projects has pointed out three major lessons other companies would do well to learn. First, AI must have what he called "internal champions" among top management or plans and projects may wither on the vine. In addition, Firdman said that the selection of the first AI application is crucial to the success of a firm's entire foray into that new technology.

"The answer to the criticism that AI people do simple things with very complex tools," he said, "is that they want to survive to do more complex things in the future."

Finally, the AI decision-making process must be adapted to the company's corporate culture.

The following are some of Firdman's other tips for making an internal AI venture successful:

- If your task force cannot explain to you in plain English what you should be doing and with what end in mind, it is not worth doing.
- You must know exactly what you want to do before you hire an AI project manager.
- Use external consultants not only as members of the task force but as external auditors during regular project reviews.
- Do not be hesitant about closing down a project if it is not advancing in the right direction.
- When a prototype AI system is developed, use expert judges to assess its performance, and test the prototype in the field as extensively as possible.

"I have no doubt that in the long term an investment in AI is a good thing," Firdman said. "AI is like the research undertaken into nuclear physics in the 1940s. No one understood the importance of what all those scientists were working on in the desert. Then one day they saw the mushroom cloud, and they all understood."

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N.Y.-area banks to tie ATMs into single net

By James Connolly
CW Staff

NEW YORK — Eight New York-area banks plan to link their 750 automated teller machines (ATM) into a single network that would let their customers withdraw cash from any of the banks' teller machines.

The network, which the banks hope to expand throughout the Northeast and into Florida, is being tested now and will be operating by the end of 1984, pending approval by the Federal Reserve Board.

The operating group, the New York Switch Corp., plans to offer the services provided by national shared networks on a metropolitan basis. A spokesman for the company said 30 more financial institutions have expressed interest in the network.

The eight founders include the Bank of New York; Barclays Bank of New York, N.A.; Chemical Bank in New York; Manufacturers Hanover Trust Co. in New York; National Westminster Bank, U.S.A. in New York; Goldome Bank and Marine Midland Bank, N.A. of Buffalo, N.Y.; and Union Trust Co. in Connecticut.

"The idea appeals mainly to commuters — people who may live in [Westchester county in New York] and commute to [New York City]. They will have the benefit of using Bank of New York machines in Westchester and the benefit of Chemical Bank or Manufacturers Hanover in the city where they work," said Alan Pohlman, a spokesman for New York Switch.

Leonard E. Malkin, chairman of the steering committee for New York Switch, estimated that the participating banks have 2½ million proprietary ATM access cards and more than two million ATM-qualified Mastercards and Visa cards outstanding.

Pohlman said the links among the banks will be through a Timeplex Corp. multiplexer marketed by AT&T Information Systems and installed in New York Switch's Fort Lee, N.J., headquarters. Each bank's ATM processors will have dedicated 2,400 bit/sec lines to that multiplexer, which will be connected by 9,600 bit/sec dedicated lines to a switch in New Berlin, Wis. That switch, consisting of Tandem Computers, Inc. Nonstop II and TXPs, is operated by A.O. Smith Data Systems, which developed the software for the switch.

When a customer begins an ATM transaction, the ATM's host processor will detect whether the customer's access card is from that bank or another participating bank. If it is another bank's card, the transaction will be routed to Fort Lee and on to Wisconsin, where the Tandem will identify the appropriate bank and, again through Fort Lee, query that bank as to the account status.

The customer's own bank can approve the withdrawal and record it in the same transaction. The approval is relayed back through the Tandem, and the cash is dispensed. Pohlman said the entire process should take about five seconds longer than with the previous systems, where customers could withdraw cash only at their own banks.

The system will not allow customers to make deposits or payments at banks other than their own.

System check ends search for terrorists

By Donna Raimondi
CW Staff

A gang of alleged terrorists — subjects of an intense nationwide manhunt for years — were flushed from their hideouts earlier this month after police officers did a simple computer cross-match that revealed the group's location.

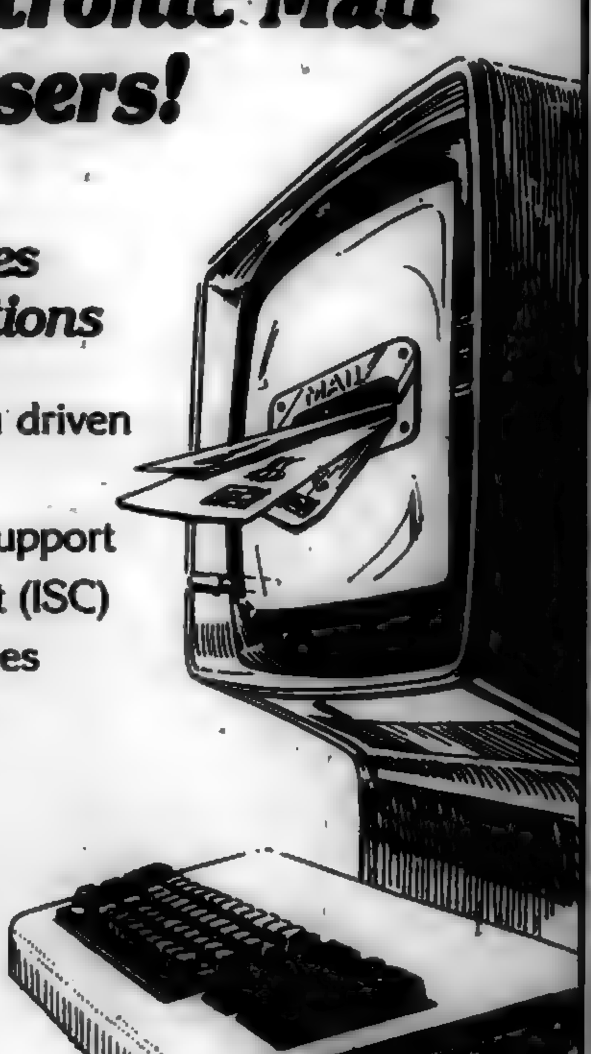
Federal agents in Ohio arrested five fugitives with a long history of political terrorism, bank robbery and murder after a license check by Massachusetts State Police turned up an alias used by Patricia Gros — wife of alleged terrorist Raymond Luc Levasseur — who was wanted for questioning in the brutal Dec. 1981 murder of a New Jersey State Trooper.

Massachusetts State Trooper Richard J. Barrett said police came up with an alias that was eight or nine years old by following leads. An ex-neighbor of Gros' in Connecticut remembered that seven years ago Gros was in an accident when she lived in that state, and a check of Connecticut license files showed the same name and date of birth information as one of Gros' known aliases, he said.

Massachusetts State Police Cpl. Frederick J. Roberts said the information was entered into the Massachusetts Law Enforcement Agency Processing System, which runs on a Burroughs Corp. B7900 mainframe with approximately 300 of the state's towns linked via terminals. The alias information was then run through the computerized records of several states, turning up again in New York and finally in Ohio, Barrett said.

Gros' alias had been lifted from the records of a baby who died in Lowell, Mass., around the time of Gros' own birth, Barrett said. Even though Gros changed her name many times since becoming a fugitive, she kept the license alias the same throughout her stay in Connecticut, New York and Ohio, where she and her gang were picked up.

Lt. Joseph Kobus of the New Jersey State Police said that, following the murder of trooper Philip Lamonaco in 1981, more than 250 troopers searched for members of the gang. Task forces from the New England states and New York had been searching for members of the gang since 1977.



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System integration vital to role of MIS exec

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — Without more sophisticated systems integration between mainframes, microcomputers and minis, the MIS director's task of "having the right information in the right place at the right time is an impossible job." The multivendor environments that exist in Fortune 1,000 companies today make integration both inevitable and necessary during the 1990s, Robert T. Fertig, president of Enterprise Information Systems, Inc., of Greenwich, Conn., said in his keynote address at the sixth annual Enterprise Information Systems Forum held in San Diego this month.

Two key benefits to integrated systems, he said, are the ability to share critical resources and information and the elimination of unnecessary barriers to the free flow of information.

> *Electronic mail applications are limited by the lack of graphics support and by the technical naivete of companies becoming involved in the technology.*

Future operating systems will be the most suitable place for integration to occur, Fertig said, and next-generation operating systems should provide facilities for integrating data bases, data communications devices and graphics. Of the many stand-alone operating systems, integrators and operating system extensions that exist in the marketplace today, (including Apple Computer Corp.'s Lisa, Visicorp's Visi On and IBM's Topview), the Windows operating environment from Microsoft Corp. has emerged as the de facto standard for intramachine integration, Fertig said. Windows has been adopted by IBM, Digital Equipment Corp., Xerox Corp., Apollo Computer Corp., Digital Research, Inc. and other manufacturers, largely because it permits data to be viewed concurrently, he said.

During the remainder of the 1980s, there will be a proliferation of more sophisticated micro-to-mainframe links, Fertig said. These links will lower systems costs, provide higher productivity through faster response times, allow greater integrity of messages and superior security, decrease telephone and host connect times, coordinate CPU access with periods of low host utilization and enable the host to support increasing numbers of remote sites.

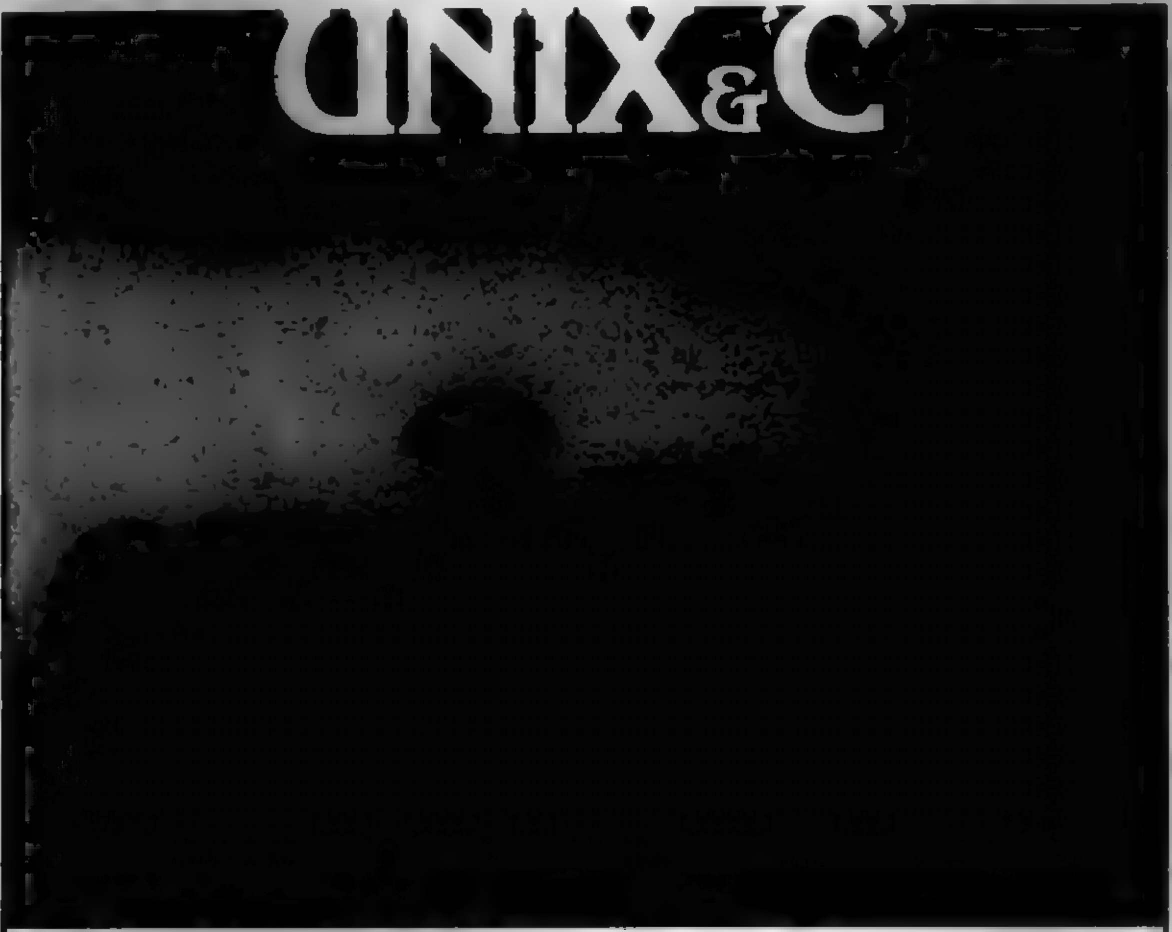
Presently, there are four viable software technologies for micro-to-mainframe links, Fertig said. These are terminal emulation, file transfer, electronic mail and distributed data processing. According to Fertig, electronic mail applications are still limited by the lack of adequate graphics support and because of the diversity and technical naivete of companies becoming involved in the technology — from small independents and public utility companies to conglomerates like MCI Communications Corp., Western Union, Inc. and GTE Telenet Communications Corp.

Interface consistency

"A key [criterion] necessary to integrate distributed data applications is developing interface consistency that is independent of its location," Fertig said. "Both ends of the link should have a consistent user interface and be able to run identical equipment at both ends of the link." So far, this has not been achieved, he said. An IBM Personal Computer XT/370 running IBM's Ramis/II or Information Builders, Inc.'s PC/Focus software, coupled with an IBM VM host, would provide today's optimum distributed solution, Fertig said.

A critical problem that has until now prevented development of commercial distributed applications for intermachine and intramachine integration, he said, is the "layer six problem." (Layer six is the presentation layer of IBM's Open Systems Interconnect architecture that translates information between incompatible formats.) Layer six format translations are usually less than 70% accurate, Fertig said, resulting in serious degradation of source data during transmissions. It is possible to solve the problem, Fertig said, by using format translations to map data exchanges between incompatible systems or by sending rules and data simultaneously.

Offering the best solution to date, Fertig said, IBM has developed three architectures — the Document Interchange Architecture, Systems Network Architecture and the Document Content Architecture — that "act as a glue" to solve portions of the integration problem.



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Computer collects campus crime statistics

By Donna Raimondi
CW Staff

ALBANY, N.Y. — Crime reporting requirements in the state of New York recently served as a vehicle to test the state university's new data base management system (DBMS) and fourth-generation language.

The State University of New York (Suny) is comprised of 375,000 students and 40,000 employees dispersed throughout 29 campuses all over New York. To keep track of crimes on the various campuses, Suny security staff members send crime data to the state computer center in Albany, said Tom Rysedorph, assistant director for systems development at the Research Foundation at Suny-Albany.

The computer center processes the information and forwards it to the state's criminal justice department once a month to satisfy state crime statistics requirements, he said.

Suny's security officers had never used the university's computer facility, which runs an IBM 3033 under MVS/CICS, Rysedorph said. When the university acquired an Applied Data Research, Inc. (ADR) Datacom relational DBMS and ADR's Ideal language this year, security requested a new crime reporting system that would allow its officers to enter data interactively and to generate ad hoc reports for its own use as well as the statistics for the criminal justice department, he said.

With the old system, security staff members filled out paper forms and forwarded them to punch card/data entry staff at the computer center in Albany, which collated the information on tape, put it through several batch programs with interim edit/audit lists and returned the tape to the security director for error checks, Rysedorph said. Once corrected, the tape was sent on to the criminal justice department, he said.

Exercising options

Members of Rysedorph's group looked at the request for a new crime package as a pilot to help them fully understand the new products, he said. "We wanted to exercise all the options and alternatives available to us and throw in all kinds of problems in order to adapt to users' needs as they become more sophisticated," he said.

The ADR system had been acquired after a search of other DBMS, Rysedorph said. "We felt that [IBM's] IMS belonged to major corporations with data base staff in the hundreds and multiyear development cycles," he said. Cullinet's IDMS needed a highly technical data base administrator, he said. "It is very hard to obtain data administration at a high level given the salaries of state employees," he added. For the Datacom relational DBMS, the data base administration is less technical, more administrative and more user-oriented, he said.

The fiscal constraints of the university also had a lot to do with the Crime Incident Reporting package's design, Rysedorph said. Little money is available for training, and New York's snowfall will make it difficult for users to travel to the center in Albany for training, he added.

"We placed procedures into Help panels that users can access by hitting a function key when they get an error message. We also provided a function where they could hit a button and get all the errors found on a screen," said Ralph Bennett, senior project leader.

Bennett trained personnel from three pilot campuses in Binghamton, Canton and Potsdam and found that training in the application itself was easy, he said, but familiarizing the staff with computer use in general was difficult. "They got hung up on getting their passwords in correctly," he said, and they had some problems figuring

See SUNY page 35

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Computer counseling may reduce marital stress

By Donna Raimondi
CW Staff

MIAMI — To the list of dedicated ministers and psychologists who specialize in alleviating marital stress, add one Sperry Corp. computer.

Mathematicians at the University of Miami here are using modeling techniques to identify and prevent sources of conflict in a marriage, said Dr. Bernard Howard, professor of mathematics and computer science.

People are like black boxes; they have finite states that include input, internal and output states, Howard said. As a result of input, the internal and output states change, he added.

Howard and his affiliates have spent the last 15 years developing a system of pinpointing behavior, rating the behavior on indexes and identifying alternative actions that could act as a tool to help reduce stressful conduct, he said. The computer simulates the dynamic behavior of the system from all possible internal situations and displays a tree to show possible behaviors. It computes various indexes — strife, compatibility, acceptability — and gives a "batting average" from zero to 1,000.

Each member of a couple answers a set of eight questions that Howard and his team designed to reflect the internal state, he said. The computer then analyzes current behavior, and a psychologist validates the results. Once the analysis is accepted, an index is given and the computer searches through all possible changes each individual could make to increase successful conduct.

Howard and Dr. Henry Kunce — a former Presbyterian minister/counselor and now a behaviorist at the university — wrote 30 programs in two classes (discrete and continuous modes) to apply to interactive behavior. They tested their programs by running more than 300 cases Kunce had worked on in his counseling days through the system, and the computer simulated what had really happened in every one of those situations, Howard said.

Dr. Joseph Kunce, a psychologist at the University of Missouri, experiments on couples and gathers data, which Howard and Henry Kunce process on a Sperry 1100/82 mainframe.

His research team has experimented on corporate decision-making processes and racially tense political situations; the hope is to someday use the system for smoothing relations between world leaders, arbitrating labor conflicts and defusing racial conflicts, Howard said.

SUNY from page 34

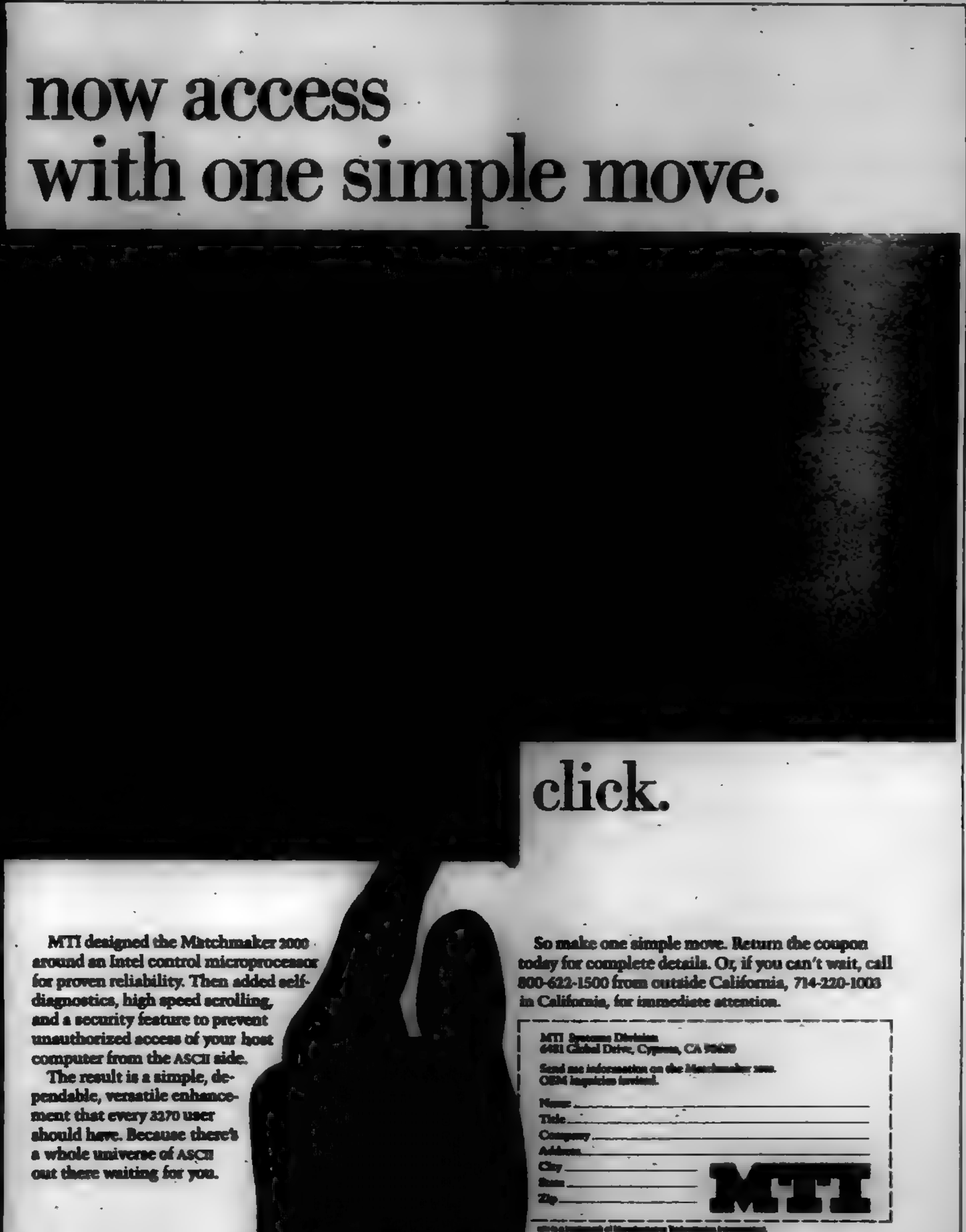
out how to access their IBM 3101 or 3278 terminals via different control unit devices."

Another problem with training has been that the Justice Department insisted on 100% accuracy in the new reporting methods, and the security department was used to allowing errors they considered to be noncritical.

For example, said Platt Harris, director of university public safety, the only traffic violation allowed on the criminal justice report is driving while intoxicated, but the security department had previously included other traffic violations for its own information.

Now, everything has to conform to justice department rules, Bennett said, and it has taken the users a while to realize that they have a tool that will readily tell them what is unacceptable so they can fix faulty reports.

Rysedorph's group prepared itself to write the program by attending users group meetings in Boston, Toronto and upstate New York, and by talking frequently with ADR's technical support people.



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UK firms plagued by misguided DP purchases

By Lisa Israel
Special to CW

LONDON — A subsidiary of a large UK manufacturing company spent two years developing a production and control system without producing a single working application.

The company's data processing department, which recommended a mainframe for the application, now recognizes that it made a mistake and has turned to a minicomputer to do a quicker and cheaper job.

According to Max Hand, a management consultant at the firm of A.T. Kearney, "Top and middle management should have controlled that project, not DP. If you leave it to DP, you will get the wrong solution."

Hand reached his conclusion after researching the use of information technology at more than 200 companies. Backed by the UK's Department of Trade and Industry and the Institute of Administrative Management, the research arrived at one horrifying conclusion: 20% of an estimated $5 billion to $6 billion in computer spending in 1984 will go to waste.

The study divided informaton technology users into "leaders" — companies that are coming to terms with information technology — and "laggers" — companies that leave themselves behind. The study found that only a quarter of the companies surveyed fit into the first category.

The rest are making all kinds of mistakes, according to Hand. "They are buying the wrong machines, spending too long or too much on developing systems and not getting the most from them when [the systems are] installed."

Hand tells hair-raising stories of money misspent at large and small firms in fields ranging from finance to construction to local government.

Hand places the blame firmly at the door of top management for not setting the right objectives for their DP departments. "Lagging companies do not really know what to do with technology. They don't understand it. It is almost an embarrassment to them, so they do the traditional, easy things," he said.

An example of this approach was used by one well-known construction company interviewed by Hand, which had all the right applications, but failed to win full benefits from automation.

The firm had put its accounts on computer, but still carried out its annual consolidation by hand. It also had a payroll package for several thousand employees but worked out some calculations manually. Employees were working as hard with a computer as they had without one.

"This particular company didn't know what the hell to do with information technology," Hand said. "The DP department was too busy responding to immediate requests. If they had sat back and thought about it, they could have automated functions on their construction sites."

Without confidence in its own judgment, top management shifts responsibility for DP decisions to DP managers, who then make the wrong decision. This is because DP managers do not always know the computer strategy that will best help a business, Hand maintained. "Nor should they be expected to; they are trained to find technical solutions, not to formulate business tactics."

Cost justification of computer-related projects is another problem for companies because so many of the benefits from computerization come in crossing intracompany barriers that managers find difficult to cross.

It is also a problem because savings are difficult to quantify from piggyback benefits like electronic mail or office automation. The survey estimates that confusion over job-costing can prevent firms from seeing more than 70% of the benefits of information technology.

Bouncing off a brick wall

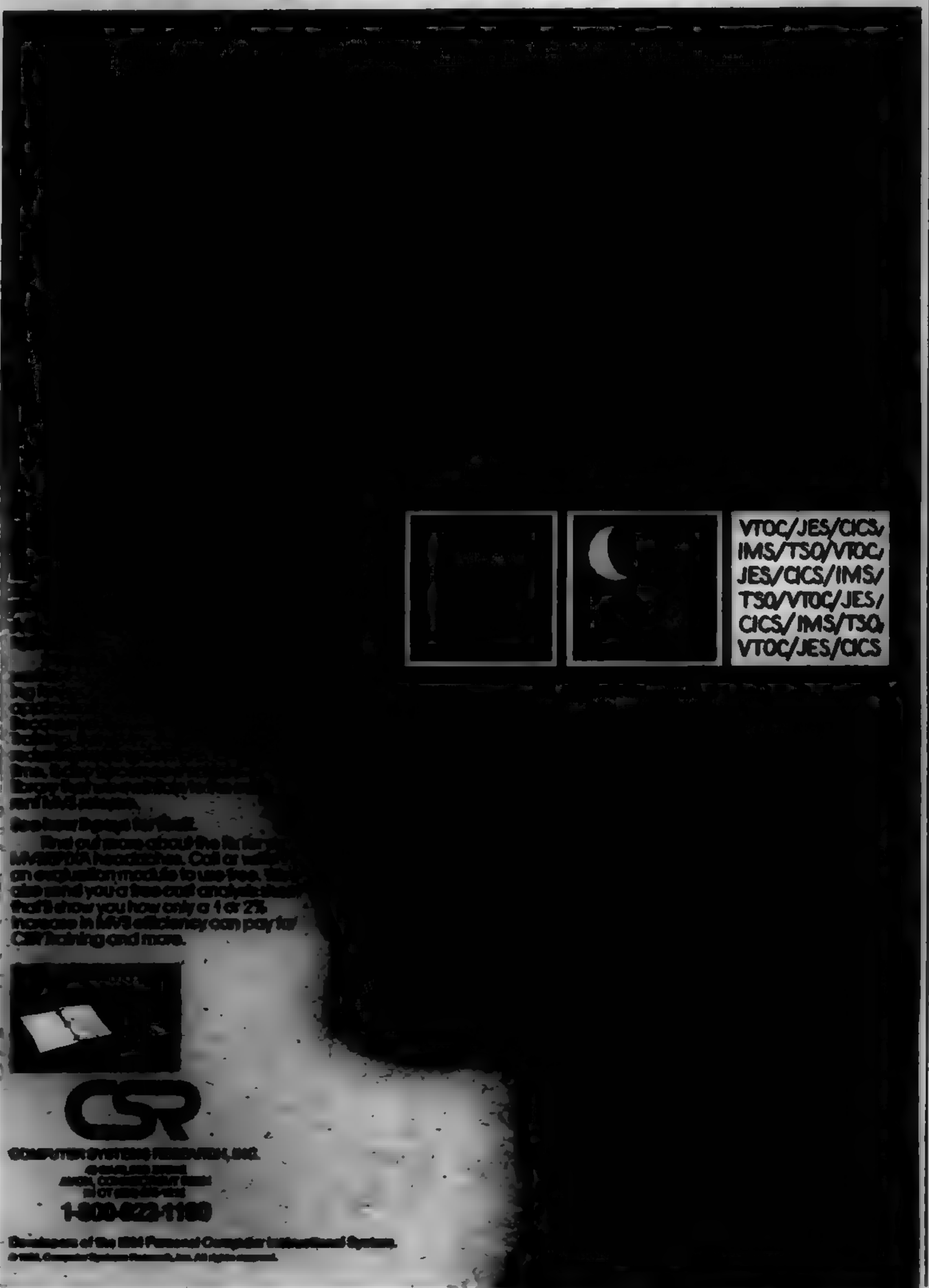
Furthermore, even when DP managers recognize that computers are not being used to full advantage, bringing recommendations to the board's attention is like "bouncing off a brick wall," Hand claimed.

"DP managers do not always know how to put forward a business case for a better system. . . . In short, what the survey identifies is a gap between business strategy and computer policy."

Top managers need to change their attitude toward computers, Hand advised. "A system is not just a big box that maximizes staff productivity and saves on wage costs," he said, adding that the latter is the stated aim that outweighed all others for computerization by 80% of companies surveyed.

"Information technology must be aligned with a company's business strategy," Hand reiterated. "A firm must work out what it wants to do and then work out what it wants from information technology. This has got to be done by top management, and it's a strategy that can then be implemented by DP managers."

Israel is a reporter with Computer News, *the UK-based affiliate of* Computerworld.



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Standards directory out

WASHINGTON, D.C. — The National Bureau of Standards has issued a directory of standards developed by trade associations, technical and professional societies, federal agencies and state governments.

"Standards Activities of Organizations in the United States (SP-681)" summarizes the activities of more than 750 organizations in the U.S. as well as 420 private sector groups. The directory also contains a list of 632 nongovernment groups that develop standards, contribute to the standardization process or are sources of documents and information.

The standards directory, stock number 003-003-02602-6, is available for $13 prepaid from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Unix users meet set for January

DALLAS — Uniforum '85, the International Conference of Unix Users, will be sponsored by Usr/Group at Infomart here on Jan. 21-25, 1985.

Fourteen all-day tutorial sessions will be held on Monday, Jan. 21, and conference sessions are scheduled in four tracks: office systems, personal computers, engineering/programming and market trends.

Vendors of AT&T's Unix hardware, software and services will exhibit their products at the international event.

Registration fees

Registration prices are as follows: for the show only, there is no fee if preregistered, and registration is $10 on-site; for the tutorials, there is a $100 fee if preregistered and it costs $150 on-site; and the price for the conference is $125 in advance and $175 on-site.

Special conference rates apply for members and students.

More information is available from Uniforum, which is located at Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

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Foreign vendors showcase wares at Comdex

Japanese, Australian, English vendors highlight product introductions in '84

By Susan Blakeney
CW Staff

LAS VEGAS — Among the 1,400 exhibitors at the recent Comdex/Fall '84 here were several international vendors looking for customers, dealers or partners in the U.S.

Fujitsu Microelectronics, Inc. unwrapped its Micro 16SX, an Intel Corp. 8086-based personal business computer that features 384K bytes of random-access memory, a 10M- or 20M-byte built-in Winchester hard disk drive and a 360K-byte, 5¼-in. half-height floppy disk drive. The machine is also equipped with a real-time clock with battery backup, a serial communications port, a parallel port, a graphics subsystem and an eight-color monitor. The system can operate on Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M 86 or Concurrent CP/M 86 operating systems, a spokesman added. Pricing on the Micro 16SX begins at $4,250.

Time Office Computers of Australia showed the Emu Ergonomic Workstation and the Kookaburra Portable Computer. The Emu was designed by Ferdinand A. Porsche's Design Studio to meet all presently documented ergonomic standards. The screen features six-directional motion and leaves no footprint on the user's desk as it is suspended by a moveable arm. The keyboard is sculpted and padded and comes complete with a hand rest bar. Pricing on the workstation starts at $5,000.

The vendor's Kookaburra machine is an Intel 80186-based, 9-lb system featuring up to 256K bytes of random-access memory, three ports, bundled MS-DOS 2.1, word processing, spreadsheet and diary software. The system can run on battery or main power supply. It costs $2,200.

Also from Australia was the Squirrel Ltd. Relational Database Management System, said to offer the same capabilities as IBM's SQL fourth-generation language to users of micros, minis and mainframes. The software also features data manipulation capabilities, security control and indexing and data definition facilities. Pricing starts at $2,400.

NEC Information Systems, Inc., the Boxborough, Mass.-based subsidiary of NEC Corp., unveiled an electronic mail system that enables up to 10,000 users of the vendor's Astra 300 VS series of 32-bit minicomputers to communicate with each other. Priced at $2,000, Astra Electronic Mail sends and receives messages within the Astra system from workstations, personal computers, portables and asynchronous terminals, according to the vendor. Multiple copies of up to 10,000 can also reportedly be sent to the system users.

Sony Corp. introduced its Compact Disk Read-Only Memory (CD ROM) product, which offers 540M bytes of memory on a single 4.72-in disk, which the company said has 500 times the capacity of conventional floppies. Digital encoding techniques combined with laser optical technology form the basis of the CD ROM format, originally devised in conjunction with Philips Information Systems, Inc. as a high-fidelity audio storage medium, according to a vendor spokesman. Sony intends to deliver samples of this product during the first quarter of 1985.

Sony also expanded its line of high-resolution Trinitron red-green-blue monitors. The additions included 9-, 12- and 13-in. screen models. All three are compatible with the IBM Personal Computer product line, and pricing starts at $550, the vendor said.

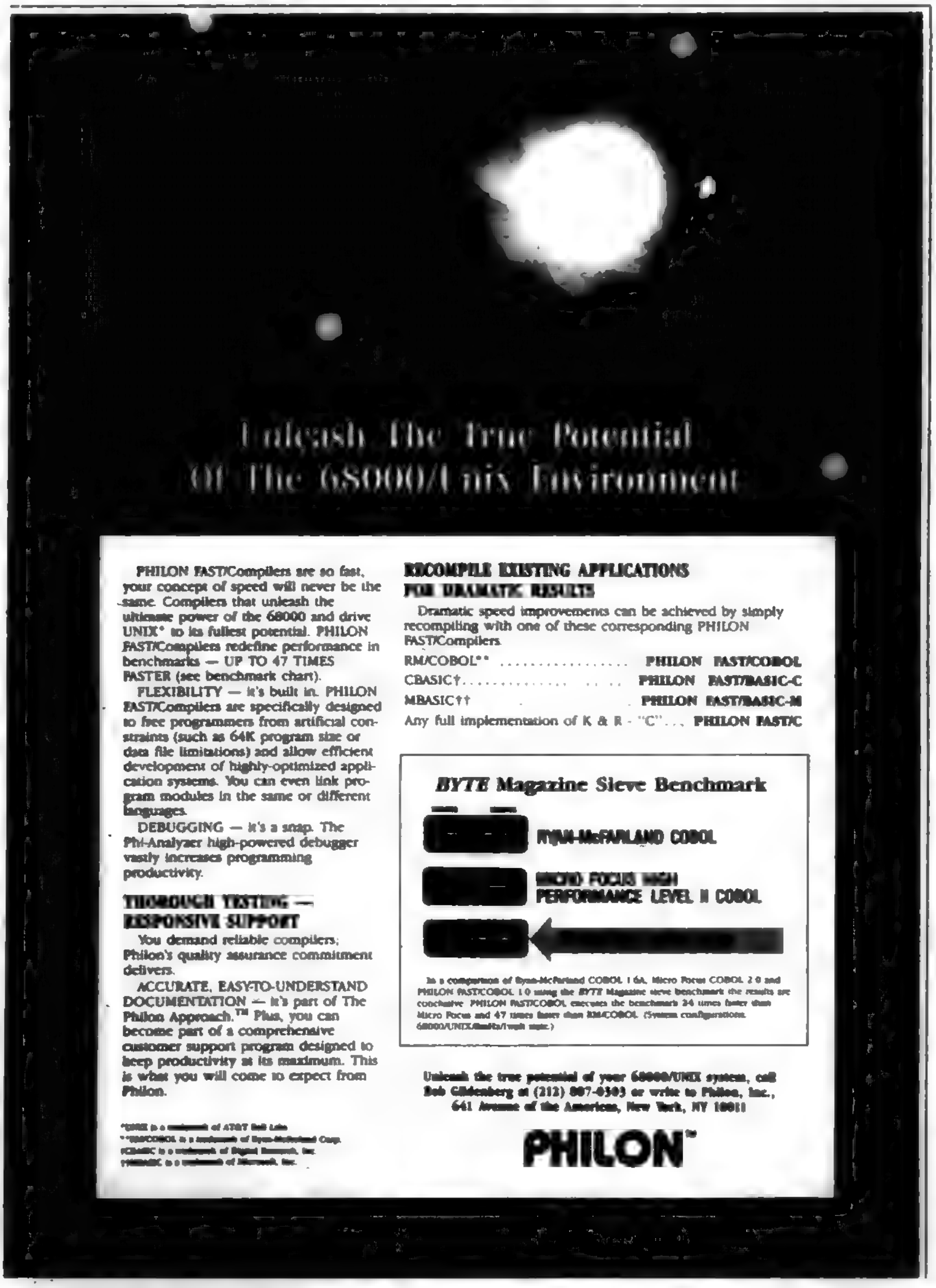
The UK's Newbury Data Recording introduced Penny, a 3½-in. fixed-disk drive offering 50M bytes of storage and an average access time of 40 msec. It costs $5,000 per drive.

Aimed at life cycle control

Introduced by Yard Software Systems Ltd., also of the UK, was Lifespan, an automated configuration management system. This product was designed to allow managers and developers more control over their software throughout its life cycle. Lifespan runs on Digital Equipment Corp.'s VAX line of machines using VMS. Lifespan does not require extra staff to implement, nor will it slow down the software development process, according to the vendor. It is priced at $19,000.

Apricot, Inc. of the UK unveiled the Apricot F1s, a 512K-byte version of its F1 entry-level business micro. With a price tag of $1,995, the F1s features an 8086 microprocessor, 512K bytes of random-access memory (RAM), expandable to 768K RAM, a 720K-byte, double-sided 3½-in. disk drive, infrared keyboard, color graphics and an optional mouse.

Apricot also introduced the Apricot Portable, a 13-lb system equipped with many of the same features as the vendor's F1 micro with the added features of voice recognition, infrared mouse and a full-size flat panel display. This machine costs $1,695.



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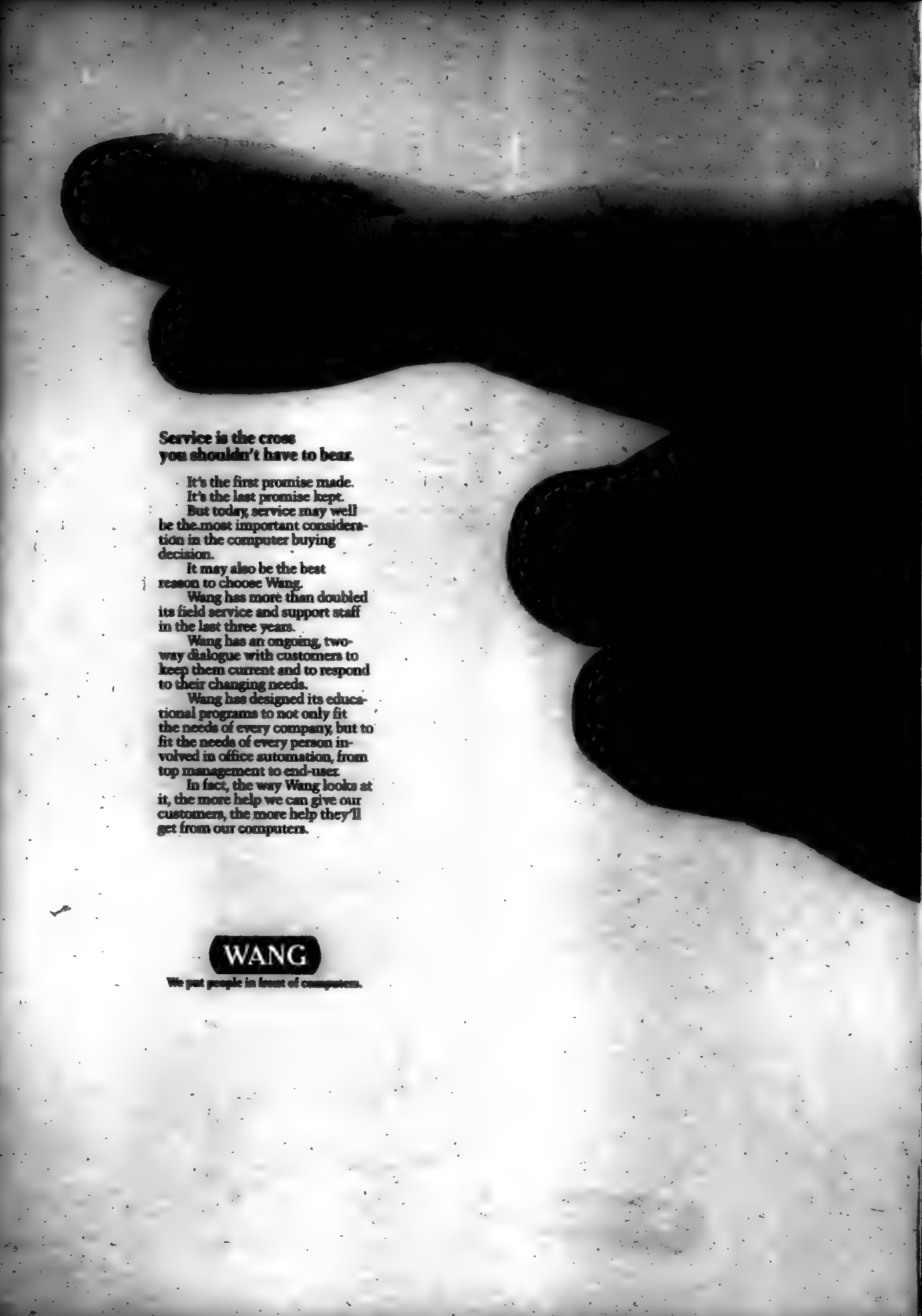

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Europe facing marginal technological growth

By George Harrar
CW Staff

AMSTERDAM — Where is the European computer market headed?

The words and tone of Vittorio Cassoni, vice-president of corporate marketing for Olivetti S.P.A., conveyed an unmistakable pessimism about the direction of the European market to the sparse crowd attending his Comdex/Europe keynote address here recently.

"Without a development in favor of the new technologies," Cassoni said, "the decline of Europe is destined to continue. . . . Europe will not be in condition to participate with full rights in the new development cycle. It will sink to an increasingly marginal technological and economic position."

Cassoni outlined what European companies must do to stay in the running in the technological horse race now dominated by the U.S. and Japan. But at few points did he sound convinced his prescription would be followed.

Do not worry about technological and productive autonomy, he told his audience, because European firms cannot succeed by going it alone or even by uniting their own forces. Agreements with Japanese and U.S. companies must be the means to active participation in the development of new technologies, he noted.

More than 200 such agreements have been concluded, Cassoni said, but in many cases the European companies are simply passive partners operating from positions of financial and technological weakness.

Venture capital could permit the birth and growth of small companies in Europe as it has in the U.S., he added.

Discord does not permit optimism

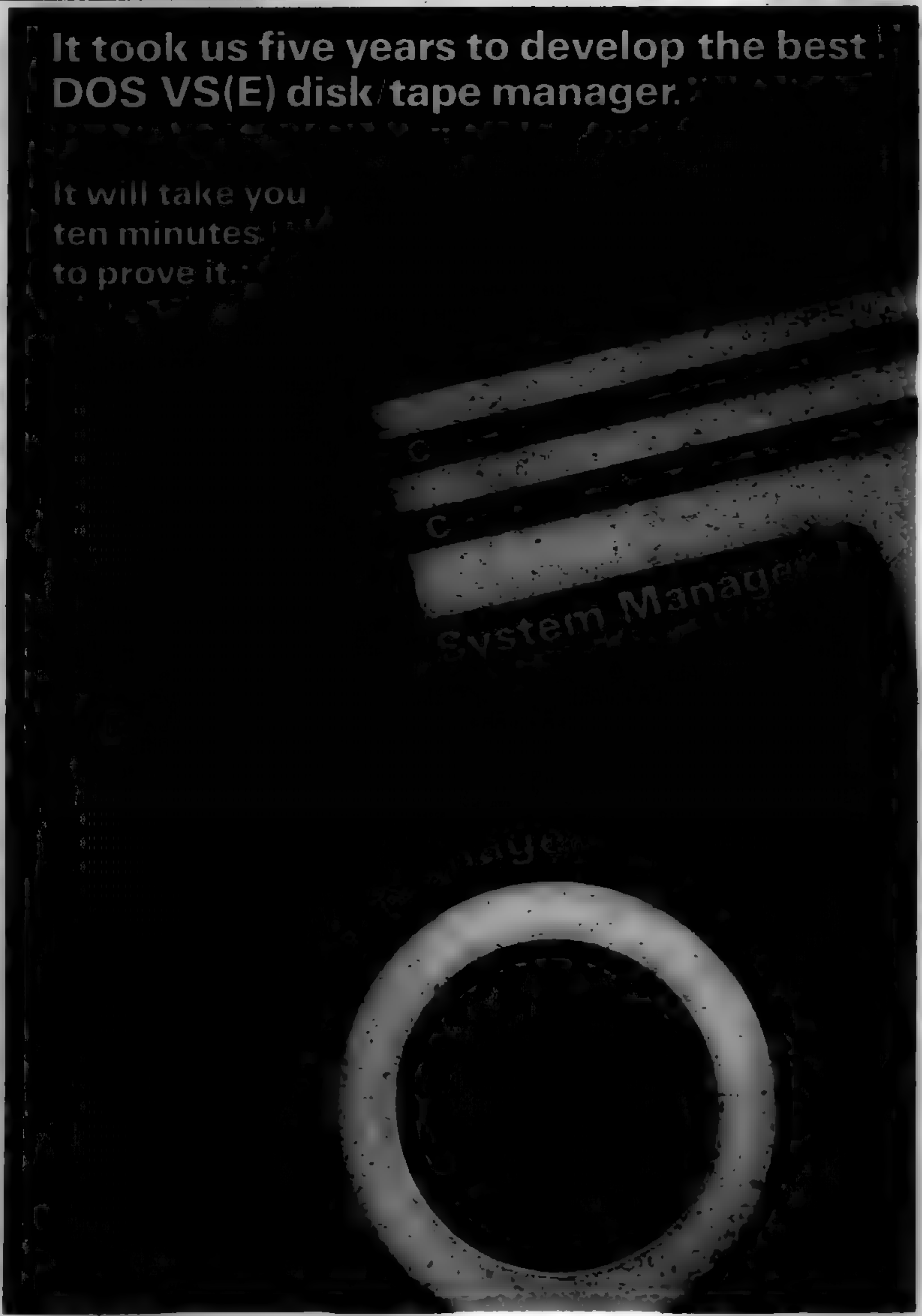
A strong home base for sales would strengthen European companies, and Cassoni called for a "more integrated and homogeneous" market. But he was bluntly realistic: "The political and economic discord that currently divides the European countries does not permit optimism on possible progress in the immediate future."

He cited figures illustrating the lack of dynamism in the European marketplace, both from user and vendor perspectives:

- At the end of 1983, an estimated one out of three U.S. white-collar workers used an office workstation, compared with one out of 12 in Europe.
- In the U.S., one in 10 white-collar workers uses a personal computer, compared with one in 30 in Europe.
- A European telecommunications company would need sales of at least $14 billion to reach typical profit levels, after an initial investment of $700 million to $1 billion to develop a new digital switch. That profitability would only be possible by the company's assuring itself of 100% of the combined digital switch markets of West Germany, Great Britain and France for the next decade.
- More than 80% of the companies controlling production in the information industry are U.S. firms, while 10% are European.

Cassoni concluded his lament about the European computer industry by describing a scenario in which Europe continues on its present course to becoming a marginal technological power. He ended by stating, "Let's hope it will not happen."

The third annual Comdex/Europe, which focused on small computer systems, had been expected to draw 10,000 visitors. The sponsor, The Interface Group, Inc., reported that 7,300 visitors attended.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Author slated to address office expo

WASHINGTON, D.C. — Tom Peters, coauthor of *In Search of Excellence*, will address the Federal Office Systems Exposition at the Convention Center here March 6.

Peters will share his findings on revitalizing corporations, continuing innovation, enhancing customer satisfaction, improving productivity and implementing strategy.

The author's research on companies has included 3M Corp., IBM, Digital Equipment Corp., Data General Corp., Hewlett-Packard Co. and Texas Instruments, Inc.

Peters first published an article in *Business Week* in July 1980 based on the findings of a survey on company excellence. The findings, published in book form by Peters and coauthor Bob Waterman in November 1982, became a best-seller.

The registration fee for the full conference is $200 by Feb. 4 and [illegible] thereafter.

Additional information on the conference and exposition is available from National Trade Productions, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

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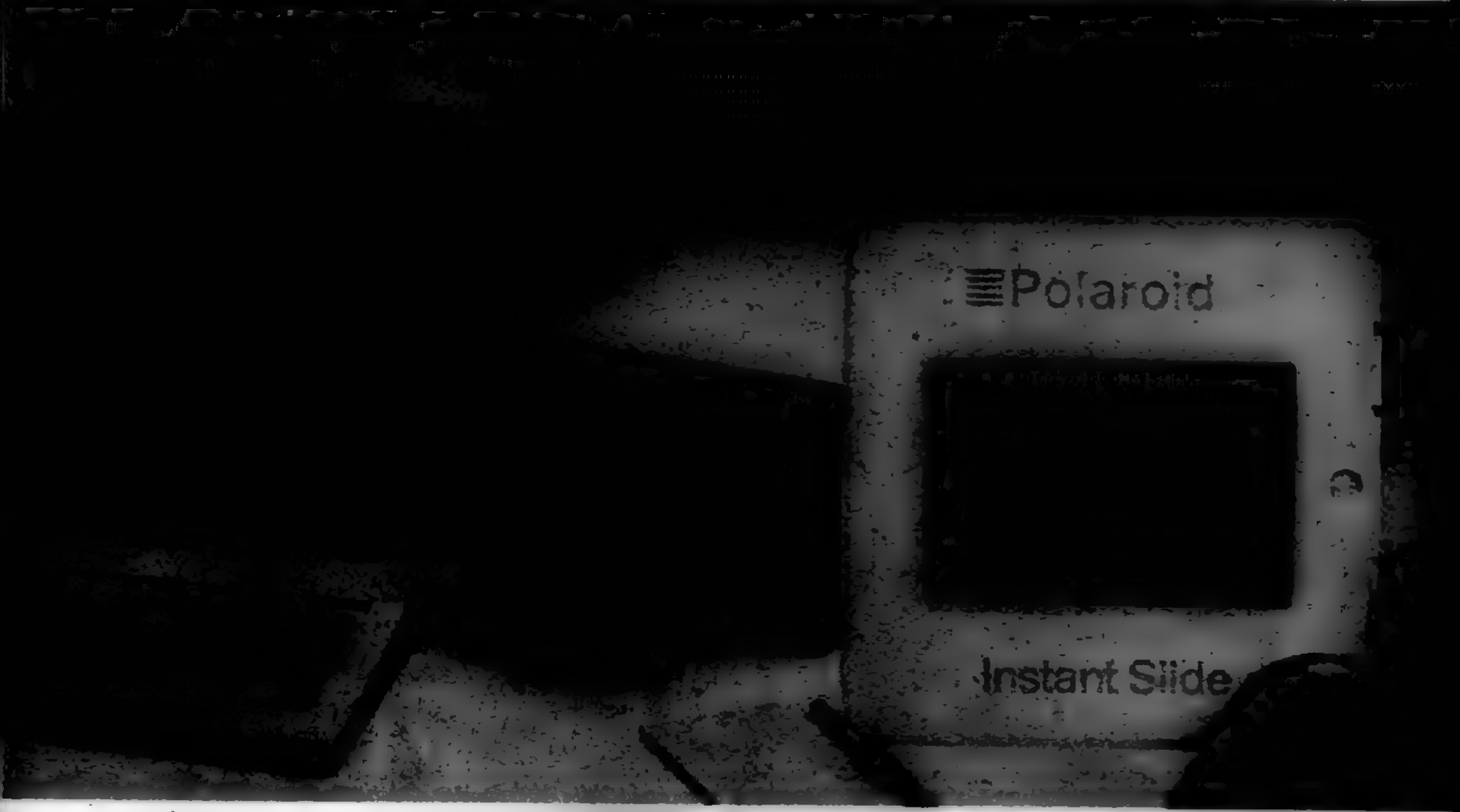

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CW International News Network

CHINA

BEIJING — China will adopt more flexible policies toward foreign investment, State Councillor Gu Mu said at a recent investment symposium here. The councillor said the government was currently considering cutting income taxes for all enterprises using foreign capital. Preferential treatment would be given to foreign start-ups, and the old 30-year time limit could be extended for projects with heavy investments and long gestation periods. He also said the country would allow high-tech products to be sold in its formerly closed market in exchange for the advanced technology that China needs.

ENGLAND

LONDON — British Telecom is reportedly running into trouble with its Kilostream digital network, which is intended to provide business users with inexpensive private digital circuits. After the system was installed in several major companies, it was discovered that local exchanges were found not to be equipped with the necessary multiplexers to handle Kilostream communications.

FRANCE

PARIS — Matra Informatique, the French aerospace group, has joined forces with the Norwegian minicomputer maker Norsk Data A.S. (ND), to research and develop superminicomputer technology cooperatively. The two companies will be jointly working on new products, including a Cmos large-scale integration version of the ND 500 and a 32-bit workstation based on ND technology. Matra will control a French subsidiary of ND, which will manufacture and market the ND 500 supermini family in France in 1985.

JAPAN

TOKYO — Hitachi, Ltd. has developed a man-machine interface that reportedly can handle handwritten input. According to the vendor, the user writes on the display in much the same way he writes on paper, and the system matches the characters to its character set: 2,300 Kanji, Hiragana and Katakana characters, the English alphabet and numbers. The product is expected to come to market next year.

MEXICO

MEXICO CITY — IBM reportedly intends to open a major personal computer manufacturing facility here. If approved next month by Mexico's National Commission on Foreign Investments, the plan would enable IBM to become the first foreign micro maker to establish business here without giving up a majority interest to a Mexican partner. The Mexican government recently said it would allow a foreign firm to exert majority control in a Mexican company, provided the firm created a significant number of jobs, produced an exportable product and brought new technology to the country.

THE NETHERLANDS

AMSTERDAM — Prices on some 800 IBM software products here will be raised as of Jan. 1, according to IBM Netherlands. The average price hike will be 10%, although prices on some products, including the vendor's Information MVS, the OS/VS version of ACT/Vtam and the Data Base/Data Communication Data Dictionary, will jump 20%. In addition, license fees on VM/SP, VSE/Vsam, CICS under DOS/VSE and Sequel/DS will increase by 15%, an IBM spokesman said.

USSR

MOSCOW — The USSR reportedly has agreed to sell its first-ever supercomputer for export to India, with a delivery date slated for early next year. The only information known about the machine is its $20 million price tag, which places it in the same category as the Cray 2 from Cray Research, Inc.

The machine is thought to be an advanced version of the 200-million-floating-point-operations-per-second (Mflop) parallel processor shown at the Leipzig, East Germany, fair earlier this year. The Soviet supercomputer is understood to perform between 400 and 600 Mflops, sources said.

The supercomputer is said to be part of a larger deal with India, a country with which the U.S. has refused to do high-tech business because of the U.S. belief that the computers will be used for India's nuclear defense program.

WEST GERMANY

MUNICH — At the recent Integrated Telecommunications Congress here, German Postal Telephone and Telegraph (PTT) Minister Christian Schwarz-Schilling presented the PTT's plan for an Integrated Services Digital Network (ISDN).

The scheme calls for an influx of roughly $300 million a year to digitize existing networks by 1988. The German PTT is anticipating between four million and five million participants in its ISDN by 1990.

Forte introduces

TURNAROUND TIME

Larry Long

Q During the last 25 years, I've advanced to a position of MIS responsibility with more than 100 people under me. I enjoy my job and would love to continue to advance within the company. But, there is literally no room.

Given this situation, I released my name to a search firm that got me an interview and a job offer.

Here is the problem. I could stay here and perhaps stagnate in my current position or, if I am promoted, I would most likely end up with about double the responsibility of my current job. If I took the job [offered by the search firm], I would be No. 1 in MIS in a much smaller company. If I leave the company, and if tradition prevails, I would have no opportunity to return to my present company. If I remain in my present position, I may have a one in four chance at the top slot but not in the near future. Any insight would be appreciated.

I could never recommend that someone wait for career opportunities to happen. Fast burners create their own opportunities, then take advantage of them. You could spend the remainder of your career waiting. Do you want a new challenge or do you want to wait?

Q A manager in another department purchased a couple of micros about a year ago, and he has been very successful in applying them to his department's needs. His success has gained a lot visibility for him and his department throughout the company. Their success is the impetus behind a decision to buy 40 microcomputers for distribution to other departments. My department, information systems, has been placed in charge of the evaluation, selection, acquisition and implementation process.

In a recent meeting, many of the managers expressed an interest in purchasing portable micros so they can work at home. Most of them have no experience with desktops micros. Do you think it is advisable to purchase portable rather than desktop micros?

I'm assuming that you are referring to portables, the lap variety, rather than the transportables. I define a transportable as a micro that can be packaged for movement and weighs about 30 lb. Practically speaking, these are a little heavy for frequent movement between home and office.

On the other hand, lap micros are so portable that they invite managers to include them with other briefcase items. Several available lap computers are at least as powerful as most desktop micros. The complaints that I have heard stem from the limitations of the liquid crystal flat panel display.

I would recommend that you select a compatible desktop and portable, detail the trade-offs, demonstrate the use of each and encourage the managers to spend at least an hour interacting with each system. Then, let them make the choice.

Given that your managers understand the trade-offs, I would expect that only those who truly need portability will opt for portable micros.

Q I manage a small customer service group whose primary functions are order entry and responding to customer inquiries. The information for most customer inquiries is not readily available, so we normally call back the next day.

I came to the conclusion that our company is technologically obsolete in DP and is going nowhere, so we decided to order a small computer with six workstations and implement our own system. The system will enable us to be more responsive to our customers. The disadvantage of the proposed system is that it will overlap with existing processing and result in some duplicate data entry, but the benefits seem greater than the costs. Our DP manager thinks we are wasting time and money, yet he [illegible] solution to our problems. Do you [illegible] should wait on DP or proceed with our plans?

Information systems progress is [illegible] necessarily a function of state-of-the-art knowledge. As I talk with successful MIS and user managers, I am becoming more convinced that cooperation and willingness to learn are more important than keeping pace with the technology. Having your own system may be the answer, but before you create an essentially autonomous system, I would reestablish a dialog and an attitude of cooperation with the DP manager. Hopefully, your manager will reciprocate.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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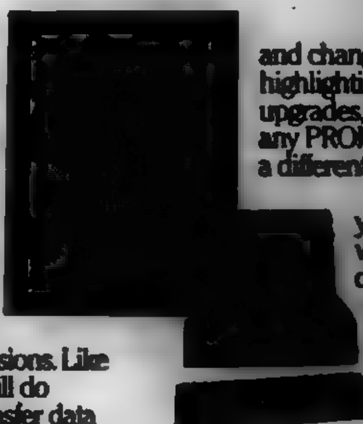

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Micros topic of conference

SAN FRANCISCO — The National Institute for Management Research is sponsoring a three-day conference entitled "Financial Information Systems — Integrating Personal Computers," Jan. 30 to Feb. 1 here. The conference will be held at the Sheraton Palace Hotel.

Registration is $595. For three or more attendees, the fee is $295 for the third and subsequent registrants.

More information is available from the National Institute for Management Research, which is located at P.O. Box 3727, Santa Monica, Calif. 90403.

Knight-Ridder tailors software to its needs

CHARLOTTE, N.C. — The data center staff of a newspaper publishing company here needed no help from reporters to dig up the hard-nosed facts about user access.

When users get on-line access to data through micros, workstations and distributed processing, data processing gets headaches trying to maintain security, according to Mike Presley, software support analyst for Knight Publishing Co.

"When you start supporting all of these tasks," Presley said, "you start exposing your system and data to all sorts of outside influences. This can be a little unnerving to a long-time DP manager. If you have a path to the outside world, you have a security risk. There is no way you can get around that simple fact."

Besides acknowledging this threat from outside on-line access, Knight recognized the possibility of unauthorized inside use. "A programmer can easily access sensitive files, like personnel or payroll, by simply submitting a batch job," according to David Orbaugh, director of Knight's advanced systems division.

When the firm decided to purchase a security system, it chose to pursue security through software rather than hardware, Presley said. The firm found hardware components such as performance monitors and automatic dial-back systems — with their related connect charges — too expensive to buy and maintain. "To obtain the security we needed by going the hardware route would have been prohibitively expensive," he said.

Knight looked for a software package that could protect data from breaches through either its on-line CICS facility or its batch system. "We look upon our data as an important company asset," Orbaugh said. "Any threat to its integrity is a major concern, so it seemed to be inappropriate to invest time and money in a security system that didn't protect both batch and CICS jobs."

Guidelines from a corporate auditor on the protection of resources, data files, batch partitions, programs and other data assets led Orbaugh toward a software security package, CA-Sentinel from Computer Associates International, Inc. "Everything that our corporate auditor had expressed concern about was included in the facilities of CA-Sentinel," Orbaugh said.

He brought the package to the attention of his division, and the division convinced the company's management to purchase the package. "We strongly recommended the system," he said, "because what we had seen up to then only included on-line protection. CA-Sentinel protects the entire system."

The data center at Knight, one of the South's largest publishing companies, is responsible for maintaining all of the company's business information. Knight, which is a subsidiary of Knight-Ridder Newspapers, Inc., publishes two papers, the *Charlotte Observer* and the *Charlotte News*, with a combined weekly circulation of 500,000.

Data center services

Services the data center performs include general accounting jobs along with advertising, marketing, customer service and distribution applications. The center operates two 4M-byte IBM 4341 Model 1 CPUs under DOS/VSE, with CICS/VS as its primary on-line facility. One remote terminal, used by Knight's circulation department, accesses the system.

Presley said CA-Sentinel secures information in one of two ways.

- Through data restraints. When a person attempts to access data, the software looks for identifiers on the recording media that tell the system whether the user is authorized to use the data.
- Through resource restraints. Physical resources such as terminal names and specific batch partitions can be taken off limits during any period of time.

Within these methods, the system administrator can selectively manipulate 18 security mechanisms. The package can restrict access to CICS files, programs, tasks, storage and transient data; can limit DL/1 I/O calls; and can control pseudo batch partitions within an interactive computing and control facility.

Choosing constraints

Using on-line menus that he can call up on a terminal, the system administrator chooses the constraints he wants to implement at any given time, Presley said. "The real beauty of CA-Sentinel is that we can tailor our security measures any way we want. We don't have to secure any more than we want to."

He said a DP shop must consider budgeting its security measures — protecting critical information more than less crucial data — so as to conserve valuable system resources. With the security software package, he said, "We have a nice balance between efficient data throughput and adequate data integrity."

Knight is looking into the possibility of interfacing micros to its system sometime in the future but has no firm plans right now, Orbaugh said.

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Standardization, training unite bank affiliates

TORRANCE, Calif. — When the nation's largest multistate bank holding company, First Interstate Bancorp, formed its data processing subsidiary in 1976, the company had DP facilities in each of its 21 affiliate banks.

"We inherited just about every brand of hardware known to man," said John Riggs, vice-president and corporate training manager of First Interstate Services, the DP affiliate that provided information processing services to the banking offices.

The challenge for First Interstate Services was first to standardize its hardware and software, then to train its users on the equipment. The equipment has since been standardized to IBM, and the DP affiliate has been organized into eight data centers nationwide staffed by 2,000 employees.

"By joining forces, DP services have improved. DP has a lot more leverage with vendors, and we've saved money by pooling resources," Riggs said.

But as DP technology spread through the banking network, DP training needs became more complex. Employees had a range of computer experience, and DP professionals needed to learn business skills. End users needed to learn how to use popular software packages and to access the bank's mainframes from more than 500 IBM Personal Computers.

In January 1983, a training department was formed within the service company's corporate structure, and Riggs went through a career change, crossing from DP to training management. He was charged with developing a companywide technical and nontechnical training program.

Program objectives

Working with senior management, Riggs outlined the following objectives for the training program:

- Offer skills training aimed at the appropriate personnel at the specific time required.
- Establish a comprehensive training resource.
- Provide uniform training to the distributed centers.
- Develop a coordinated approach to computer-based training (CBT).
- Set up a system for analyzing, monitoring and evaluating training.

The resources committed to achieving these objectives included a professional trainer, seven regional training managers, top-notch seminar presenters, skills training and management information courses from Deltak, Inc. of Naperville, Ill., and a $2 million DP training budget.

"Our biggest problem was that we often found ourselves reinventing the wheel in each regional center," Riggs said. "The quantity and quality of training varied. We needed a companywide training plan, a basic framework within which each center could work, with allowances for individual center needs and priorities."

Training needs are now identified at each regional data center. The program consists of in-house training for first-line supervisors, middle management, project management and end users; Deltak's video-based, self-paced technical and nontechnical training and its CBT for micros and mainframes; vendor-conducted hardware and software training; company-sponsored training; and outside seminars.

Technical skills training

Because the data centers are geographically dispersed and employees' needs so diverse, the technical skills training program was built around video- and computer-based training courses from Deltak. Deltak courses address a broad range of DP subjects such as MVS/SP JCL; command-level language for IBM's CICS; and Information Builders, Inc.'s Focus, a fourth-generation applications programming language.

"The main strength of Deltak's courses is that they can be delivered on-site; you don't have to take people away from their jobs," Riggs said. "As a result, we can offer ongoing technical training to our staff whenever it needs it."

As microcomputer use spread throughout the banks, end-user training became a high priority. End-user computing services and training are provided through information centers associated with four of the regional DP offices.

Infofast, the first and largest First Interstate Services information center, is located in Los Angeles. It serves more than 700 users, primarily from the First Interstate Bank of California and the corporate holding company.

For the future, more emphasis is being placed on CBT. "We track the expense of training, but we don't track the cost of time away from the job required to complete training programs. As we become more sensitive to this, we'll use more CBT," Riggs said.

The bank is also considering a technology training program for senior management. This program would focus on DP management, strategy and technology. It would also address potential upper-level-manager-reluctance to becoming part-time DP students.

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Restaurants eliminate paperwork, lessen errors

ATLANTA, Ga. — When Arby's Inc. wanted to put the bite on errors and improve efficiency in its system of collecting payroll data, it turned to the use of small terminals with attached acoustic couplers.

The terminals, each measuring five by three inches and weighing about half a pound, allow the managers of each Arby's restaurant to send what would otherwise be a mouthful of data — their weekly payroll information — to the corporation's IBM System 38 mainframe here at the firm's headquarters.

The system, in use since January 1983, has replaced verbal reports, which had once occupied 20 operators at a service bureau, the corporation's former payroll processing site. "We ended up with a 25% error rate with people transposing figures" under the previous system, recalled Bill Needham, manager of Arby's point-of-sale system.

The terminals are part of a data collection system called Toes, from Interface Technology, Inc. Each week, they are used to upload payroll information to an IBM Series/1 minicomputer, which creates data files and passes them on to the mainframe for later processing. Needham said Arby's was largely pleased with the terminals, called Port-a-Store units, though he found them "very sensitive to telephone line problems" and would like them to come equipped with automatic shut-off switches.

Without the auto-off switch, Needham said, managers are likely to leave the unit on accidentally. "We get eight to ten calls a week saying 'what's wrong with it,' and the battery is usually dead," he said.

The terminals allow restaurant managers to enter payroll data (employee number, rate code, hours worked) into the Port-A-Store at their convenience, check it for accuracy, correct mistakes and add or delete lines. When the manager is sure the data is accurate, he calls the Toes computer at Arby's headquarters. An electronic voice answers with, "Hello, this is Arby-Net, please enter unit number and security code."

The manager positions the terminal to the first line, attaches it to the telephone mouthpiece and presses the transmit button. The terminal transmits the unit number and security code using Touch-Tone signals and the computer checks the code and prompts the manager for the next information.

The Toes voice repeats each entry before it prompts for the next line so the manager can check for accuracy. It also reportedly informs the manager of any errors and allows him to cancel lines and make any changes before they sign off.

The benefits of the Toes system have included a reduction of three or four minutes in the amount of time managers spend transmitting the payroll data — it had taken them as much as a half hour previously — and a reduction in errors, Needham said. In addition, the Arby's MIS department reportedly can generate a report showing which restaurants have not yet entered payroll data for the current period. This is said to expedite the collection of late reports and promote efficient closing of the pay period. The number of calls made by each restaurant and the time spent on each call can also be monitored, enabling problems to be isolated quickly.

In December 1983, Arby's added coupon sales and product sales reports to the Toes system. These reporting applications give Arby's the latest sales information. Each coupon promotion can be evaluated almost immediately from coupon sales reports, whereas before it took several weeks to gather information, compile it and then analyze the effectiveness of each promotion.

General DataComm
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Supplier boosts output with electronic printer

WICKLIFFE, Ohio — Two years after it switched to an electronic printing system, Bailey Controls Co., a process industry supplier based here, found it was saving $64,000 in paper and printing costs annually. It is also getting more printing done and getting it done faster, according to DP operations manager Leonard Bruno.

One of the biggest cost savings for Bailey, Bruno said, was derived from the 9700 printer's ability to print in duplex, using both sides of a sheet of paper. "We figure we save between $2,500 and $3,000 each month in paper costs alone, simply by printing in duplex," explains Bruno. "Our original goal was to print 75% of our output in duplex. Now, it's been so successful that we're at about 90% duplex printing."

Bailey's savings in paper costs, however, were not due entirely to the acquisition of the new printer, Bruno noted, but also occurred because of the firm's war on paper waste — which saved it $42,000 and cut paper use by 20%. The firm designs, manufactures and markets high-technology instrumentation and control systems.

Prior to leasing the Xerox Corp. 9700 electronic printer, Bailey's NAS 6650 computer, running under an MVS 3.8 operating system, was generating some 1.5 million pages of output every month, supplying the company with documents ranging from proposals for customers to time-critical daily inventory and order processing reports for manufacturing, according to Bruno.

To keep up with the heavy demand, Bruno said, two Xerox 1200 series nonimpact printers ran almost around the clock, and overtime costs averaged $500 per month.

The 9700 printer handles between 500 and 600 jobs daily, Bruno said, and has allowed the firm to increase its accuracy in meeting printing schedules from a little over 99% to 99.8% — with less than 2% downtime. "It used to take us two whole shifts to print all our reports," Bruno noted. "With the 9700 printer, we finish in plenty of time, and we can get more out if necessary. If we run into a problem, the speed of the 9700 allows us to recover and still meet our deadline."

The company runs the 9700 printer on-line, printing on plain 8½- by 11-in. paper at up to 120 pages per minute.

The computer-controlled printer uses xerographic printing, under which a laser beam creates images on a photoreceptor belt and the images are transferred to paper. The 9700 prints numbers, text, logos and forms.

Bailey's printing manpower requirements have also been reduced, saving $23,000 yearly, Bruno said.

Now, he said, only one operator is needed to monitor the laser printer during its heaviest use, and less operator handling is required because reloading toner and developer is easier, and "fixing the jam . . . is twice as fast because the machine tells you exactly where to look."

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Tool aids firm's DOS-to-MVS conversion

SOUTH BRUNSWICK, N.J. — When business operations at Dow Jones & Co.'s Computer Service Facility were reaching peak load last year, the company decided to change operating systems, hoping to streamline maintenence. But managing the conversion was not an easy task.

In 20 years, Dow Jones has gone from using batch systems running on the backup computer for a typesetting/message-switching system to an on-line system using approximately 300 terminals in 23 locations operating on three IBM 4331 Model Group 2 machines under DOS/VSE.

Handling a data storage increase of approximately 25% a year, in January 1983, the Computer Service Facility business staff consisted of 30 programmers, 22 operations people running three shifts 24 hours a day and 12 technical services people. With more than 25 systems and approximately 2,000 programs, the group was using 84 volumes of data, each with a capacity for storing 317 million characters. The site was rapidly becoming a large and complex environment requiring many DOS/VSE systems.

"It was time to stop and reevaluate our environment," said Jim Golis, systems project leader. "We were on the verge of becoming bogged down in sheer complexity. A conversion to MVS was a sensible alternative."

With that in mind, in January 1983, a project team representing the business areas of the Computer Service Facility was formed to research the possibility of converting from DOS to MVS. By spring, the group presented a conversion proposal to management.

The proposal included an inventory and evaluation of the current system environment, company growth projections, a detailed report on the business system, an implementation plan and breakdown of responsibilities throughout the conversion, estimated costs and cost justification. In June, the project team got the go-ahead.

An effective conversion tool

"One of the first things we knew we needed was an effective conversion tool for both JCL and Cobol source code," Golis stated. After examining the marketplace, Golis chose three systems to evaluate — IBM's conversion aids, Uccel Corp.'s Duo and Focus and a product developed by Arkay Computer, Inc. of Newton Centre, Mass. Arkay Computer was recently acquired by Computer Associates International, Inc., and Focus is now marketed under the name CA-Convertor.

Golis established a list of the requirements he expected to be filled by a conversion tool. "First of all, you want the conversion tool to do as much of the work as possible," Golis explained. "Conversions require minute attention to detail. . . . To experience hands-on training, you want your programmers to be involved in the process, but you have to reduce the amount of repetitious work and keep them challenged and motivated.

"Next," he added, "the conversion tool has to reflect and interface with your software and methodologies. Dow Jones has a mix of software products from a variety of vendors. You need a tool that will be compatible and function with the code of all those vendors. In addition, the package must be compatible with the standards and naming conventions at your site.

"The conversion package should also be able to monitor the conversion process," Golis continued. "It should report on progress — what has been converted and what has not. It should provide an inventory and cross-reference information on files, programs and jobs."

Maintenence, ease of installation and documentation as well as cost were also considered. Golis then set up a table and evaluated each of the three products on a scale of one to 10.

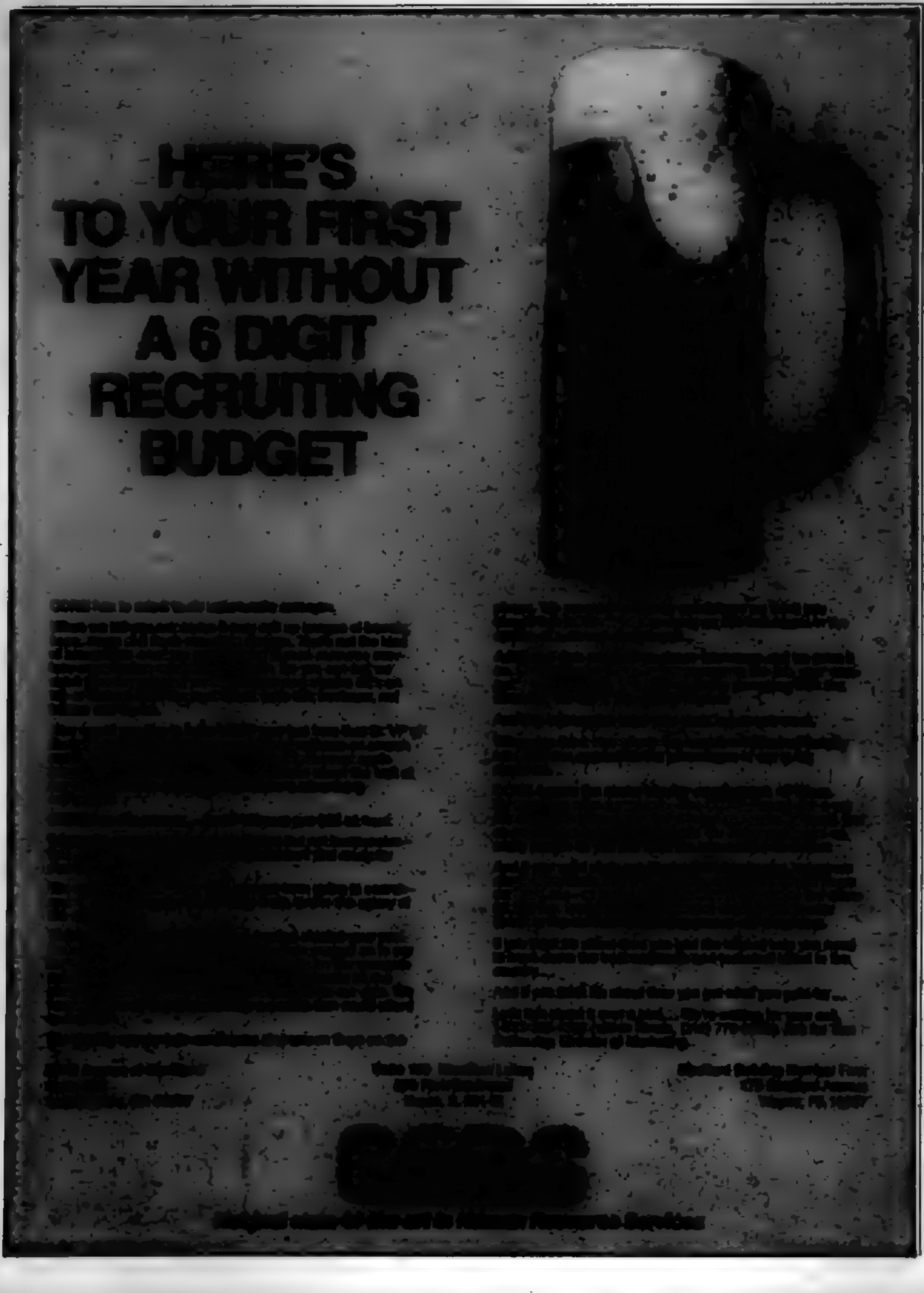
"CA-Convertor was the clear leader," Golis said. "It does the majority of work for us, and only exceptions are handled on a manual basis. This helps in the training process, for example, and also allows our staff to become actively involved at a non-tedious level. CA-Convertor reads the DOS source code, gives us a list of the OS code and creates an OS member directly in our source statement library.

"If there are exceptions, CA-Convertor shows us the lines of code [and] indicates what it did to correct them. We review the correction, and 95% of the time, it will compile."

Dow Jones' Computer Service Facility runs the conversion software during the day "just like another job," Golis said. "I would say it's the equivalent of about a quarter of a compile in runtime," he added.

CA-Convertor has interfaced with the vendor-supplied software at Dow Jones, according to Golis. "It has also helped us maintain our standards. With CA-Convertor, we provide the unit names we're using and the [direct-access storage device] information, and it sets up the space characteristics we want. It also sets up the OS data set names according to standards. If we were doing the

See CONVERT page 55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Accounting system aids firm's vendor payments

TORONTO — A corporation with 20 operating companies and a booming business cannot afford to stick to outdated methods of paying vendors.

Rogers Cablesystems, Inc., headquartered in Toronto, is a multiple cable system operator that serves nearly two million subscribers in Canada and the U.S. Until 1982, Rogers processed 2,500 invoices a month — payments from its 20 operating companies to more than 63,000 vendors — on an internally developed batch system, said Bruce McBurnie, manager of applications support.

In 1980, corporate executives decided to shop for an accounts payable software package that would allow all of its divisions to enter their data on-line, McBurnie said. The executives also wanted better control of charges to account numbers, he said. Major enhancements to the existing batch system were ruled out, since they would cost more than buying a new accounts payable package, he added.

Rogers selected the MSA Accounts Payable System from Management Science America, Inc. of Atlanta and had the system up and running by January 1983, according to McBurnie. Similar packages that the company looked at were not offered on-line at the time or were not on the market long enough to have been proven effective, he said.

The company now has one central processing location in Toronto for the Accounts Payable System that runs on two IBM 4381 computers under IBM's DOS/VSE operating system. The operating companies in Canada and the U.S. communicate via dedicated lines using IBM's 3278 remote terminals, McBurnie said.

Easier to spot problems

The new system has made the accounts payable process much more efficient, according to McBurnie. It is easier to spot problems and fix them immediately, he said. Vendors who call for information can get it quickly, instead of being put on hold while people search through file cabinets, he added.

All divisional reports go back through remote spooling and print at the remote location, McBurnie said. Many of the system's criteria have been standardized for all Rogers divisions by the corporate managers, he said. Options, however, are at the discretion of each division's management.

Many divisions use the system's recurring invoice feature for standard payments, McBurnie said. Once a contractual payment has been entered into the system, the computer takes over, eliminating the need for manual entry every month, he said.

Rogers' Toronto division sets up automatic payment dates and discount dates with terms of 2%, 10 days; net 30, McBurnie said. If the invoice clears the internal approval process on time, the system takes the discount automatically, he added.

Pauline Vancott, supervisor of accounts payable for Rogers' largest cable division, said, "If an error occurs, it flashes on the screen as we're working, and we can balance it immediately on-line." Some of the operating companies were using manual procedures before, and the new system saves hours of work at month-end, according to Vancott.

CONVERT

from page 54

conversion manually, we would be faced with a collage of different styles of coding from the various members of the conversion team. Now we're getting good, consistent code that reflects our standards."

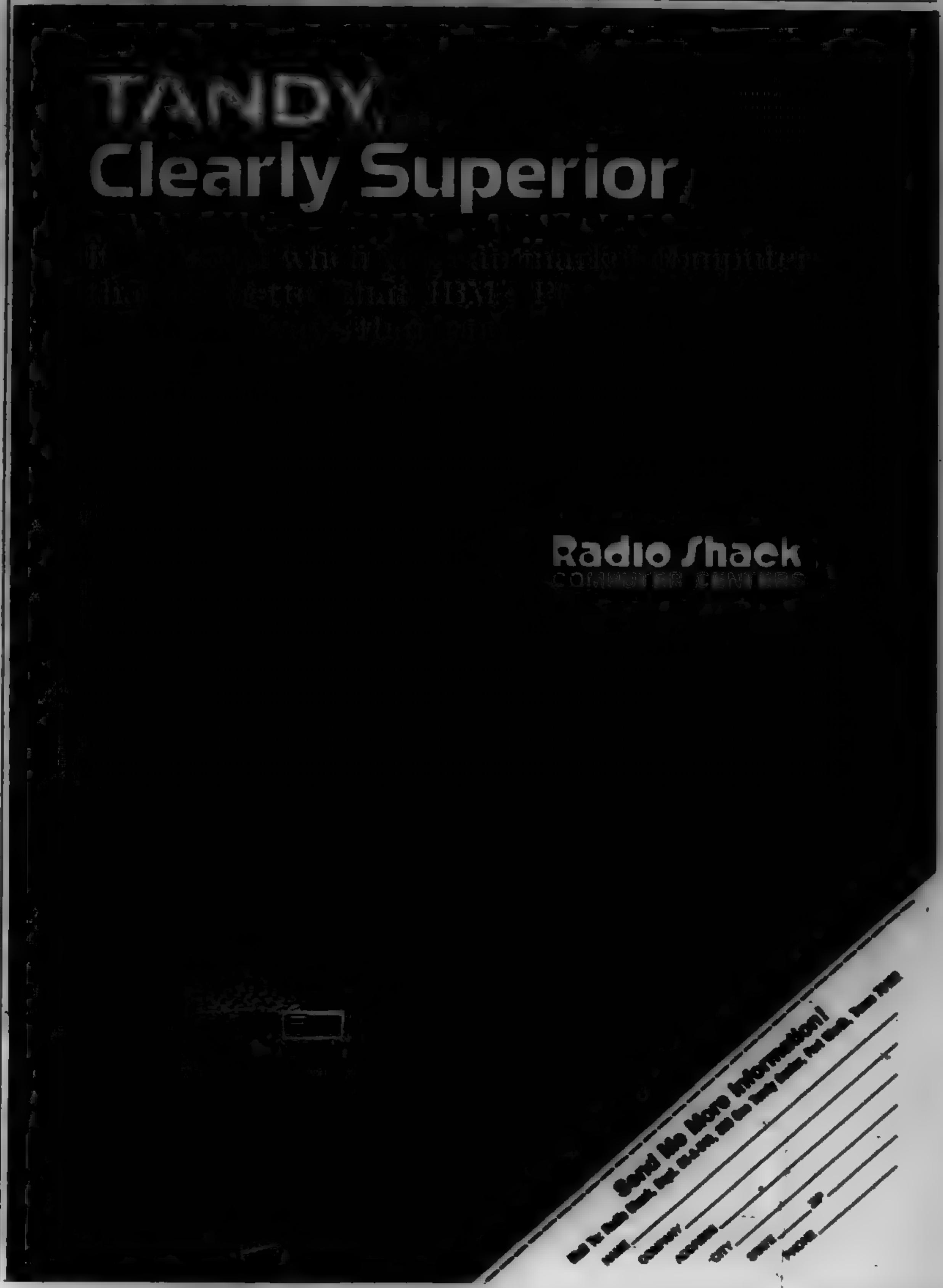
A conversion manager, the monitoring component of CA-Converter, has helped Golis stay apprised of the progress of the project. Instead of talking individually to each member of the team, he can go to the conversion manager for a report of what has been converted and what still has to be done.

According to Golis, keeping management and the end users informed is one of the keys to a successful conversion. He holds weekly meetings with the conversion team and publishes the minutes of those meetings. He documents the results of the conversion for his end users.

For instance, Golis explained, "We ran a billing run for one of our systems which used to take 17 hours in DOS. It now takes less than eight hours. Visible results like this and the faster CICS response time have helped us get the maximum amount of cooperation from our users when we've had to freeze a system."

After management had approved the project and at the same time evaluated the conversion tools, Dow Jones installed a complete MVS system on an IBM 4341 to get the project under way. A conversion plan was also established by application and schedule dates.

"A DOS-to-MVS conversion has to be delicately orchestrated," Golis explained. "Here at Dow Jones, we were faced with 2,000 programs and 2 million lines of code to convert. One year into the project with the help of CA-Convertor, we are still on schedule in both time and cost areas."



CALENDAR

WEEK OF DEC. 2

DECEMBER 3-4, TULSA, OKLA. — **Managing Information Centers Effectively.** Contact: Thomas J. Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-4, HARTFORD, CONN. — **IMS/VS Data Communications Programming.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-4, TIMONIUM, MD. — **Construction Cost Estimating and Control.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 3-4, SAN JOSE, CALIF. — **Operating Systems: A Comparative Analysis.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 3-4, COLUMBIA, MD. — **Local-Area Networks.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 3-4, NEW YORK — **Successful Integration of Micro and Mainframe: The System Architecture.** Contact: Grumman Data Systems Institute, Center for Professional Development, 250 Crossways Park Drive, Woodbury, N.Y. 11797.

DECEMBER 3-4, CHICAGO — **Local-Area Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 3-4, ORLANDO, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 3-4, WASHINGTON, D.C. — **Personal Computer Communication Systems.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

DECEMBER 3-4, FORT LAUDERDALE, FLA. — **Discovering Lotus 1-2-3.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 3-5, BOSTON — **Controlling Software Projects.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

DECEMBER 3-5, NEW YORK — **Backup Network Planning.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

DECEMBER 3-5, SAN FRANCISCO — **Data Base: A Manager's Guide.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

DECEMBER 3-5, WASHINGTON, D.C. — **Telecommunications Alternatives in the '80s.** Contact: Continuing Engineering Education, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

DECEMBER 3-5, WASHINGTON, D.C. — **Relational Data Base.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

DECEMBER 3-5, CHARLOTTE, N.C. — **Systems Project Management.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-5, WASHINGTON, D.C. — **National Conference on Government ADP and Telecommunication Acquisition Management.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

DECEMBER 3-5, NEW YORK — **EDP Disaster Recovery Seminar.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

DECEMBER 3-5, BOSTON — **Conference on Control, Audit & Security of Digital Equipment Corp. Systems.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

DECEMBER 3-5, ORLANDO, FLA. — **ADS/On-Line Workshop.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 3-6, PORTLAND, ORE. — **Structured Analysis and Systems Architecture Seminar/Workshop.** Contact: Jane Crosswhite, Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

DECEMBER 3-7, ORLAN-

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DECEMBER 3-7, ORLANDO, FLA. — **Managerial Tools for Decision Making.** Contact: West Virginia University Research and Training Center, Suite E, 1 Dunbar Plaza, Dunbar, W. Va. 25064.

DECEMBER 3-7, HARTFORD, CONN. — **ANS Cobol Coding Techniques and File Applications II.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-7, DALLAS — **Marketing and Employer Development.** Contact: West Virginia University Research and Training Center, Suite E, 1 Dunbar Plaza, Dunbar, W. Va. 25064.

DECEMBER 3-7, HARTFORD, CONN. — **OS/VS Job Control Language & Utilities.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-7, CHICAGO — **CICS Macro-Level Programming.** Contact: David Shapiro, Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

DECEMBER 3-7, HARTFORD, CONN. — **Systems Analysis & Design Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-7, ST. LOUIS — **SMP Maintenance.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

DECEMBER 3-7, TORONTO — **Basic Systems Analysis.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-7, MAUI, HAWAII — **C Programming Workshop.** Contact: Suzanne Battista, Course Manager, Plum Hall, Inc., 1 Spruce Ave., Cardiff, N.J. 08232.

DECEMBER 3-7, DES MOINES, IOWA — **Advanced Systems Analysis.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-14, PARSIPPANY, N.J. — **ANS Cobol.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

DECEMBER 4-6, SADDLEBROOK, N.J. — **Selecting a Local-Area Network.** Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, [redacted]

DECEMBER 4-6, LONDON — **Eighth International Online Information Meeting.** Contact: Jean Mulligan, Learned Information Ltd., Besselsleigh Road, Abingdon, Oxford, England OX13-6LG.

[redacted] INGTON, D.C. — **Microcomputer Data Base Management Systems.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

DECEMBER 4-7, LOS ANGELES — **Digital Image Processing.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45406, 6305 Arizona Place, Los Angeles, Calif. 90045.

DECEMBER 4-7, WASHINGTON, D.C. — **The 1984 Videodisk, Optical Disk, Compact Disk Conference and Exposition.** Contact: Mark Roseman, Meckler Communications, 11 Ferry Lane W., Westport, Conn. 06880.

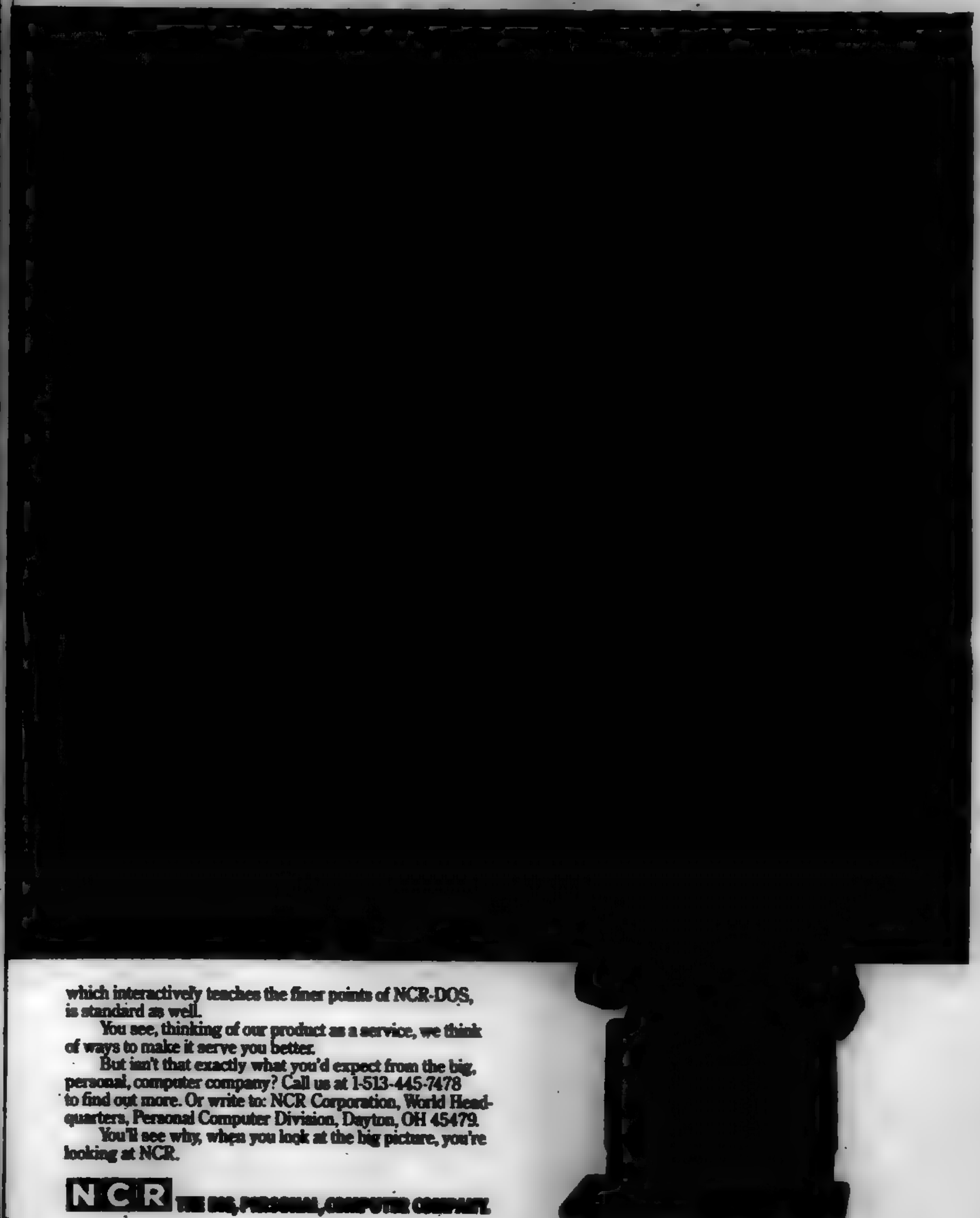
DECEMBER 5, COLUMBIA, MD. — **Tax Reduction Institute Seminar.** Contact: Center for Management Development, University of Maryland, College Park, Md. [redacted]

DECEMBER 5-6, WASHINGTON, D.C. — **Contemporary Telecommunications Management: Trials and Tribulations of Telecommunicating in Year 1 A.D.** Contact: Marilyn Chasteen, The DMW Group, 2020 Hogback Road, Ann Arbor, Mich. 48104.

DECEMBER 5-7, BOSTON — **Office Automation and the Technology Revolution.** Contact: Data-Tech Institute, P.O. Box 569, 336 Franklin Ave., Nutley, N.J. 07110.

[redacted] INGTON, D.C. — **Decision Support Systems on Personal Computers.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 5-7, DENVER — **The First Conference on Artificial Intelligence Applications.** Contact: Institute of Electrical and Electronics Engineers, P.O. Box 639, Silver Spring, Md. 20901.



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EDITORIAL

Managing productivity

Imagine, if you can, working days and evenings, with a few weekends thrown in for good measure, on a project that demands the utmost of your creativity and ingenuity.

The project becomes all consuming, as original deadlines, set months before, loom increasingly unrealistically. Unforeseen glitches render portions of your work unusable, while other portions need wholesale redoing. Meanwhile, your family begins to feel the strain of your chronic absence from home. Suddenly, nothing in your life is going right.

Then, as the project finally nears completion, your boss informs you that your labors will never bear fruit — the project is to be scrapped. What's more, you and the other members of the project development team must set to work immediately on a new design plan, whose future is no more guaranteed than that of the one just thrown out the window.

Sound familiar? It is, hauntingly so, to scores of programmers. And to add insult to injury, the programmers are often the objects of blame for wasteful development projects, when the real culprit, as often as not, is poor planning at a higher level.

That a certain number of software development projects will encounter cost overruns, massive delays and millions of dollars in misspent corporate resources is to be expected, given the nature of the work.

But what is disturbing is the apparent frequency of such wasteful endeavors — and their attendant costs. According to a recent survey of 300 Fortune 1,000 corporations (see page 14), one in four large system (64,000-plus lines of code) development projects now underway will be canceled. Three quarters of them will experience serious operational difficulties. The survey found further that a typical large system project today runs more than a year behind schedule and, if completed, will cost twice the original estimate.

These survey findings mirrored another recent study of programming in the corporate environment [CW, Nov. 12], a study that described programming as "labor intensive, difficult to manage, expensive and often leading to a product that is functionally deficient, unreliable and difficult to maintain." This study also labeled programmers as "not highly professional," and programming "more like a craft than a profession."

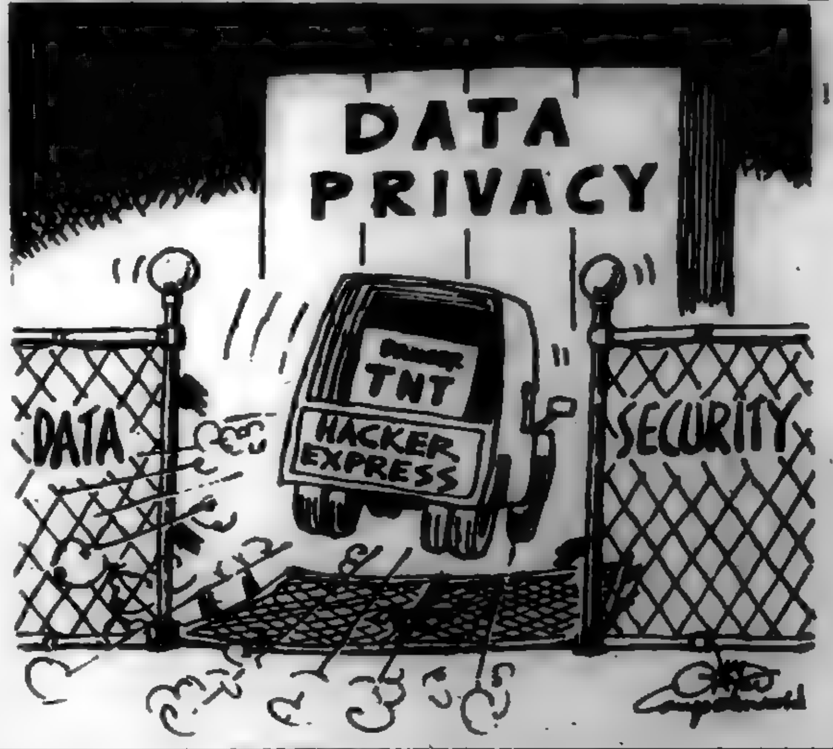
Alas, the poor programmers.They do what they are told with the tools given to them by management which hands them the project blueprint and says, "Now go and do it."

While the good news is that certain forces are at work mitigating the programmer productivity problem, DP management must heighten its awareness of what it can do to hasten the process.

■ *Hire the best.* The days of rampant programmer turnover have ended, for now anyway, so there's no good reason to hire relatively inexperienced programmers for complicated tasks. Let the newcomers cut their teeth on simpler tasks, or where they can be highly supervised.

■ *Take the lead in fostering software development methodologies designed to control costs and anticipate problems as early as possible in the development cycle.* This effort should be supported by serious testing of portions of the project early on.

■ *Wherever possible, develop libraries of reusable code.* While some argue that too much standardization in software development can stifle innovation, it appears most shops have a way to go before reaching this stage.



LETTER

A clear case for documentation

The article "Documentation: The Time-Saver" [CW, Nov. 5] is interesting, and it makes some important points. However, it should have mentioned something about the need to have documentation organized in a contemporary style.

This is the age of high tech, where information is transmitted quickly. But documentation writers are dishing out instructions as if their audiences were pounding on a Royal Underwood.

Procedures tend to be written without regard to format or readability. Often, instructional documentation contains related information that is not pertinent. To end users, it all comes across like alphabet soup. Then [the users] must waste time [sifting] through it, trying to find what appropriate action to take. Bits and pieces of related information are excessive noise and can be cross-referenced to another section — perhaps overview — or background. Presenting the important information first, in a quick, easy to read, logical order will [promote] fast, efficient performance.

Documentation has to be presented clearly and precisely. Instructions that are easy to read and follow will save time. If documentation layout is properly presented, it will lead to quicker comprehension and faster action. This may seem like an incidental matter; but it's this and the other incidentals that put food on the table.

Timothy J. Lair
Spokane, Wash.

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VIEWPOINT

Managing the data center crisis

THE DATA CENTER
John P. Murray

An unfortunate situation that arises in data centers is associated with the introduction of new application systems or substantial changes to existing systems that degenerate into chaos.

The scenario is often the same. The new system is intended to provide substantial benefits to the organization, improve customer service and reduce costs.

For awhile, until the stress testing — if stress testing is used — or worse yet, the production stage is reached, all will appear to be going well.

But suddenly, the new system turns into a monster that threatens to destroy the data center operation and, in some cases, the entire organization.

Out of control

What now appears is a system that has consumed all available hardware resources. The system is out of control, has disrupted the entire work flow of the data center, destroyed the data center's client service levels and is creating an increasingly difficult situation.

Such situations do arise. They bring with them turmoil, finger pointing, unrest, anger and, eventually, senior management involvement on a rather intense level. Such situations can and should be avoided. Avoidance requires strong data center management, sound control and discipline.

Once into such a situation, it is common to attempt to fix, or avoid, blame for the current state of affairs. Often an attempt will be made to analyze the causes of the difficulty, to philosophize about "how we came to this."

These are exactly the wrong approaches at that time. Consideration of these aspects is appropriate, even necessary, but at some later date, not at the crisis time.

The key issue, once into a crisis, is to gain control, to stop the bleeding. Time and effort expended on anything other than containing and correcting the immediate crisis is simply wasted.

The key issue, once into a crisis, is to gain control, to stop the bleeding. Time and effort expended on anything other than containing and correcting the immediate crisis is simply wasted.

The tendency to panic, to resort quickly to whatever appears to offer some assistance, must also be avoided. The first step must be to make a calm, factual appraisal of the situation.

Ask yourself the following

Ask yourself the following questions. What specific programs are causing the problem? Are poor programs the only problem? Is the client and operations documentation also at fault? Are the system controls that are in place correct and adequate?

A common cause of difficulty in such a circumstance are untested or inadequately tested programs. These should be identified and an immediate effort mounted to correct those programs that are causing the difficulty.

The data center management must take a strong position in this effort. Changes to these programs must be carefully tested. They must work correctly and more effectively than those they are to replace, or they should be rejected.

It is often the case that the "nice person" syndrome is in effect in the data center. This often compounds the problem. Adopting a pattern of accepting untested, or not carefully tested, programs in an attempt to avoid hurting someone's feelings or creating conflict is not going to help anyone.

The goal of data center management in the case of an application system crisis must be, number one, to keep things from becoming worse, and number two, to build appropriate controls to move steadily toward making things better.

Swift and decisive action

Someone, obviously not the original project leader, should be selected to manage the way out of the crisis. That person should have absolute authority and control in order to be able to act swiftly and decisively. Clearly, this must be someone who is strong and not afraid to take the required action. Such action will likely bruise some egos.

This is particularly true if consultants have played a role in bringing the organization to such a state. Be that as it may, there is no time, given the circumstances, to consider anything other than the achievement of the required results.

These situations often have an insidious aspect. They seem to arise almost from nowhere, and in a very short time they reach disaster status. Data center management must work to develop appropriate controls that will effectively sound early warnings, which can be used to alert everyone to the potential for disaster. When those controls are in place, they must be relied upon and used by data center management.

Sound the alarm

Sounding the alarm does place the person raising the issue in an uncomfortable position, particularly in a situation where a great deal is riding on the new project and where considerable time and expense have been devoted to the project.

If outside assistance, such as consultants, is involved, the situation becomes more difficult, because these people will have a need to protect their positions.

However, the data center manager is remiss if, when it becomes clear that difficulty looms, nothing is done to correct the situation.

Crisis can be avoided. What is required is the ability to see it coming and the willingness to do whatever is required to correct the situation. Discipline, firmness and control are the watchwords in these situations.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Software fads: Costly waste or valuable resource?

HUMAN CONNECTION
Jack Stone

There is an unfortunate side effect from the heavy sales promotion of the new multifunctional superintegrated programs for personal computers in the corporate arena — also known as Lotus Development Corp.'s Symphony and Framework — that is becoming chronic.

Such marketing efforts inadvertently, but inevitably lead to the creation of yet another fad, and the subsequent forcing of one more instance of what I term the "maelstrom effect" on the part of the personal-computer-obsessed users, especially managers and executives. This situation evolves when users, however guileless, are swept up into a whirlpool of enthusiasm for the latest and greatest personal computer technology, virtually irrespective of knowledge or need, fervently believing that without it, they will not reach the quintessential zenith of their productivity potential. This results in a soaring demand for expensive software — one copy per system if the license specifications are adhered to — and more personal computer power including hardware add-ons, training and ongoing systems support. The end results? In a number of cases, dollars are wasted and, even more important, the efforts of scarce technical talent are dribbled away in providing ongoing support.

Now then, along with everybody else in the business, I am a devout believer in the expanding of computing capability when the need exists. But when the costs in terms of systems outlay and follow-on support become extravagantly large relative to computing gains, then the procurement brakes should be applied and the maelstrom attenuated until saner heads can prevail.

The good old days

Let's take a look at a few numbers to make the point. We will first harken back to those good old personal computer days of yesteryear, days of 64K bytes of random-access memory (RAM) and twin 160K-byte floppy disk drives — which, lest we forget, continue to do a journeyman's job for a very large population of users. The move into the realm of Lotus' 1-2-3, for example, typically requires an upgrade to 256K-byte RAM (or equivalent RAM/read-only memory combinations) plus twin 320K-byte drives. Add up the cost of software and hardware increments, and one is staring at a bill of around $1,000 per system. If we toss in the extras of training and ongoing systems support, something on the order of a $2,000 investment per single-user machine — double the hardware/software costs — is not overstating the situation. Now, if we take as a model an organization with a hundred machines installed — all candidates for upgrading — the final tally approaches a ballpark estimate of $200,000.

Now let's start with that number as a base, and take a look at the Symphony upgrade. One can perhaps sneak by with a 512K-byte RAM and the same disk drives, but I don't think that configuration is realistic, and even if it were implemented, I think that users would shortly come back to the negotiating table, demanding 640K-byte RAM and a hard disk. This latter upgrade plus software comes in at about $2,000 per machine, and, if we add in the same amount as above for training and support, we arrive at a rough estimate of a $4,000 investment per single-user machine. For the hundred-machine organization, the price tag for the upgrade from Lotus's 1-2-3 to Symphony is a whopping $400,000.

I am not suggesting that the superintegrated programs are not of great utility for business users. What I am saying is that decision makers have to discriminate legitimate need from opportunistic fadism before committing a company — and its hard-earned cash reserves — to an applications programming system of this complexity and expense. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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VIEWPOINT

Micro standards in, innovation out

READER'S PLATFORM
Ira H. Krakow

The era of standard microcomputer hardware and software has arrived. Hardware and software selection has been reduced to the ritual of brand name recognition. Vendors have concentrated on high-budget advertising and slick packaging, instead of on product quality and user needs. The result is that today an innovative product without a multimillion dollar marketing budget is doomed to failure. A mediocre product with a multimillion dollar budget may succeed if the competition is not IBM or AT&T, both of which sport multibillion dollar budgets.

Suppose you've been given a four-month project of recommending microcomputer hardware and software for your company. Your boss has told you to determine user requirements, research the market for the latest products and perform a cost-benefit study to determine which configuration is best. Do you need to do all this? No. Do the following:

- Spend an hour browsing through any of 100 computer magazines. Be sure the paper is sufficiently glossy and the cover story is something like "Morticians Use Micros to Cut Embalming Costs." Try to read an article. Note that the first page (which consists of one column of the article and three columns of advertising copy), is followed by 15 pages of advertisements.
- Strike up a conversation at the water cooler with secretaries. Ask them what the label on the word processor says.
- Your research done, pick from this list of products:

Microcomputer. Anything with the IBM Personal Computer logo on it.

Disk drives. Get a 10M-byte hard disk. If your budget allows, any multiple of 10M bytes will fill the bill.

Memory. Pick a number — divisible by 64 — between 256 and 640.

Integrated spreadsheet. Buy Lotus Development Corp.'s 1-2-3.

Database management software. Ashton-Tate's Dbase III should do.

Word processing package. If a secretary said Wang in response to your question, choose Multimate. Otherwise, choose Wordstar.

- Take a well-deserved four-month vacation in the Bahamas.

This scenario, while tongue-in-cheek, is uncomfortably close to the truth. The much-publicized shakeout in the microcomputer industry has affected all of its components. There is a glut not only of IBM [Personal Computer-compatible] computers, but also of spreadsheets, data base management systems, word processing packages, diskette drives, hard disks, add-on boards, computer books and magazines.

The result of this glut and uncertainty has been a retreat to brand name loyalty and a low tolerance for new ideas. This is understandable. A product that has been around for a while and has a substantial user base is probably relatively bug-free. The vendor (particularly if it's IBM) stands a better chance of sticking around.

Even well-established vendors with big advertising budgets, such as Lotus and Ashton-Tate, have had problems convincing the marketplace to accept the idea of all-in-one integrated software, as embodied in Symphony and Framework.

What chance does an innovative microcomputer product have nowadays? Regrettably, a very small one. Microcomputer standardization has become a barrier to creativity. ‡

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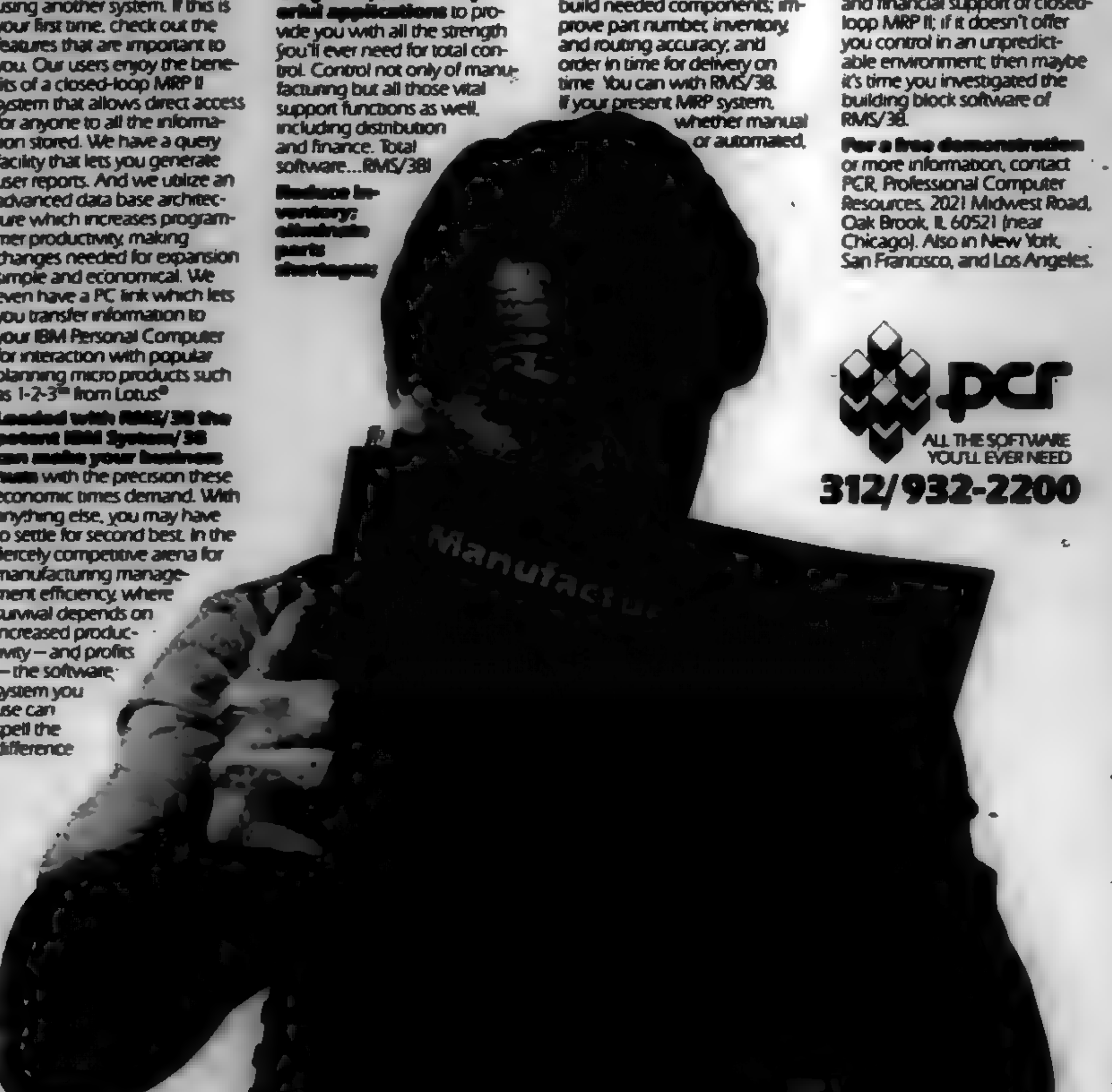

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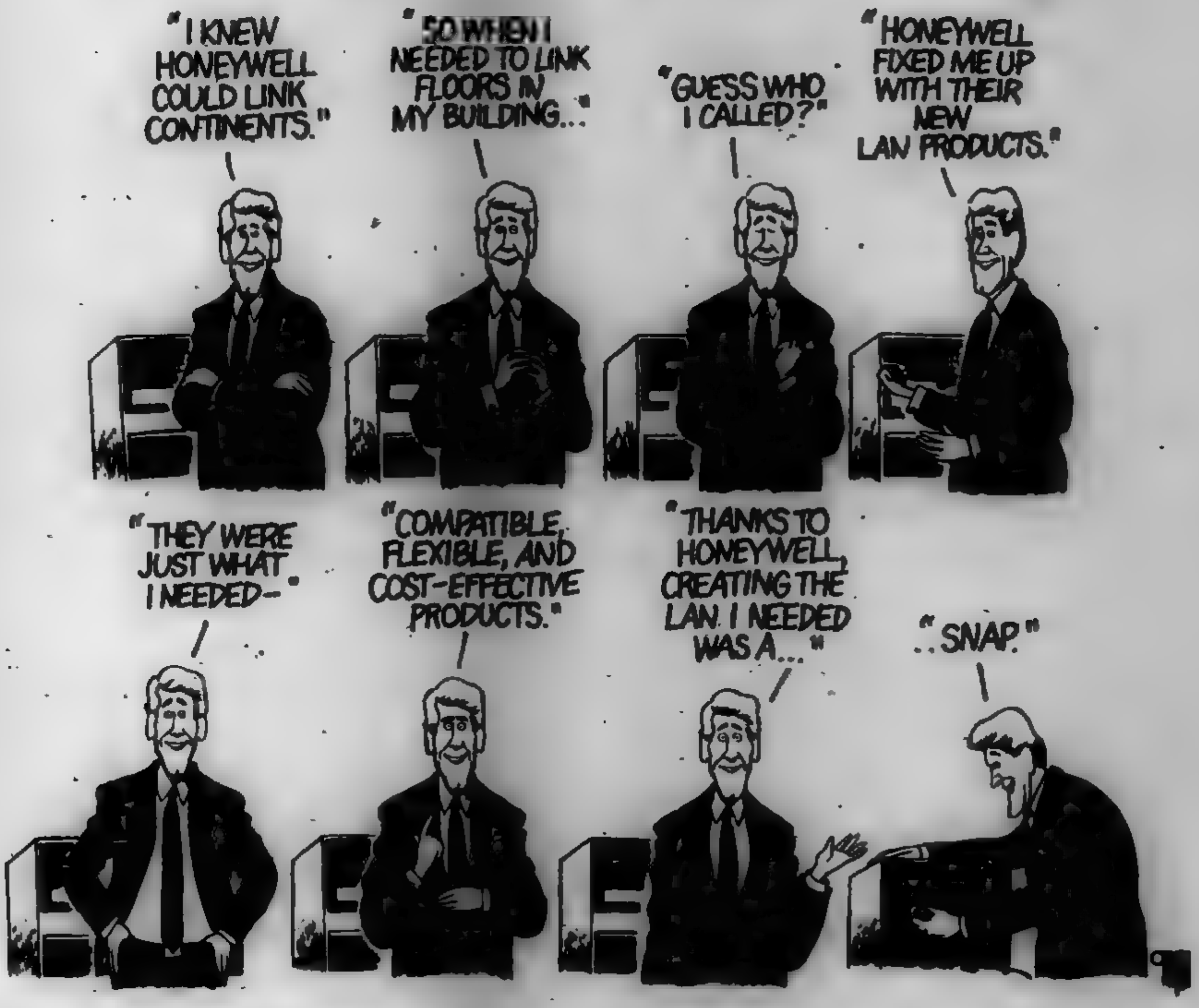
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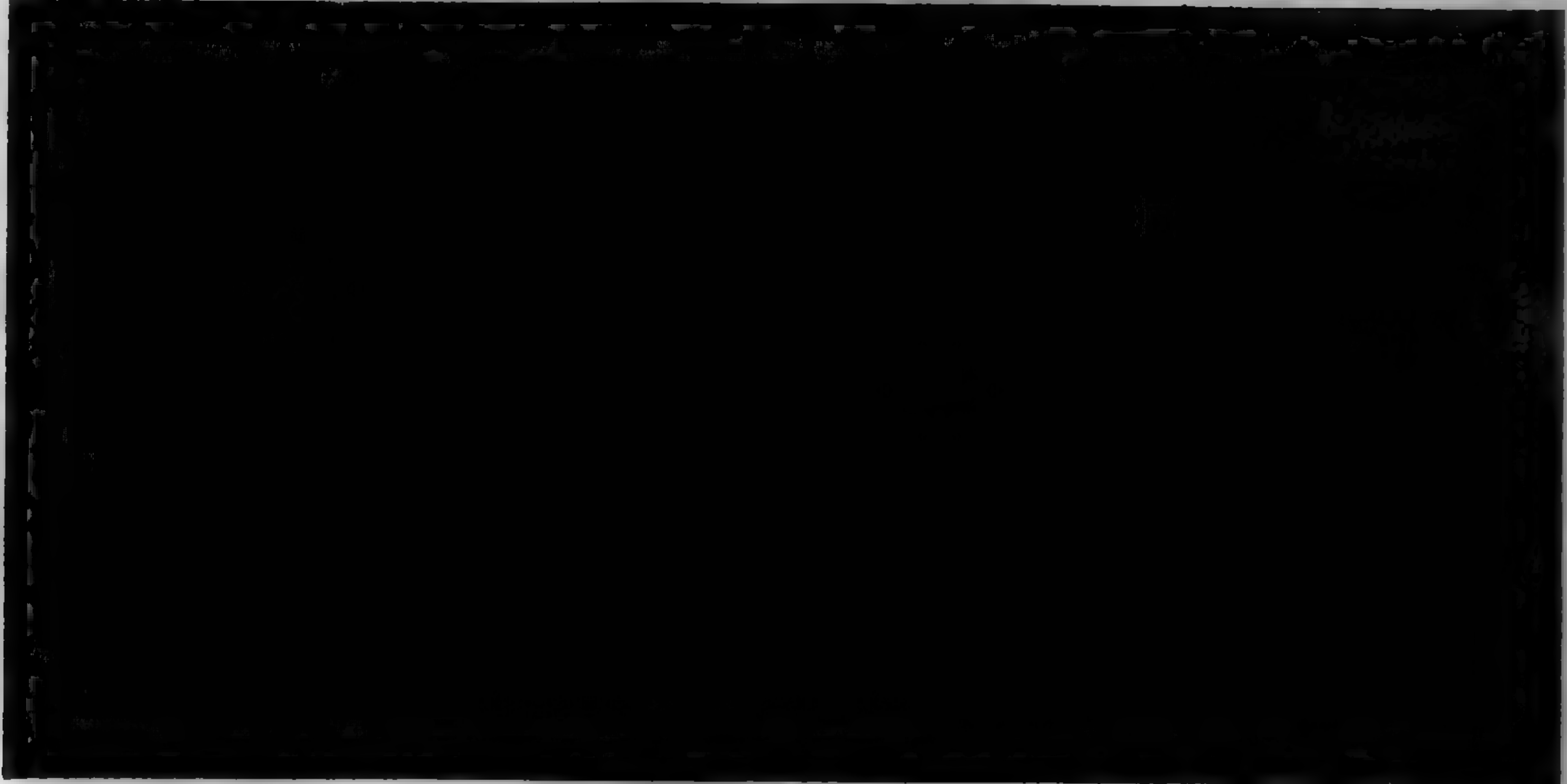
Support Systems For the Executive

A Look at Five Installations



By Eliot Levinson

Executive support systems are currently the high fashion for senior managers. This article describes the realities of development and impact of executive support systems in five large firms. The focus is on five key elements that must be managed for these systems to be effective:

1) A business problem or vision that defines the purpose of the system.

2) Sponsorship by a senior executive.

3) The organization of MIS computing groups as effective support organizations that translate managerial needs into technical systems.

4) A well-defined, accessible data base.

5) Resistance as the new systems change established procedures and reporting relationships.

Companies initiate executive support systems for three reasons: to solve a business problem, to make executives more efficient or to signal to the organization that technology should be employed. A distinct difference in development and use exists between use of an executive support system in firms where it is initiated as a problem-solving tool and firms where it is brought in for other reasons.

The problem-solving systems begin small in number of applications and number of users and then grow. They gradually evolve into planning systems. The efficiency systems begin with a larger number of users and atrophy. At the end of two years, only the problem-initiated systems survived. Distinction between the two types of systems is the relationship of the executive support system to the core of the business.

The business problem is most important during the early stage of system development. Two of the systems in this discussion were established as crisis responses by new chief executives, who were looking to the new technology for an effective solution to serious problems.

Smokestack was losing $250 million a year, and the chairman asked for a system that would allow him to control costs.

At Wellness, sales had decreased substantially, and the CEO wanted a data base that would allow him to shift the company to an analytic marketing orientation.

At International, the division head knew that unless the company could come up with a clear strategic plan and find better ways of communicating financial information, it was headed for hard times. He looked to executive support systems as a possible way of averting serious problems.

Clear expectations of the system's capabilities and benefits to the firm by the executive sponsor play an important role in its early development and ultimate utility. At Wellness and International, the sponsors defined their problem or organizational vision clearly and manageably so these issues were addressed. In both cases, a "critical success factors" process was used with a small group of top managers to clarify goals and specify the type of information executives needed. This process also served to establish a sense of mission within the organization.

At Smokestack, the function of the support system was initially more ambiguous. The early prototype focused on cost problems, but there was no clear direction because several other problems were apparent at the same time. It was not until two years and three pilots later, when executive support focused around the budgeting process, that the system began to function.

At Manuco and Toy, the executive support system was not linked to business problems. Although Manuco had several long-standing business issues caused by its competitive situation, these were not employed as a catalyst for the executive support system. The only expectation set by the chairman of Manuco was that senior executives should experiment with information technology and provide an example for people below them in their organization to use it. At Toy, the president wanted a machine for the 30 vice-presidents and their secretaries that would help them communicate and manage their time better. In comparison with the effectiveness systems, the initial expectations of these systems were low, as they supported tasks peripheral to the core needs of the business.

Installation phase

As implementation evolves through and beyond the installation period, the original business problem is not as important as in the organizational phase. During the installation phase at Wellness, the support system evolved to include more applications and become useful at lower levels in the organization. The focus of the system moved from present problems to planning of future products, and a component for the sales organization was added. At International, several financial, competitive and nonfinancial data bases were added to the initial support system, and the executives of the divisions were put on the system.

Initially, executives use the support system to retrieve the management reports they used to receive in hard copy. As the support systems evolve and their staffs develop competence in using decision support tools, the systems are increasingly used for "what-if" queries and scenario building.

At Smokestack, the evolutionary design was subject to trial and error. Since the initial goals of the executive support systems were ambiguous, a series of support systems were developed for various executives, including an executive personnel system, a pricing model, a management reporting system and a plastics division model. None of these systems was totally successful, and they reflected the chairman's lack of precision in his initial call for executive support. They did, however, serve to expose senior executives to some of the possibilities of information technology.

The approach to executive support systems at Manuco and Toy during the installation phase could be termed the "portfolio approach." The information systems departments provided a range of applications such as electronic mail, calendars, word processing, spreadsheets, automatic dialing and corporate reports. The rationale was that with a wide choice of applications, the executives would find something useful. At both firms, a significant number of executives utilized electronic mail, though a lack of participation on the mail system at Toy limited its use. Over time, use of the communications tools diminished, and only a small number of people used them.

The difficulty of implementing the efficiency systems can be attributed to the fact that senior executives have satisfactory support in the form of executive secretaries and assistants, and subordinates respond to their demands quickly. On the other hand, business-problem-based systems provide value-added information about a core concern of the business.

Institutionalization phase

During the institutionalization phase, the *raison d'etre* for executive support systems shifts from a business crisis to a combination of monitoring business health and looking toward the future.

At International, the president has used the executive support systems in assessing new ventures as a way of avoiding the decline of old products. At Wellness, the executive support system is being used to make decisions about new product development.

Another aspect of executive support in the institutionalization period is its linkage to core organizational processes. At Smokestack, it is utilized in the budgeting process, at International in strategic planning and at Wellness in marketing and sales. It is interesting to note that those executive support systems that were not institutionalized were not linked to any core business function.

Sponsorship is the initiative role the senior executive plays in the design, development and use of support systems. The executive's participation makes more of a mark on the implementation of executive support systems than on any other element in the initiation and execution of executive support. The sponsor's functions include:

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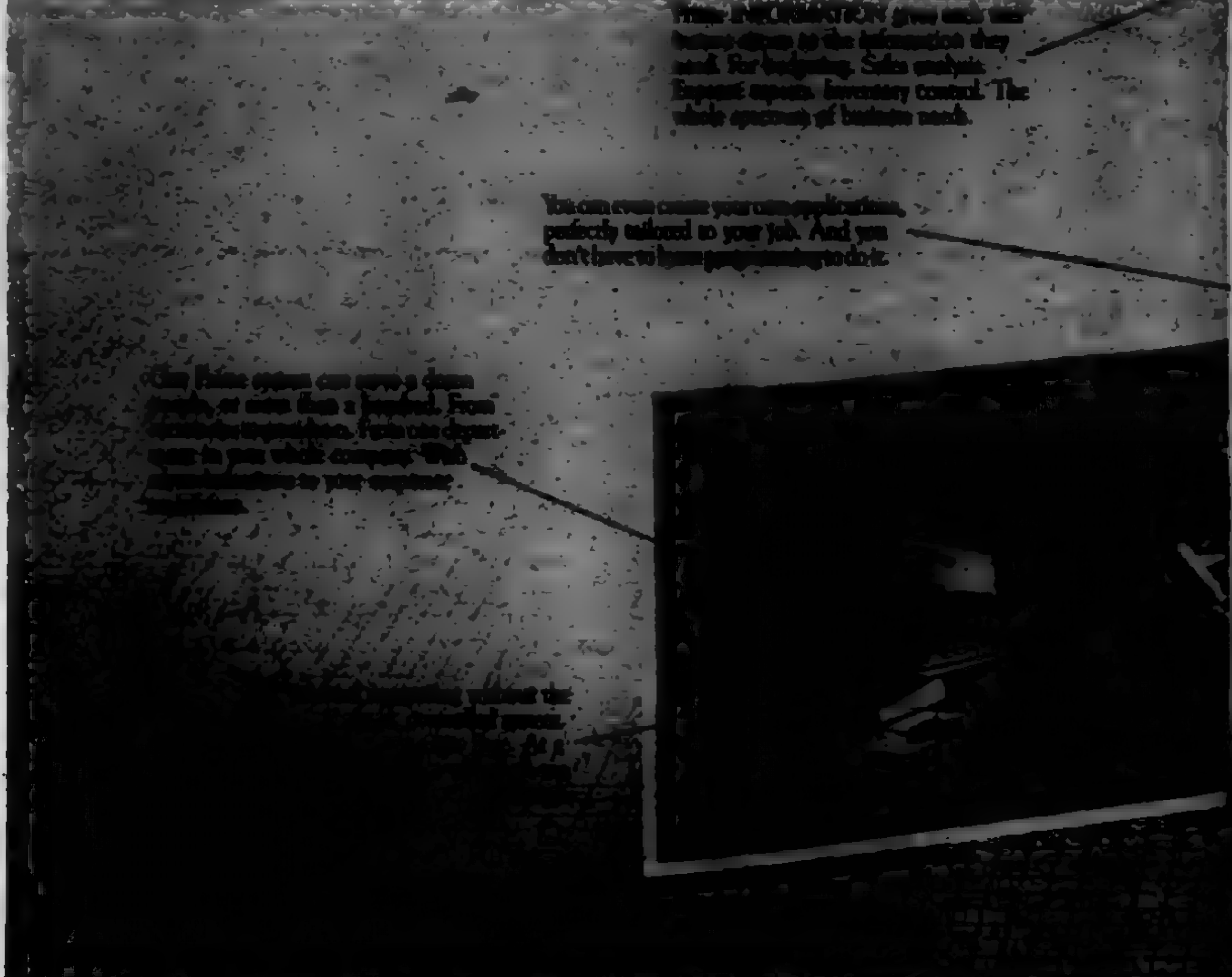

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- Initiating the demand for executive support systems.
- Establishing an organization to implement them.
- Defining the purpose.
- Developing usage.
- Utilizing outputs.
- Moving the systems through the organization.

In the firms we researched and worked with, there have been a variety of patterns of sponsorship that include executives who view executive support systems as an essential management tool and those who see them as peripheral.

There are executives who participate in the design, development and evolution of the system, while others delegate it to the information systems department. There are those who define the purpose of the system very early, while others discover its utility during implementation.

> *After saying, "I want one," the next step was defining what "it" was. At this stage, there was a variety of responses by the sponsors.*

The sponsorship role changes during the life of the support system. Initially, the titular sponsor, that executive who called for the system, is most important. As time moves on, an operating sponsor, the person delegated to manage the installation and diffusion of the system, becomes most important.

Organizational phase

The titular sponsor's motivation to call for executive support systems is spawned by two situations: the combination of a crisis he wants to solve and being new to the job; or a desire to have executives utilize computer technology as part of their daily work.

The titular sponsors in this study were divided into two categories. Those who called for effectiveness systems were all new to their jobs. They were looking for information to aid them in the solution of some problem, to provide a quick understanding of how the organization functioned and to bring about organizational change. The sponsors who called for efficiency systems had been in their jobs longer and were motivated by a generalized desire to have other senior executives demonstrate modernity and work more efficiently by using technology.

After saying, "I want one," the next step was defining what "it" was. At this stage, there was a variety of responses by the sponsors. At Wellness, there was a problem-solution support system match. The CEO and his top managers went through a critical success factors process and defined the information needed to analyze their markets, assess performance of their products and link the two to their sales territories. This exercise articulated a clear vision of where the management team was heading in aiming at high-profit margin items.

At Smokestack, the chairman and the head of decision support utilized a similar problem-solution match to develop a prototype system for cost control, but no other executives were involved. At International, the "discover as you implement" approach was used in defining the system. The comptroller, who had been developing accounts receivable and forecasting applications, and the new CEO, who was trying to find a way to communicate financial information easily, requested that a computer graphics system be linked with the data base.

At Manuco and Toy, the CEOs defined the support systems through delegation. At Manuco, the chairman stated that he wanted a computer on every group executive's desk, symbolizing to the rest of the organization that senior management was using technology. He then delegated sponsorship of the project to the information systems organization.

At Toy, the president asked an engineering group and then the MIS group to find a communications tool for senior executives that would combine a telephone and computer tools to help them with their management. In both cases, the titular sponsor saw the support system as technical support and delegated its definition to technical organizations. This approach was in sharp contrast to the other three firms where the titular sponsors saw the systems as management tools and involved themselves and other executives in defining the systems.

Operating sponsorship

The role of sponsorship shifts from the titular sponsor to the operating sponsor as the task changes from envisioning the support system to installing it and evolving its usage within the organization.

The role of operating sponsorship is best demonstrated by its absence. At Smokestack, the chairman delegated installation of the project to the chief financial officer, who resigned, and then to another vice-president, who was not interested in the system. During this 15-month hiatus, the computing group initiated a series of less than successful support systems for division heads and various vice-presidents. A new chief financial officer was appointed who implemented a management reporting system for the group vice-presidents that had been stalled by his predecessor, and then the computing group, under the auspices of the chief financial officer, developed a model to be used by all groups in the budget process.

IN DEPTH/EXECUTIVE SUPPORT

Sophisticated knowledge of computer technology was not necessary for effective use of the support system by senior executives. The systems incorporated menus, touch screens and fourth-generation languages.

This model allowed the chairman and chief financial officer to look at the relationships of the various groups as a value-added chain, something they had previously been unable to do. The budgeting model is becoming the executive support system as it allows senior management to look at individual businesses and their relationship to each other, which is the current central problem of the firm.

The comptroller at International represents a good example of operating sponsorship. He acted as the gatekeeper between the computing group and the president, made decisions regarding applications development, linked the support system to the strategic planning process and executed all of the applications so they were usable by other executives. As his primary contribution, the comptroller directed the financial analysts in learning to develop and utilize the executive support systems. He was also instrumental in diffusing executive support systems usage downward into the various divisions of the group.

Sophisticated knowledge of computer technology was not a necessary condition for effective use of the support system by senior executives. The executive support systems were very easy to use, with such features as menus, touch screens and fourth-generation languages.

During the installation phase, the executives learned to utilize the technology, usually beginning with retrieval of the standard reports they had received in hard copy. When more demanding tasks, such as querying and modeling, were needed, the executive had the system chauffeur-driven by one of his staff. The CEOs at Wellness and International both stated that executive support systems gave them an understanding of the dynamics of their businesses they had never had prior to the systems' installation.

Directors to users

During the institutionalization phase of executive support systems, the sponsors became more users of the system's output and less directors of its development. By demanding a coherent set of information within an easily accessible, defined framework, these sponsors had driven the organizations under them to hire and train managers with computer skills who spent a significant part of their time inputting data for the system. At both Wellness and International, line managers and staff analysts adapted their work to the support system.

During the institutionalization period, there are two processes that occur: the executive support system is diffused to other parts of the organization where new sponsors must adapt them to their needs; middle management has to fit analyses and reports into the framework of the support system in answering requests of superiors.

The importance of new sponsorship can be seen at International. The MIS group disseminated the tools developed in the original division to another group. The group executive did not perceive the financial management tools as linked to his job, so what had been an executive support system became a middle-management efficiency tool, helping the financial analysts in the new group to get their work done faster.

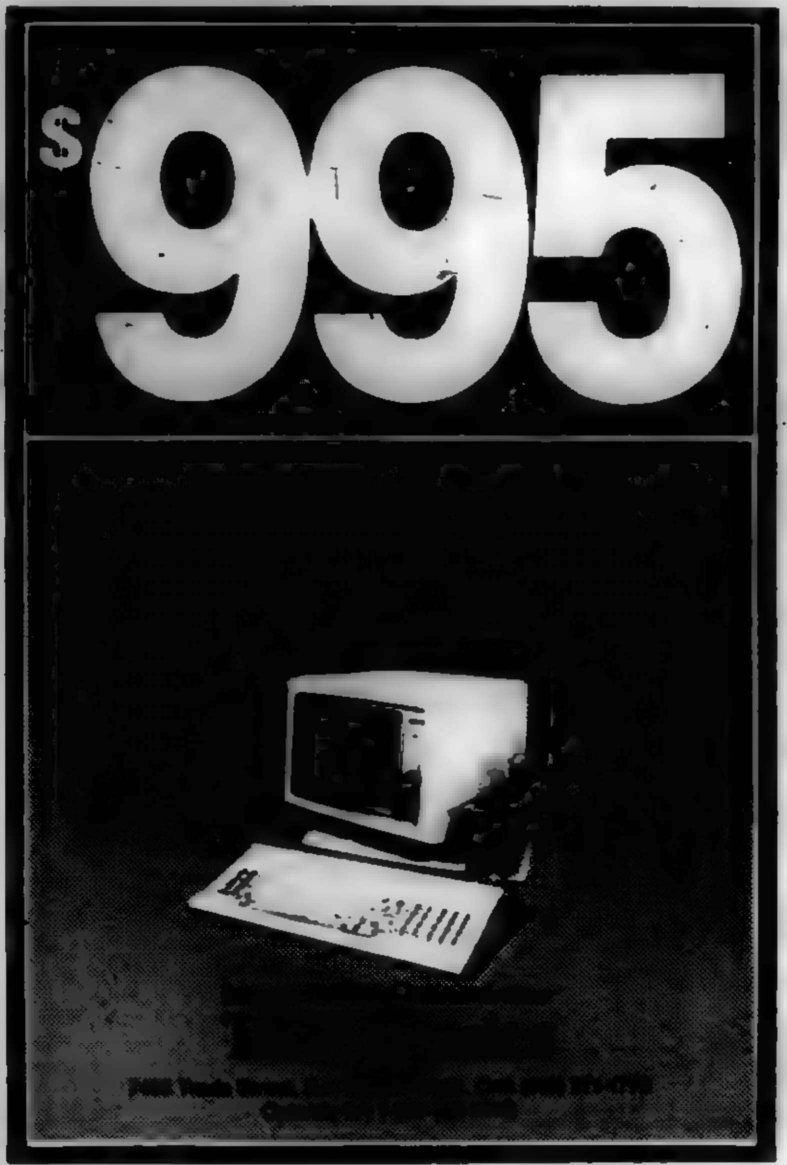
At Wellness, and in the original group at International, the division heads and middle managers were highly affected by the executive support systems. The systems imposed a discipline on the types of questions senior executives asked of their subordinates, which in turn demanded that middle managers utilize computer-based skills and begin thinking in the framework of the executive support systems.

In the three firms where problem-oriented executive support systems were established, the middle managers perceived their advancement as linked to their ability to utilize decision support tools.

End-user tools

Executive support systems are end-user computing tools. The sponsor plays the key role in defining the use of the system so that it is used as a management tool.

There were two patterns of sponsorship that delineated whether the executive support system was ultimately useful as a management tool. One group of sponsors, exemplified by either the titular or operating sponsor in the effectiveness groups, saw the executive support system as an extension of themselves and participated actively in its design and



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the establishment of an organization to implement and manage it. Systems implemented under these sponsors reached full implementation. The other group delegated the design of the system to others, giving the message that it saw executive support systems as technical support rather than as a management tool.

There are two constructs that should be considered in understanding sponsorship. The first is that business crises or visions create effective sponsorship; the second is that some executives, the *co-opters*, view the technology as a valuable phenomenon that must be turned to their advantage, while others, the *victims*, do not understand it and therefore manage it by delegating it to technical groups and do not involve themselves in the process of implementation.

Computing groups

The role of computing groups is central to executive support systems throughout the life cycle of implementation. The structure of the group, its relationship to management and the approaches it uses in developing the support system at different stages of evolution significantly impact the effectiveness of the support system.

Executive support systems present MIS with the extremes of the problems and opportunities associated with end-user computing. The perceived power differential between general managers and MIS staff, combined with the differences in the nature of managerial and technical work, affect the process of defining and implementing easy-to-use but complex support systems.

In the various approaches that MIS or management take, there are three key factors to be controlled that affect implementation: problem definition, the type of executive support system presented as the solution to the problem and the organizational sponsorship. When all three factors are addressed, as in the case of management-generated support systems to solve a defined problem, the implementation process will move most effectively to meet expectations. When these expectations are not well defined, the executive support system is less likely to be effective.

There are three types of information systems organizations associated with executive support systems: the data processing group, the segmented group and the integrated group. The data processing group includes the data center, office automation, decision support systems and development. The segmented group is made up of DP, systems development and end-user computing. The integrated managerial group would typically consist of end-user management and end-user computing.

The DP group differs little from the groups that constructed transaction processing systems a decade ago, but they have since absorbed new technologies, including office automation and decision support. The DP groups approached executive support systems as a traditional systems development effort. These groups were staffed by people with strong technical backgrounds who had a product orientation. They took full delegated control of the projects rather than sharing decision making with management and placed major emphasis on the development of hardware. The DP groups concentrated their effort more on the early phases of the project rather than on installation.

In the segmented MIS organization, the end-user computing function is autonomous: Data processing is handled by one group, systems development by a second and user-controlled technologies by a third.

End-user computing groups differ from traditional DP groups in several respects:

- They are service rather than product-oriented. Their role is to help the end user accomplish his aims and establish the most appropriate hardware and software environments in which to do this. They do not "control" the system. From the outset, it is clear that decisions concerning use of the system come from the end user. In two of our cases, it was decided prior to beginning work to build a turnkey system for the end user.
- End-user computing groups are staffed by people with a business background, or project teams are set up to include end-user management.

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At the manufacturing firm, executive support was given to an engineering group within the management systems organization, which then developed technical specifications for personal computers to be used by executives.

- End-user groups use an evolutionary design process that starts with a prototype and adds applications incrementally, as opposed to the traditional DP process of developing the system fully before usage.

The integrated MIS groups report directly to management as members of the executive's staff and have only a "dotted-line" relationship to the MIS organization. None of the groups we studied started as integrated groups, but they evolved that way as implementation of the executive support systems progressed.

The staff within the integrated group is more managerial than technical in background and demonstrates consulting skills. However, they have a strong background in computer tools. They view information technology as the tool to accomplish a primary business task, such as financial planning or marketing.

The differences and similarities between the groups can be seen in their definition of and approaches to implementing executive support systems at different stages of development.

Determining need

The main task in the early stages of executive support systems is defining the problem to be worked with and choosing appropriate hardware and software. At Wellness, the end-user computing group interviewed several subsidiary presidents to find a situation where an executive support system would meet a need. The group found a subsidiary where the new CEO was looking for a tool to change the focus of the company from sales to marketing.

Critical success factor interviews were conducted among the four senior executives to determine what information was needed and then a prototype of the marketing support system was developed. At this point, Wellness committed the funding for the project and management, jointly with the end-user computing group, chose Express as the language for the executive support systems. A member of the end-user computing staff was assigned at Wellness.

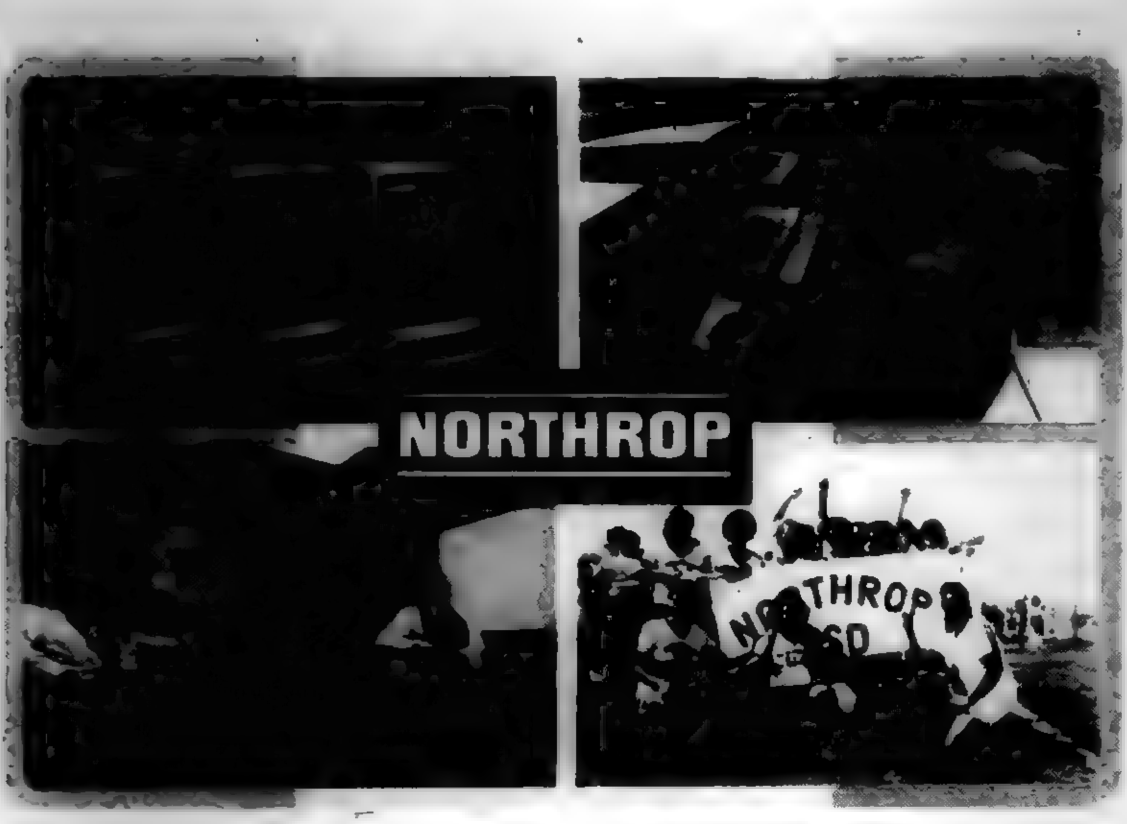
In contrast to Wellness, at Manuco, executive support was given to an engineering group within the management systems organization, which then developed technical specifications for personal computers to be used by executives. The project was then given to a newly formed marketing group within the information systems group, which developed applications for an executive workstation. After the hardware had been ordered, the marketing group interviewed the 18 executives and their secretaries who were designated as users. Unfortunately, they found out in the interviews that the hardware did not meet the work requirements of the executives.

The main differences between the approaches of the DP groups and the end-user organizations were as follows:

- DP groups emphasized hardware, whereas the end-user organizations concentrated on problem definition and software.
- The DP groups were delegated or took control of the project, whereas the end-user groups shared decision making on the nature of the support system with line management.

Installation phase

In the installation stage, the task of the computing groups is to get the system functioning and work through start-up problems,



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The software picture

There are three categories of software used in executive support systems. The majority of executive support systems are custom-tailored, built from general-purpose decision support languages. The common software used for these systems are:

Management Decision Systems, Inc.'s Express; Information Builders, Inc.'s Focus; Mathematica Products Group, Inc.'s Ramis and Boeing Computer Services Co.'s EIS.

In the majority of firms with which we have worked, the company places considerable emphasis on choosing the language and then builds its own system.

Category II — Executive support systems. There are now specialized systems for executive support that are targeted at senior executives and are distinguished from the generic systems in their visual emphasis.

Category III — Communications and management support.

Digital Equipment Corp.'s All-In-One comes under this group. IBM's Professional Office System and Computer Corp. of America's Comet 204 are used more by middle and lower-level managers for general managerial support. However, these systems are used by senior executives for electronic mail and communications.

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modifying the system so it is a real utility to the users.

International presents a typical example of where an end-user computing group worked on a parity basis with management, supplying half the manpower to teams developing different applications. After developing a prototype of a financial data base with a financial analyst, the computing staff went on to develop a nonfinancial data base, an accounts receivable package and a competitive data base. They also helped select a graphics package, but their choice for graphics was not the one finally picked by International's management. The computing group at International combined a strategy of evolutionary design with participative decision making by the management group.

In contrast to International, the computing groups at Manuco and Toy were delegated more responsibility, but they had less authority over the installation of the executive support systems. To cope with the ambiguity, the groups used a portfolio approach to the project. At Manuco, the MIS group decided that executives and their secretaries would use word processing, calendaring, electronic mail, document transfer, the Dow Jones & Co. News & Retrieval Service, corporate reports and spreadsheets. They put all these applications on very easy-to-use menus and provided individual training to all the executives and secretaries involved.

Their rationale was that out of the sumptuous buffet of software, the executives would choose something. Although secretaries did use the system, only four executives used it regularly and the computing group was unable to get access to the executives to train them — or to divisional data that might have been of assistance to the executives.

Another aspect of the DP group's approach was an emphasis on the computer interface. At Toy, the hardware, which was a combination of telephone and computer, took only an hour to learn to use, and at Manuco, considerable effort went toward establishing one-button access to any application faced with low usage. As a solution, the computing groups continued to expand the portfolio and the number of installations.

With both the end user and DP groups, emphasis was placed on user training during the installation phase. At International and Wellness, the computing group saw its function as developing expertise within the executive staff, and at Manuco and Toy the emphasis was placed on user-seductive software that could be of immediate utility to the executive.

At Smokestack, an effort was made to provide executives with easy-to-use management reports. The training efforts were more successful when aimed at staff people rather than at the executives themselves.

During the institutionalization phase of implementation, the tasks for the computing groups are to disseminate the system either downward, so it diffuses within the

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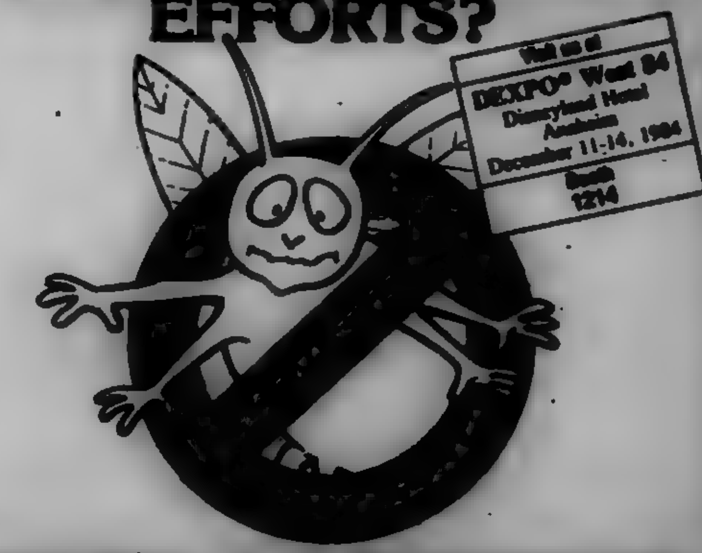

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organization, or across other divisions and to establish a standardized environment for operation of the system.

The efficiency-oriented communications systems ceased to exist after the installation phase. At Manuco and Toy, the support systems had been labeled as pilots, and both firms declared victory and ceased operation. At the other three firms, the support systems became embedded within the organization.

In all three firms, the computing groups moved toward being more integrated into the user organization. At Smokestack, the computing group moved from de facto reporting to MIS to reporting to the chief financial officer. At International, the comptroller's staff took over operation of the support system, and the computing group disseminated the applications to four other divisions. At Wellness, the computing organization lost its reporting independence from MIS but became fully integrated within subsidiary management.

At both Wellness and International, the support system affected the jobs of middle managers and analysts within the organization, and training programs were established to provide these managers with the necessary skills in use and growth of the technology. At Wellness, the increase in breadth and depth of the system necessitated a reconstruction of the data base, and that job was given to the computing group.

At Smokestack, the integration occurred around a central corporate-wide budgeting process. The computing group, as delegate for the chief financial officer, developed a budgeting model that affected all groups in the corporation. The computing group is currently in the process of training the various financial staffs in use of the tool.

In summary, the computing group is an important factor in executive support, since it affects the implementation at all stages and has considerable daily contact with the nuts and bolts of the system. The role of the computing group changes during the process of implementation from problem definer to implementer to maintainer and diffuser of systems. The computing groups that were most successful appear to have shared decision making more with management than those who were delegated more responsibility for the implementation.

The discussion of computing groups as a factor illustrates the problem of separating factors. It is obvious that the kinds of management sponsorship and problem definition greatly affect the role of the computing group. It is no coincidence that computing groups were more effective when business problems catalyzed initiation of the system and managerial sponsorship was active. However, the ability of computing groups to capitalize on these opportunities depends on their structure and skills.

The existence, usability and development of data bases were major factors in building executive support systems. Existing data bases were a necessary but not sufficient condition for the installation stage of the effectiveness-oriented systems and became important again in the institutionalization phase. The preexistence of a community of users is as necessary a condition for communications-oriented support systems as data bases are for business problem-based systems, because being accustomed to the technology speeds the implementation process.

The existence of data bases and a community of users demonstrates a seeding of technology within the firm that prepares it for the growth of support systems. During the last phase of implementation, data bases become important as diffusion of executive support systems from one division to others and to the corporate office demands the creation of a data warehouse and the establishment of common conventions surrounding data management.

Business problem-based executive support systems demand the presence of information on which alternative scenarios for decisions can be made against past performance, and categories of information may be compared with each other. In two of the firms we studied, Wellness and International, the use of information technology was well developed. Managers had apparently been exposed to information technology, and historical data bases on matters central to the firm were usable.

In contrast, information systems had been given very low priority at Smokestack prior to the arrival of the new management. At the beginning of the implementation process, the computing group found that all financial accounting had been decentralized to the subsidiaries, rendering financial data incomparable. The centralization of accounting practices and the development of a common general ledger system were necessary before financial data could be developed for an executive support system.

The development of these systems took 18 months and made the initial concept of a cost-control executive

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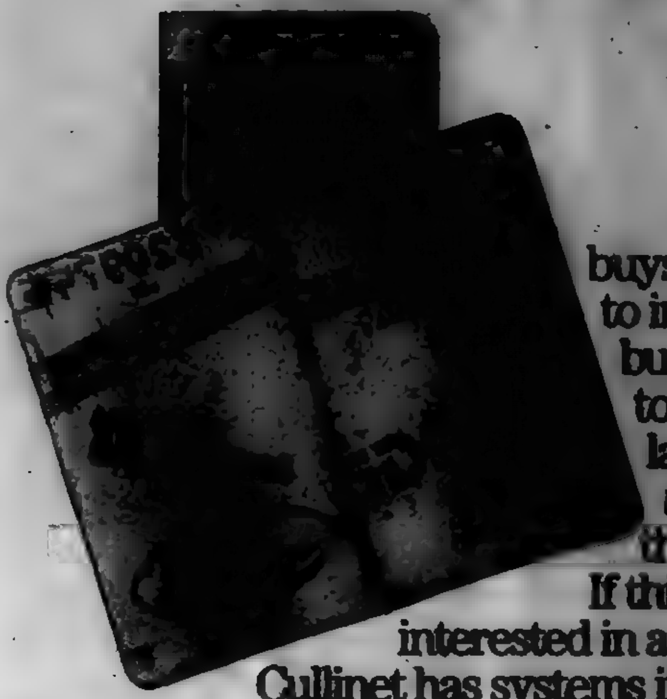

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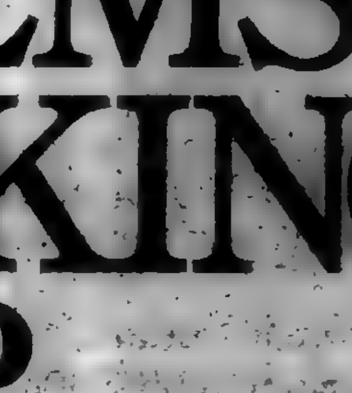

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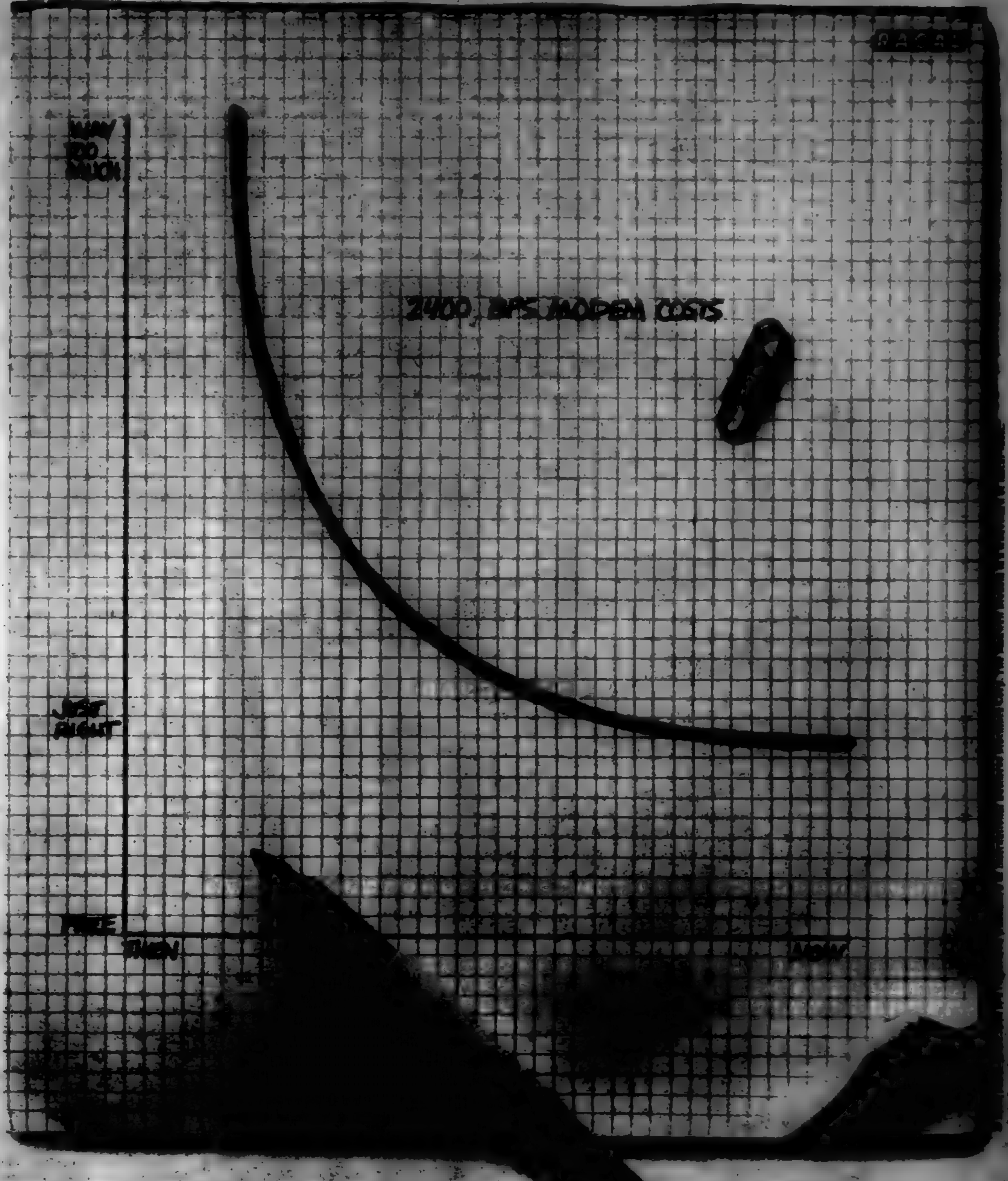

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support system unfeasible. Smokestack was able to establish a management reporting system and then a budget model only after the data requirements between divisions had been standardized and the consolidated reporting system needed for the data base was established.

With communications-oriented executive support systems, the executives need to be linked with the people with whom they communicate. If the people in the executive's communications community do not use or are not on the system, then the executive cannot gain the benefits of using such efficiency-oriented communications tools as electronic mail. At both Manuco and Toy, it was found that executives communicated downward to their subordinates. Support systems were organized horizontally to other executives, and subordinates were not originally on the system. The structure limited the systems' potential utility.

Manuco provides a good example of what occurs when data bases cannot be compared or utilized across different groups. The firm had more than 50 separate divisional and staff data bases, but they could not be used in concert. This situation caused considerable difficulty for the policy-oriented group executives, who complained that the executive support systems could only be of help to them in their work if they could utilize and compare information across divisions and groups. This example illustrates why three of the firms spent considerable time and effort in selecting data base management systems that created relational data bases.

The data bases for executive support systems are often, though not exclusively, extracts of corporate transaction systems. During the institutionalization period, executive support systems diffuse into other divisions and staffs, and usage within corporate subgroups increases. It is necessary to establish corporatewide systems that allow for easy transfer of data.

Two firms that reached the institutionalization stage have approached the problem of standardization by establishing corporate data warehouses from which data can be extracted for individual support systems and setting up common data base management systems that all divisions and subsidiaries must use.

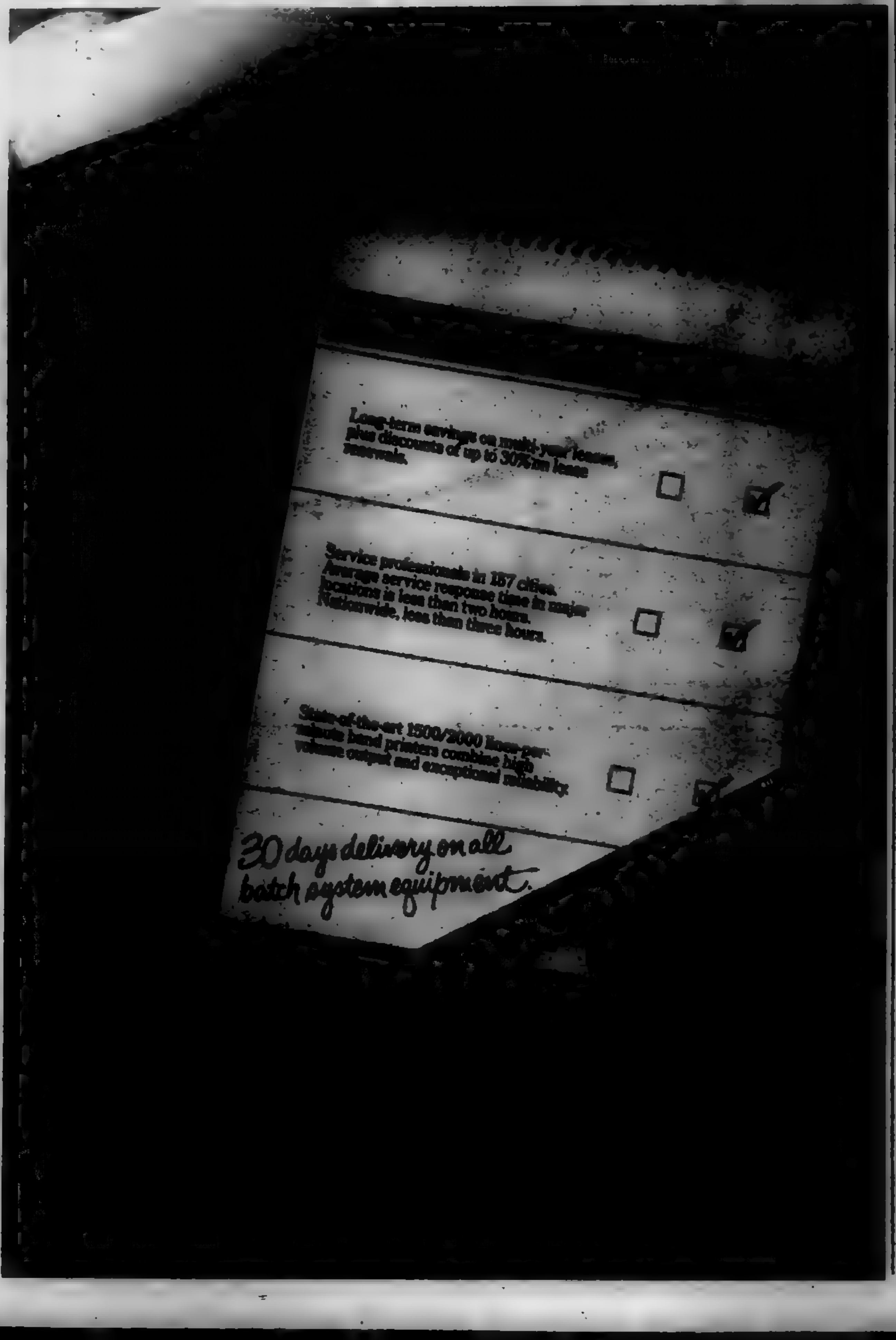
Managing resistance

Resistance to new technology is a normal phenomenon. It can be either an act to protect one's domain or simply a reluctance to change without proof that a new way is better. Resistance to executive support systems occurred during the installation period in all the companies studied. It took the form of avoiding the system, actively resisting it and withholding. Resistance can slow down or cripple installation of an executive support system. Where the executive support systems were installed well, resistance was effectively managed.

In efficiency-based systems, the resistance took the form of nonusage. Toy Electric provided a good example of this passive resistance. The executives already had good support in place: secretaries to pass and screen their messages and administrative assistants to do budgets.

The resistance was expressed by both secretaries and executives. In responding to questionnaires, they said the system was fine and asked for minor modifications, but they didn't use it, because the questionnaires addressed interface rather than compatibility or work issues. In this way, the systems satisfied the perceived desire of the CEO to provide a personal management tool, and then the staff proceeded to work as they liked. At Wellness, the problem of nonusage was dealt with by the president himself, who invited other executives to attend training sessions with him.

Active resistance was evident at Smokestack. The decision support group developed an easy-to-use query system for the vice-president of personnel. He used the system for three weeks and then gave it to his own systems person to operate. The systems person claimed that the new system was inadequate and not as complete as the complex personnel information system already in existence. He was, however, the only one in the corporation who could operate the older system; the new, sim-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plier system was usable by anyone.

A third form of resistance, withholding, is based on the "information is power" principle. At Manuco, the MIS people were unable to obtain several divisional data bases that would have been helpful to group executives in policy planning, because the divisions did not want their data on a common system.

At International, the divisional presidents were reluctant to provide information for the executive support systems because they thought their autonomy would be affected. A frank discussion about critical success factors was held between the divisional executive and group president, allowing resistance to be handled by negotiation. This is a good example of how resistance can be resolved. Because participation in designing the system was high, end users perceived it as a central tool to their success rather than an infringement on their autonomy.

There are definite patterns in the relationship between the number of elements that are managed well during the implementation process and the effectiveness of the executive support systems. Wellness and International had all the elements present early and promptly and have the most successful implementations to date. Manuco and Toy had the fewest elements, the most problems and ceased the implementation process prior to institutionalization.

Organizational change

Executive support systems are often a lever for organizational change. This change tends to be associated with a new leader's vision of how the organization should function. The executive support system becomes an extension of the leader. It is one of the tools he uses in bringing about a restructuring of the organizational mission. The reports and data in the executive support systems are the message to the rest of the organization as to what indicators count, and the staff members who manage the executive support systems become the gatekeepers of information.

The relationship of executive support and organizational change was clear in this sample. The three executives who sponsored effectiveness-oriented systems had been in their jobs less than a year. They all said that after spending several months getting accustomed to their jobs, they developed a vision of where they wanted to move the organization.

At International, Peter Dewey saw a need to focus the corporation on its future. This focus meant finding ways to communicate critical information to the top of the organization and to bring the divisions in his group into line with a strategic plan. Dewey perceived the firm as complacent because of past success and unrealistic about its future. He also felt that the changes had to be brought about carefully, since theirs was a long history of decentralization of the subsidiaries and no immediate crisis to justify participants' action. He was also conscious that as a group executive he had limited staff and it was not fruitful for him to become involved in the nitty-gritty operations of his divisions.

He saw his increase in effectiveness in being able to make his divisions and the upper management of the corporation focus on strategic planning. For Dewey, the presentation form of information became very important. He felt that graphics allowed people to see trends clearly and kept them from being buried in numbers and paper.

This picture fit the role he saw for himself as communicating crucial information and goals upward to the chairman and down to his divisions. He also used the critical success factors process in bringing his division presidents into agreement with the strategic plan and established a graphics reporting system linked to that plan. Dewey's vision was one that he saw as gradually moving International to its future rather than reacting to crisis.

At this point, the divisions have institutionalized reporting, which addresses the strategic goals.

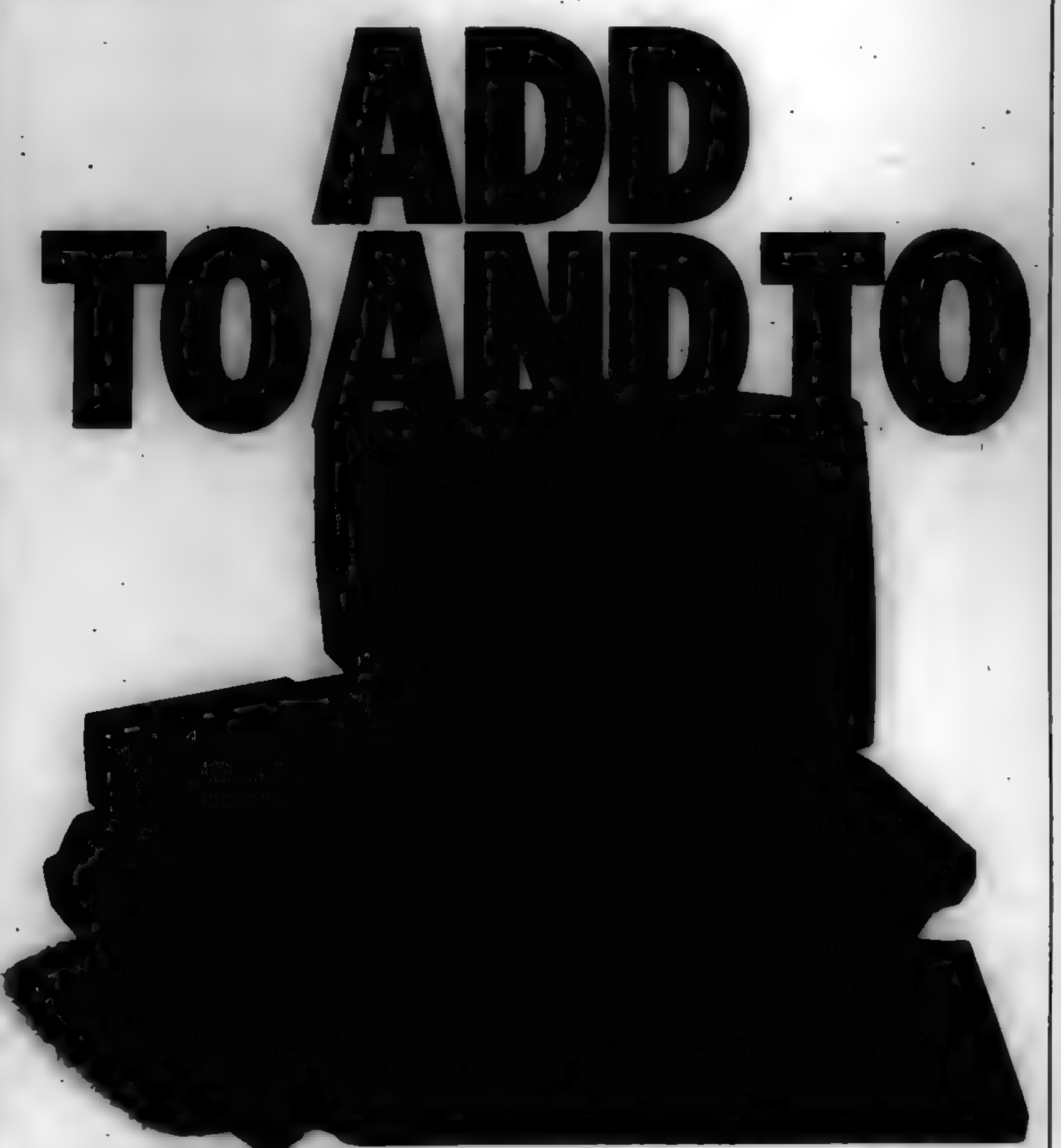
When Paul Dawson assumed the helm at Wellness, he knew that the traditional sales orientation was not working any more. Dawson had a vision of changing Wellness into a firm that was analytically marketing based. Dawson established his executive support system with a marketing data base and simultaneously established a market research group directly below him to run the system. He changed the reward system for his managers from one that granted bonuses as they met quota on any products to one that required them to meet quota on all product lines.

In the last year, Dawson has restructured the division, amalgamating units and dropping product lines, forcing them to use the system. He has also focused his sales effort on a different market segment. In Dawson's case, the executive support system can be seen as one of the tools in a tool kit for changing the operation and culture of Wellness.

It is worth noting that a significant difference between the executive support systems that are business problem-based and linked to visions of change and those that are oriented to personal management and efficiency is that the communications-based systems are not driven by a vision of organizational change. This may make them more difficult to implement because the executive is actually viewing the system as office equipment, a typewriter or dictaphone, rather than as a central part of his business.

About the author

Eliot Levinson is a visiting scholar at the Center for Information Systems Research, Sloan School of Management, MIT.



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IN DEPTH

How to evaluate micro-based systems

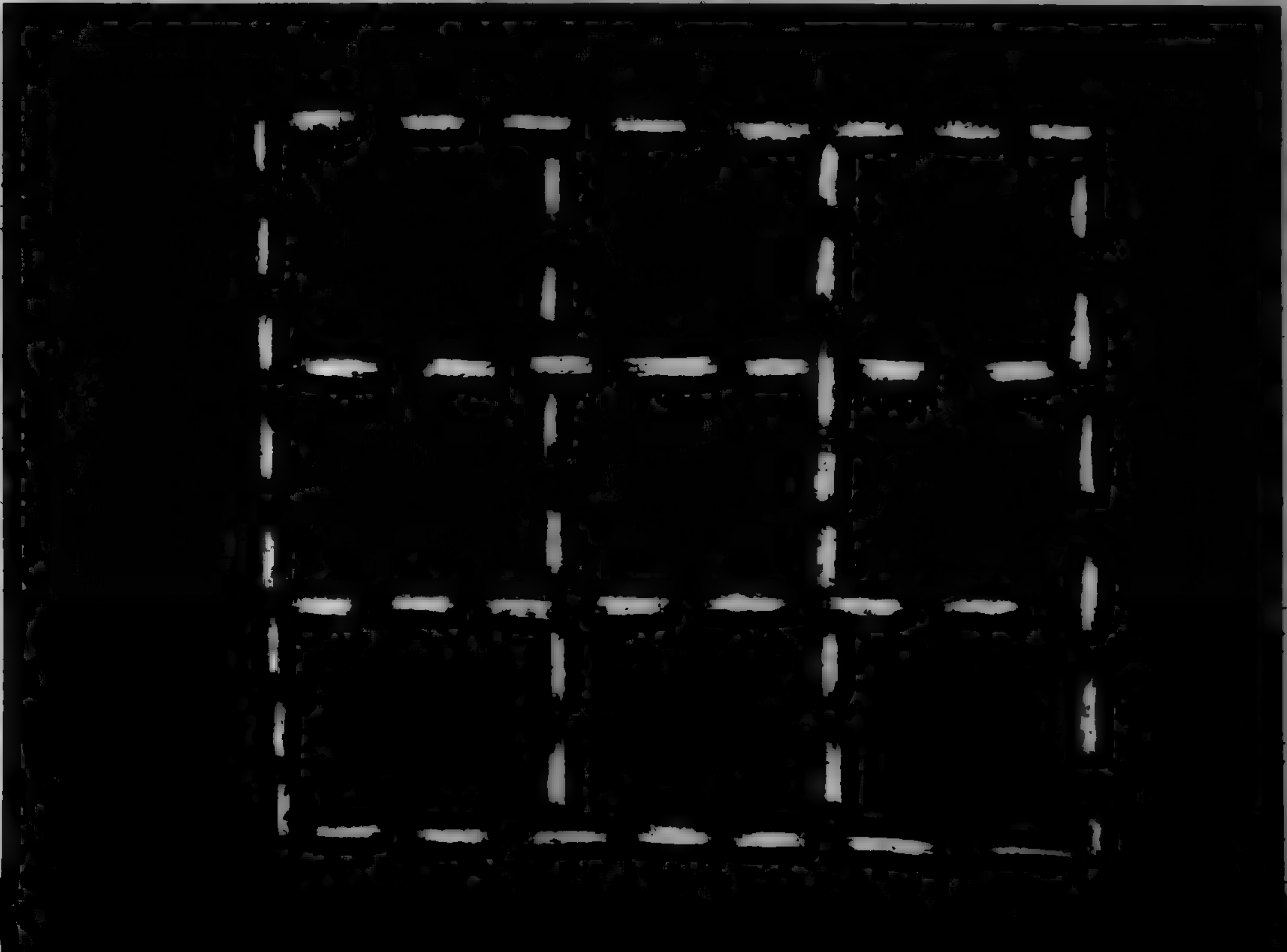
By John Saunders and Naomi Karten

To justify custom development for micro-based systems, the proposed project should be either highly unique (no packaged software available), very important to the organization (performance expectations exceed what packages normally provide) or both.

Information systems management and potential users often feel uneasy about exactly what role micros and micro-based systems should take in their organization. One sound approach is to consider a custom micro-based system for a particular application. A custom-developed system is defined here as any system that is the product of a project life cycle and that meets the unique requirements of the business for ease of use, documentation and compatibility.

The techniques and tools used during development could be as sophisticated as a high-level programming language like Pascal or C or as general-purpose as a financial modeling language. What really characterizes a custom-developed, micro-based system is the explicit recognition of the analysis, design and development stages of its creation.

Up to now, most of us have assumed that a micro best serves the needs of an individual. This



view recognizes that the micro can focus considerable processing power on a specific problem.

When used with general-purpose software, this power is easily applied to a wide range of specific needs. The analyst who works with a large amount of financial information can use a spreadsheet package every time he needs to prepare a worksheet. The manager who must prepare a large number of reports can rely on a word processing and graphics package to generate high-quality copy. In both cases, however, the user applies a general-purpose tool to the specific tasks he faces.

However, micros can also serve other purposes within an organization, extending beyond the specific requirements of an individual. One theory provides a four-way classification scheme for information systems. Gordon David, in his book *Management Information Systems*, describes all information systems within an organization as being either personal or public, as well as formal or informal. These classifications account for automated or manual, mainframe-based or micro-based systems.

> *Given the processing and memory capacity of micros, there is no reason they should not be applied to systems in the middle levels of the systems pyramid. This is particularly true in cases where a communications link can be established to the mainframe.*

In terms of this classification scheme, an automated general ledger system would be a public, formal system in that it would serve the requirements of the organization in a formal manner. Similarly, the Rolodex file maintained by an employee is also an information system, but it would fall into the private, informal category. Such an information system clearly serves only the needs of the individual who uses it. The organization has no requirements for how the Rolodex is to be organized or maintained.

Micros have largely been relegated to the role of private, informal information systems within organizations. Most firms assume that users should have direct control over their use of a micro and that this view is appropriate since the tasks they perform are personal in this sense. The desire of some DP managers to reduce their applications backlog by sharing the burden with users drives this assumption. The assumption is encouraged by the easy availability of packaged software designed to help inexperienced users meet general needs. In a sense, the entire information center concept of supporting and advising users is intended to encourage direct user control of micros.

But while there may be strong incentives for organizations to encourage the use of micros to meet private requirements, there is no reason that micros cannot also be considered for certain public, formal systems. Keep in mind that the processing capacity of micro hardware has increased enormously in the last few years. The processor at the heart of the Apple Computer, Inc. Apple II could handle 300,000 to 400,000 instructions per second. The recently announced Motorola, Inc. MC68020, on the other hand, can process four to five million instructions per second, an increase of more than one order of magnitude in processing speed alone.

The instruction set of modern microprocessors has also become considerably more advanced, resulting in more compact and efficient programs. Similar progress has been made in main memory and disk storage capabilities. The results of these advances in technology are small machines that are in some ways as powerful as the mainframes and minicomputers of previous years.

One can think of the information systems in an organization as a pyramid. At the bottom lie the transaction processing systems, which account for the bulk of data processing within an organization and which have been the traditional realm of mainframes. At the top of the pyramid reside information requirements that are generally difficult to define and that are constantly changing. The need of a top executive to prepare a three-year business plan might fall into this category. Microcomputers used with packaged software have traditionally been applied to these kinds of decision support needs.

However, at the middle levels of the pyramid are systems that do not have the heavy transaction processing requirements of the lowest level and yet are more standardized and static than systems at the top level. These systems usually address control and short-term planning needs of a firm, take as input standard data from the transaction processing systems and produce reports that aggregate this data in a predefined way.

Given the processing and memory capacity of micros, there is no reason they should not be applied to systems in the middle levels of the pyramid. This is particularly true in cases where a communications link can be established to give the micro access to the mainframe data base for downloading information. What managers need to know, therefore, is

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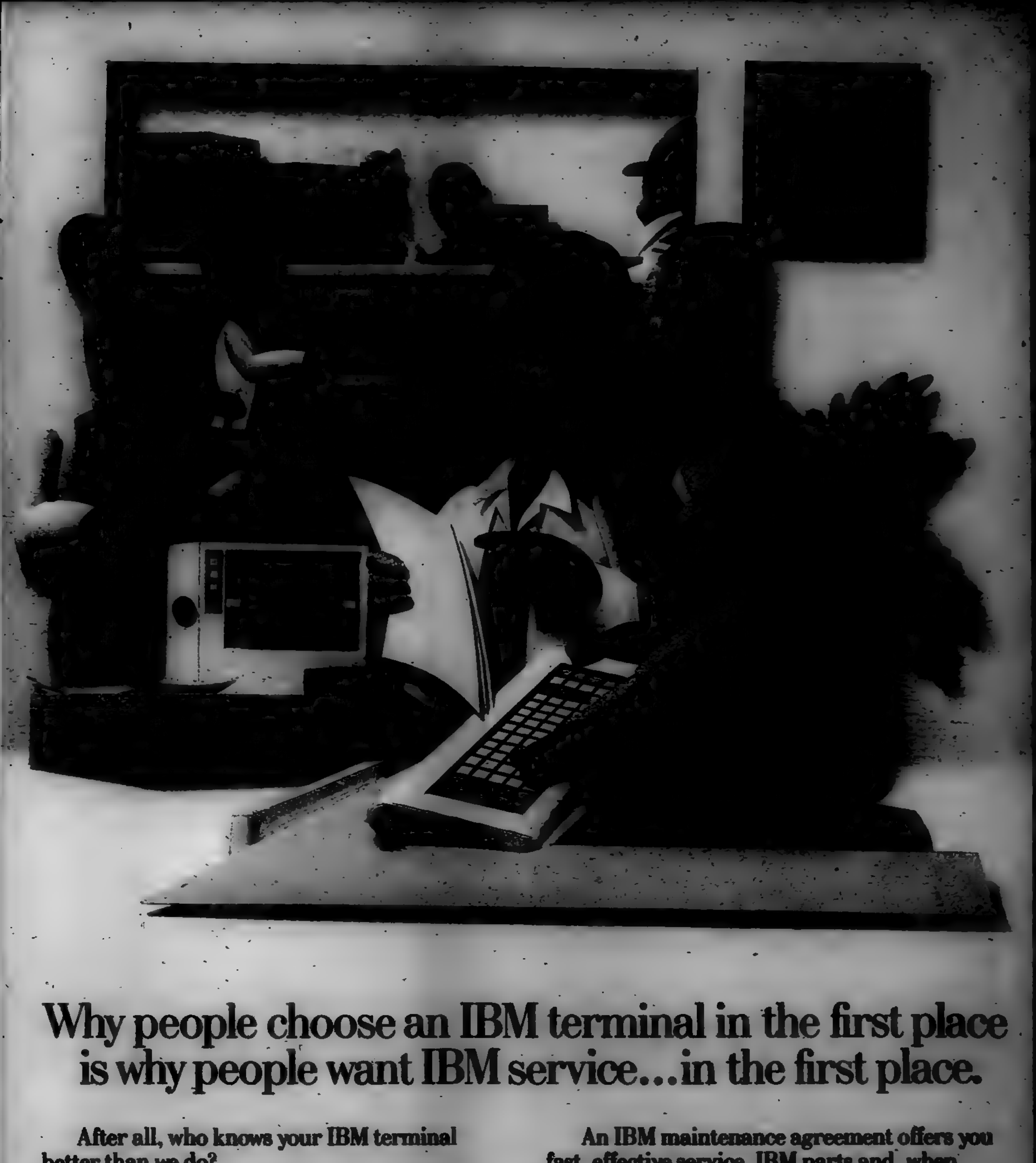

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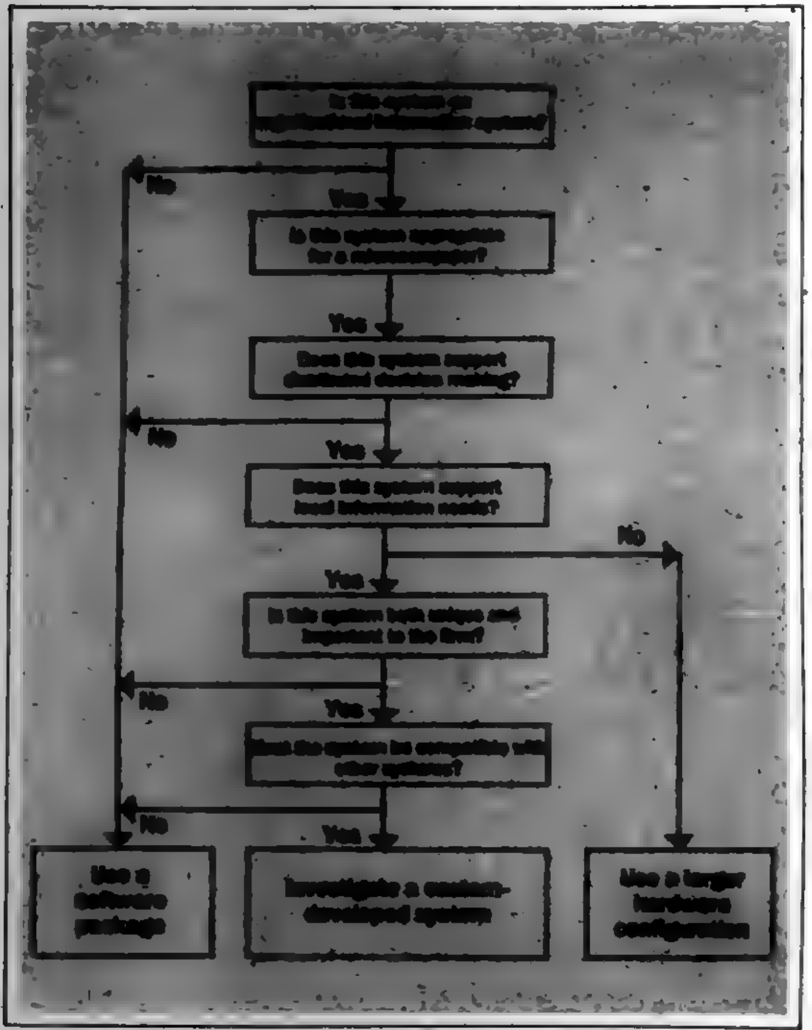
Is this system an organizational information system?
No
Yes
Is this system appropriate for a microcomputer?
Yes
Does this system support distributed decision making?
No
Yes
Does this system support local information needs?
No
Yes
Is this system both unique and important to the firm?
No
Yes
Must the system be compatible with other systems?
No
Yes
Use a software package
Investigate a custom-developed system
Use a larger hardware configuration

Figure 1. Tests used in choosing a development methodology

how to determine when a micro is appropriate for such an application and how to approach the development of the system when that determination is made. The following sections describe a methodology for identifying systems that are public and formal in nature and good candidates for a micro-based system.

Identifying custom projects

How does one decide on a development strategy for a system that might be appropriate for a microcomputer? The answer is contained in a series of tests to which proposed applications can be put. For the purposes of these tests, the manager should assume that the menu of strategies includes developing a system on a microcomputer, acquiring a software package or using a larger computer with either a software package or a custom-designed system. Figure 1 outlines the test sequence.

1. Is the proposed application an organizational or a personal information system?

A personal information system is one that meets the needs of a single person by keeping track of data of interest only to that user and that performs functions designed and used only by that user.

Insofar as micro applications are concerned, a software package can certainly meet the truly individual needs of a manager.

If, however, the system uses data that is standardized across an organization or performs processing that is standardized across an organization, it may be thought of as an organizational information system and may require a custom development effort. In this case, the proposed application should be submitted to the next test.

> *The micro can be an effective tool for middle-level decision making because it focuses processing capacity where it is required.*

2. Is this application appropriate for a microcomputer?

This question implies a number of further tests, as follows:

2a. Does the application support decision making that is highly distributed throughout the organization?

We must ask this question in order to filter out those projects that support very centralized information needs. Such centralized decision making (such as companywide financial reporting to a chief financial officer) often should be supported by a centralized data processing operation. At lower levels of an organization, however, decision making often relies on local information; centralizing the processing of such local information can slow the turnaround times of essential reports. The micro

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can be an effective tool for middle-level decision making, therefore, because it focuses processing capacity where it is required. The result is almost immediate availability of information.

There are other organizational advantages to decentralizing data processing capacity besides providing timely reports to local managers. For one, decentralization can sometimes enhance security of data maintained on a central computer. Suppose a small staff group is responsible for preparing a biweekly report to an executive committee and that this group relies on operating data read from tape on a central computer. A production manager in the same organization uses this operating data to make critical production decisions. There is always the possibility that the first group will inadvertently destroy or lose the operating data in manipulating it for the report. A system could be designed, however, to transfer the necessary operating data from the central computer to a micro and allow the staff group to make the manipulations it desires in preparing its report.

2b. Does the application support information needs that are highly localized?

This question should also filter out projects that support centralized information needs, as the previous question does. However, the question admits projects that are localized rather than distributed. Localized in this sense means projects that support information needs at only one location. For example, the marketing director of a small subsidiary company may manage his sales force in a way completely different from the managers of all other subsidiaries. His needs are local.

The example in the previous section also described a localized information processing need. Applications that are distributed represent identical information processing needs repeated at various points throughout an organization, usually at middle levels. It is quite possible, therefore, for a distributed application to be localized, although a localized application will not be distributed.

3. Is the application both unique and important?

This is a question of the marginal economics of a custom-developed vs. a packaged software approach to a problem. If the application is appropriate for a micro (as determined by the previous tests), then the next step is to determine if the benefits of a custom system will outweigh the costs.

One approach to this problem takes a qualitative perspective. It begins by mapping the project on a three-by-three matrix, which plots uniqueness vs. importance (see diagram on ID/17). In order to justify a custom development effort, the proposed project should be unique (in which case there will be no packaged software available for the application), very important to the organization (in which case the software must meet performance standards that exceed those of most packages) or both. In terms of the matrix, the project must fall in one of the three boxes on the upper right-hand corner in order to justify custom development.

If the application is appropriate for a micro (as determined by testing), then the next step is to determine if the benefits of a custom system will outweigh the costs.

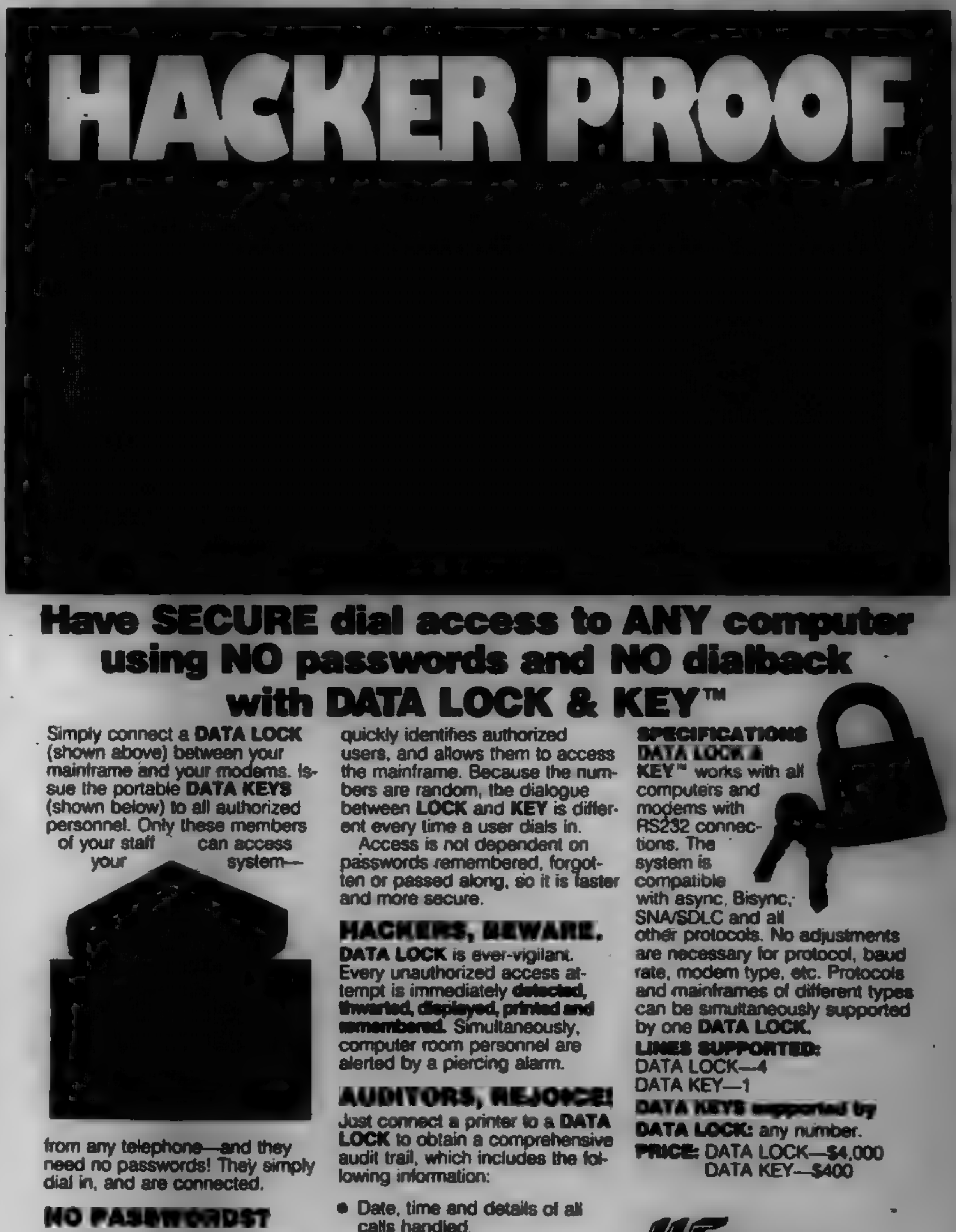
In mapping the proposed project on this matrix, determining application uniqueness is simpler than determining importance. One might begin by determining the availability of packaged software to meet the needs of the application. This implies, naturally, that the requirements of the system are already well understood. In any case, it is generally true that the more unusual a given application, the less likely a packaged software product will be available for it. In making this determination of uniqueness, therefore, one might ask:

- Can functionality be added easily to a packaged product to meet changing user needs?
- Is the package compatible with other systems now in use in terms of data, input and output requirements?
- Can the package handle the size of data base required by this application?
- Does the package provide an appropriate user interface?
- Does the package have the processing speed necessary for this application?
- Will support be available for implementation and use?

If a package meets these or other appropriate criteria, it can be considered an alternative to custom development. Otherwise, the application may be viewed as unique. Compatibility is significant enough that it is treated as a separate test below.

Judging the relative importance of an application is a more difficult task. The extreme cases are often self-evident. For example, a claims processing system is critical to an insurance office, since no work can be accomplished without it. But the marginal cases are more difficult.

One approach relates the relative importance of a proposed system against systems already in operation. One might prepare a list of



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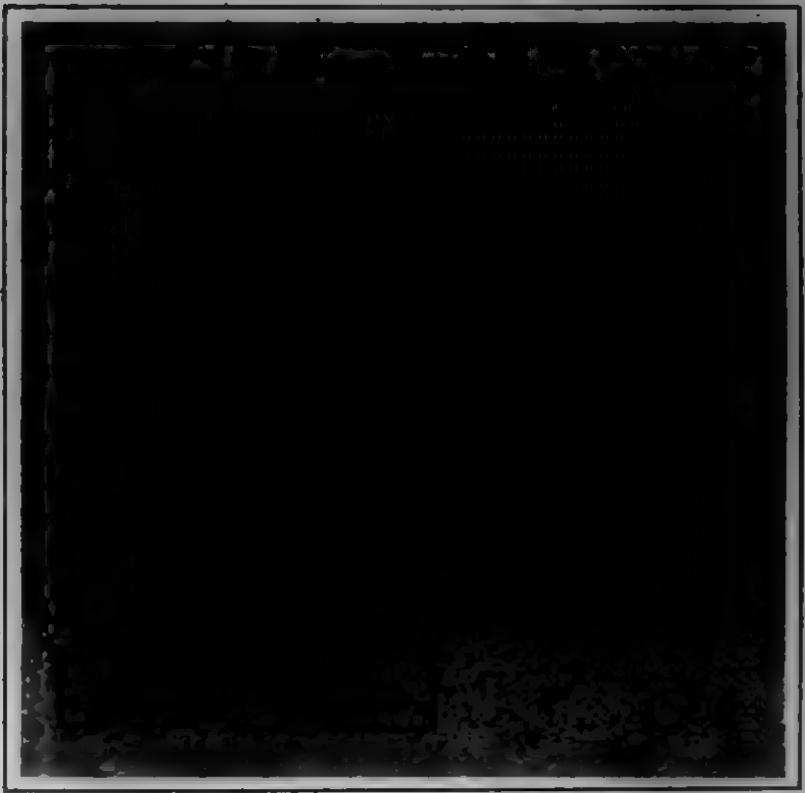

Figure 2. A micro-based order costing system

applications in use, ranging from customer billing to a spreadsheet package used by a manager to prepare budgets. Note that these systems need not all reside on a microcomputer, nor do they have to be computerized. It is only necessary that a reasonable range of discrete operations be compiled. The proposed project can then be ranked against operations in existence in order to determine how critical it actually is to the organization.

There are subtle ways in which the judgment of a system as relatively unique and important can interact. For example, the degree to which a project is highly distributed throughout an organization can affect its "importance." An application that would be used in all the marketing offices of an industrial equipment manufacturer would be more important to that firm than one that would appear in only one office. The application that is widely distributed would yield higher benefits in total productivity gains than an application that is extremely localized. Hence, all the issues of distribution, localization, uniqueness and importance must be considered within the analysis of the problem. That interaction should come out in this stage of the analysis.

4. Must the system be compatible with other systems in use?

This last criterion may be the one that most often justifies custom development efforts. Even if the proposed system is not unique and does not rate high in terms of importance to the organization, the requirement that it be compatible with other systems in that firm is often enough reason for custom development. "Compatible" means that the system uses data in the same format as the systems used by the organization as a whole, that it produces reports that appear in the same format as those of the organization, that it is able to communicate directly with the centralized data processing system of the organization and/or that the language in which it is constructed is the same as, and meets the standards of, the organization as a whole.

An example illustrates the notion that a micro-based application should serve needs that are localized and distributed throughout an organization. A manufacturer of industrial process control equipment marketed its products through a large number of local sales offices. These offices were staffed by sales engineers who worked closely with customers in helping them choose the proper equipment configuration for their needs.

Because the company produced thousands of individual items that could be combined in many ways, the process of preparing orders for the customer was time-consuming. It involved looking up all the items required by the customer, checking their compatibility and availability, finding their price and filling out a complicated worksheet.

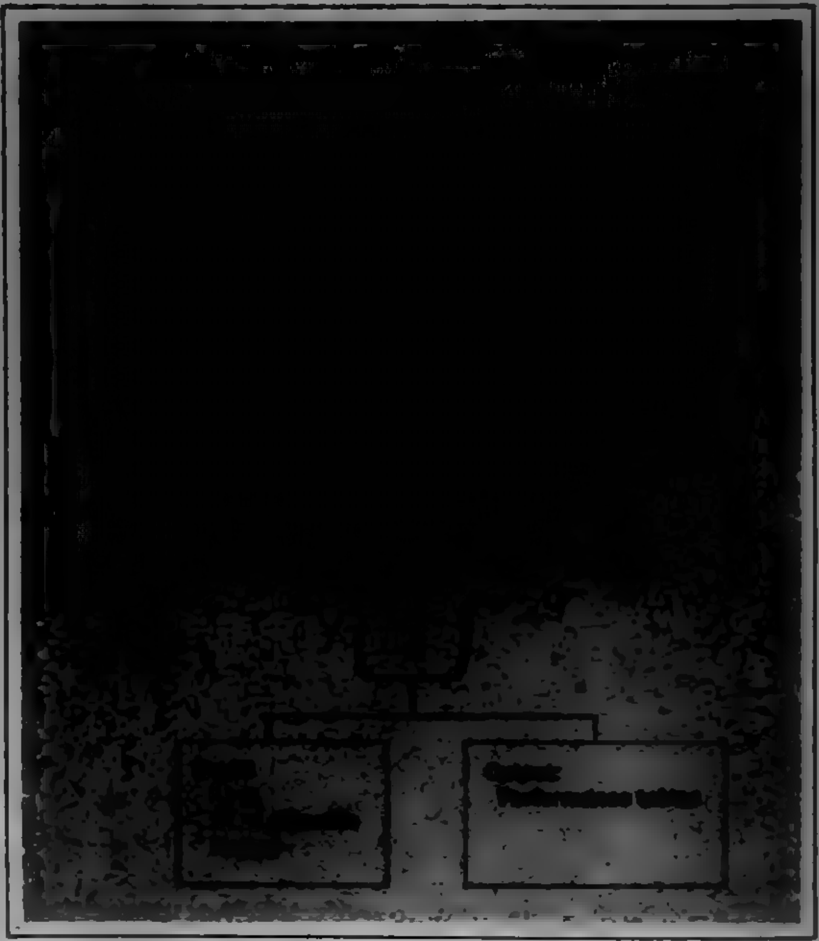

Figure 3. A micro-based mutual fund reporting system

The firm addressed this problem by developing a micro-based system that could retrieve price and availability information from the mainframe and prepare an order costing sheet (see Figure 2). The system was used in each of the sales offices of the firm by the sales representatives. They could prepare a proposal for a customer based on the most recent price and availability information on the central system.

This arrangement decreased the time necessary to prepare proposals and allowed the sales staff to be much more responsive to customer needs.

The project met several of the criteria discussed in section two. The need for the application existed in each of the local sales offices of the company, making it distributed. The application was also quite specific to the parts list and pricing scheme of the firm. In fact, an early prototype developed using Ashton-Tate's Dbase-II turned out to be unbearably slow.

Finally, because of its wide distribution throughout the marketing organization of the company, the project was easily justified by the increase in productivity in each sales office. The system did not represent

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a critical function for the firm in any sense. Orders were, and probably still are, prepared by hand. But the system had the potential for greatly reducing the time necessary for preparing proposals and orders for customers. The system also would standardize the ordering process and provide information to the manufacturing operation about sales much more quickly. Thus, the cumulative benefits of the system justified custom systems development.

The second case illustrates the opposite situation. An investment advisory firm tracked the performance of about 600 mutual funds and published its data in a newsletter. The data used in this activity included several measures calculated from current security price data. A small staff group carried out the calculations necessary in compiling these tables, using, in part, security price data read from pricing tapes. Another group within the firm also used these pricing tapes in managing clients' investment portfolios.

The firm felt that the job of compiling performance statistics should be automated. This would allow the staff greater freedom to pursue special analysis of the raw performance data. However, rather than develop the system for the minicomputer that read the pricing tapes and that the firm's portfolio managers used in their jobs, the company chose to build the mutual fund tracking system for a microcomputer (see Figure 3 on ID/23).

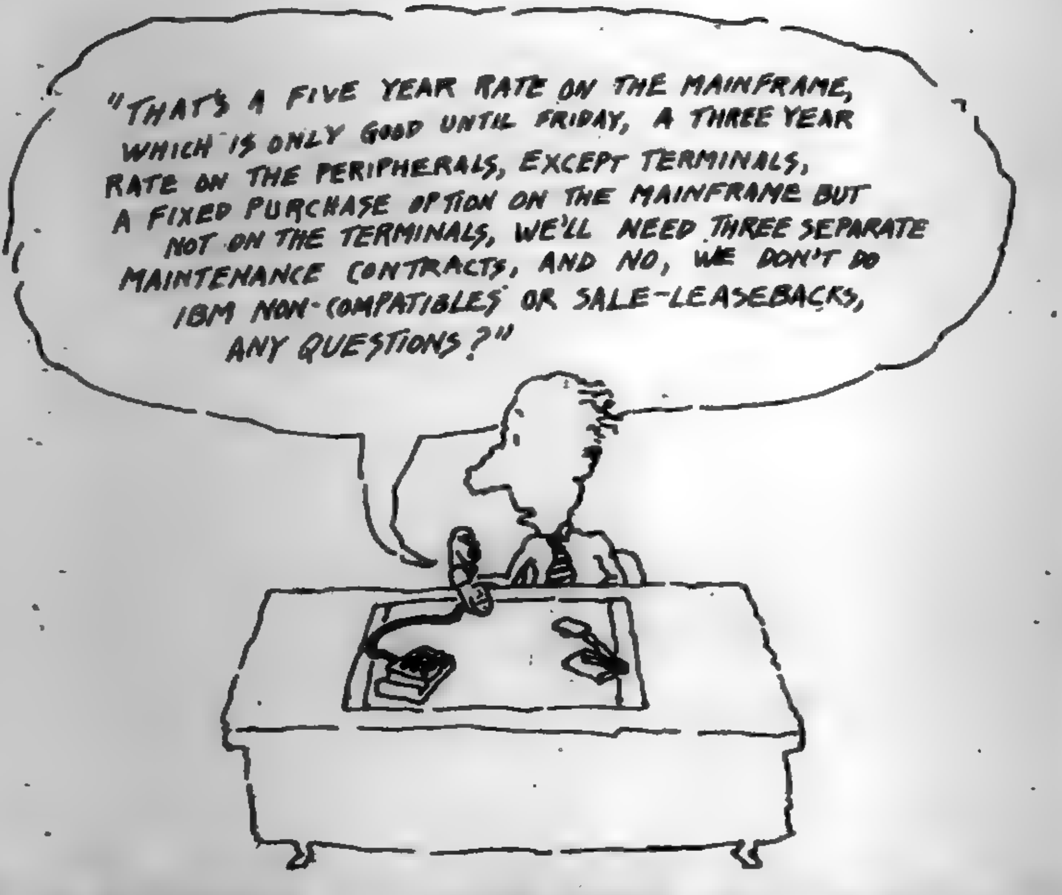
Both the system developed and the hardware would be totally dedicated to the task of compiling biweekly performance data. The system would download the necessary price information from the minicomputer to the micro, read other information from manual data entry, compile reports and allow the staff group to perform limited analysis of the basic information.

One firm, rather than add another function to its minicomputer, chose to build a custom mutual fund tracking system for a microcomputer. The system would be totally dedicated to the task of compiling biweekly performance data.

This system illustrates the virtue of placing a critical business function on a dedicated piece of hardware. The biweekly reports represented one of the most fundamental products sold by the company. This value in itself justifies a custom development effort. However, further justification was provided by the competition for pricing information between portfolio managers and the mutual funds tracking group. The importance of each of these activities argued strongly for separating their functions as much as possible.

Finally, since the work of the mutual funds group included some analysis of performance figures, the system had to allow for possible future enhancements. Even though the need for the application was extremely local, the critical nature of the application, the need for compatibility with other systems and the need for a modular design all required custom development.

In a final example, a large commercial bank recently decided to enter the municipal bond registration and transfer agent business. It already offered government banking services to municipalities, specifically by providing advice on the preparation and marketing of a new bond issue. In making the decision to enter the registration business, the bank also recognized a need for a high-quality system to support the service. Yet, while the bank realized that the volume of registrations it would handle was small and that a microcomputer could handle the required data base, it was unable to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The bank met this need by specifying and building a microcomputer-based system to manage the process of registering municipal bonds and transferring the ownership of certificates. The system was built using such standard development tools as the C programming language, a commercially available data base management package and AT&T Bell Laboratories' Unix operating system. Unlike the previous examples, this system operated in isolation from other systems at the bank. It received all input through data entry operators in the bond registration area of the bank and produced all output locally, including all regular interest and principal payment checks.

This project met several of the requirements mentioned in the previous section. First, the application was critically important to the business of providing registration and transfer agent functions. In an important sense, the system that managed registrations and transfers was the business. The bank had a strong motivation, therefore, to seek out the most effective system it could find for this application.

Second, the application was unique in that no packages were available for mini and mainframe computers, but these were too large for the scope of the business the bank had in mind.

Finally, the operation was extremely localized. It was run by fewer than 10 professional and clerical staff. Information fed into the system from only one location in the bank, and processing took place in only one location.

All these examples demonstrate that there are many situations in which organizations should pursue a custom development strategy for microcomputer-based systems. Demands for such systems exist in most industries, in all functional areas and at most levels of organizations.

There are many situations in which organisations should pursue a custom development strategy for micro-based systems. Demand for these systems exists in most industries, in all functional areas and at most organisational levels.

These systems are typically organizational and localized.

End users and MIS management must recognize that many information management problems have these characteristics and that microcomputers can accomplish a great deal more than run word processing and spreadsheet application software. Of course, many firms are coming to this realization, particularly now that hardware such as the IBM Personal Computer AT is available to support truly multiuser, multitasking systems.

Indeed, the potential of micro-based, multiuser systems suggests that we may see a reverse of the trend found in mainframe environments, which has been from custom to packaged software.

About the authors

John Saunders is a principal with the Boston Systems Group. He recently managed the development of a decentralized management system for a division of a large university.

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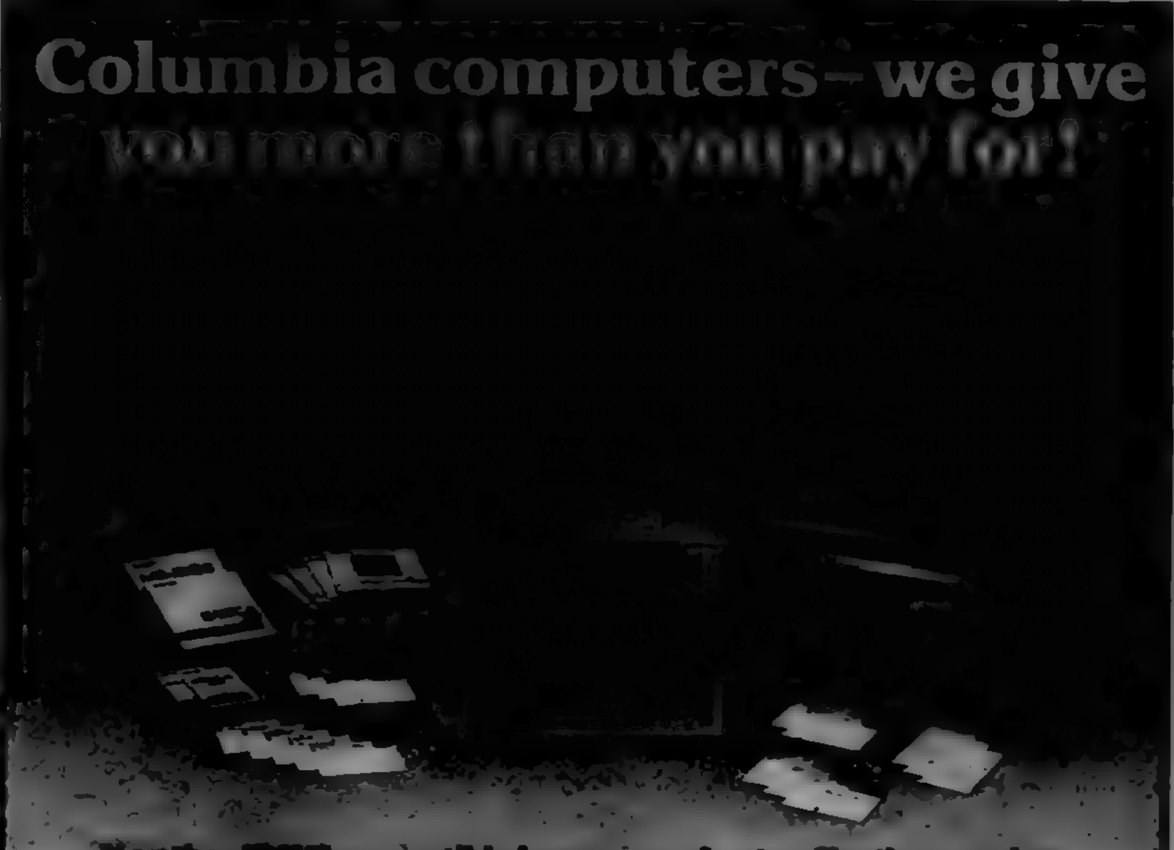

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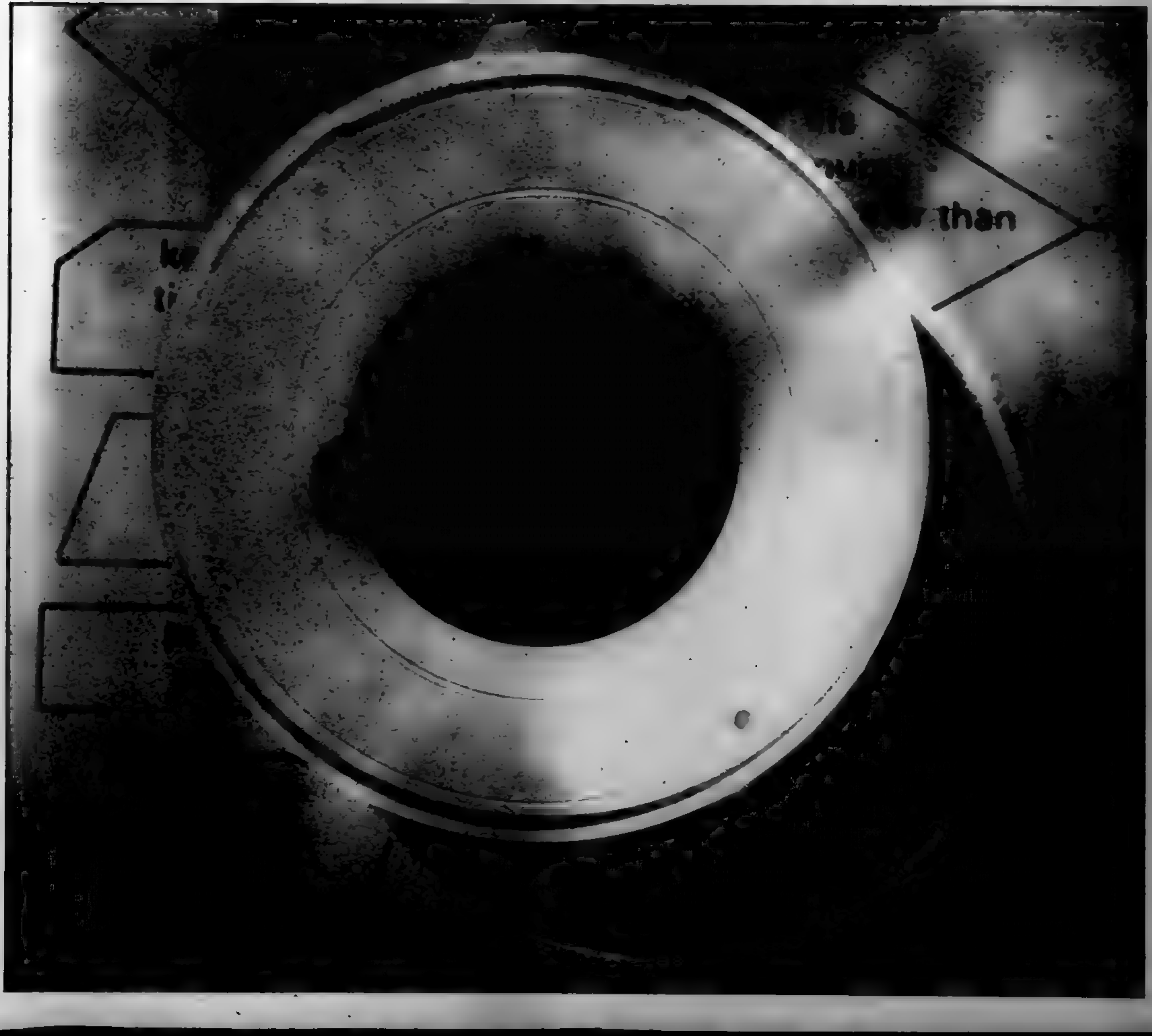
By Stephen Becker

Software patents are not for everyone. They protect only certain types of software and must pass a stringent examination process at the U.S. Patent and Trademark Office. They are expensive because in virtually all cases a patent attorney must be hired to do the work. In addition, the period of time required before the patent is granted is substantial. The process can take up to two years or more, and a patent has no teeth before it is granted. But once the patent is granted, it is formidable.

Unlike a copyright that covers only expression, a patent protects the concept behind your software. Whereas you must prove actual copying of your software by another person to show copyright infringement, patent infringement does not require copying; it covers competitive software that is independently developed after yours.

A trade secret must be a secret. Once your software becomes known to the public (and this can be done by a competitor who may reverse engineer your software), trade secret law is lost. Software protected by a patent, however, does not have to be maintained secret. Legal protection extends even to different but equivalent software that may have been written independently or by reverse engineering yours.



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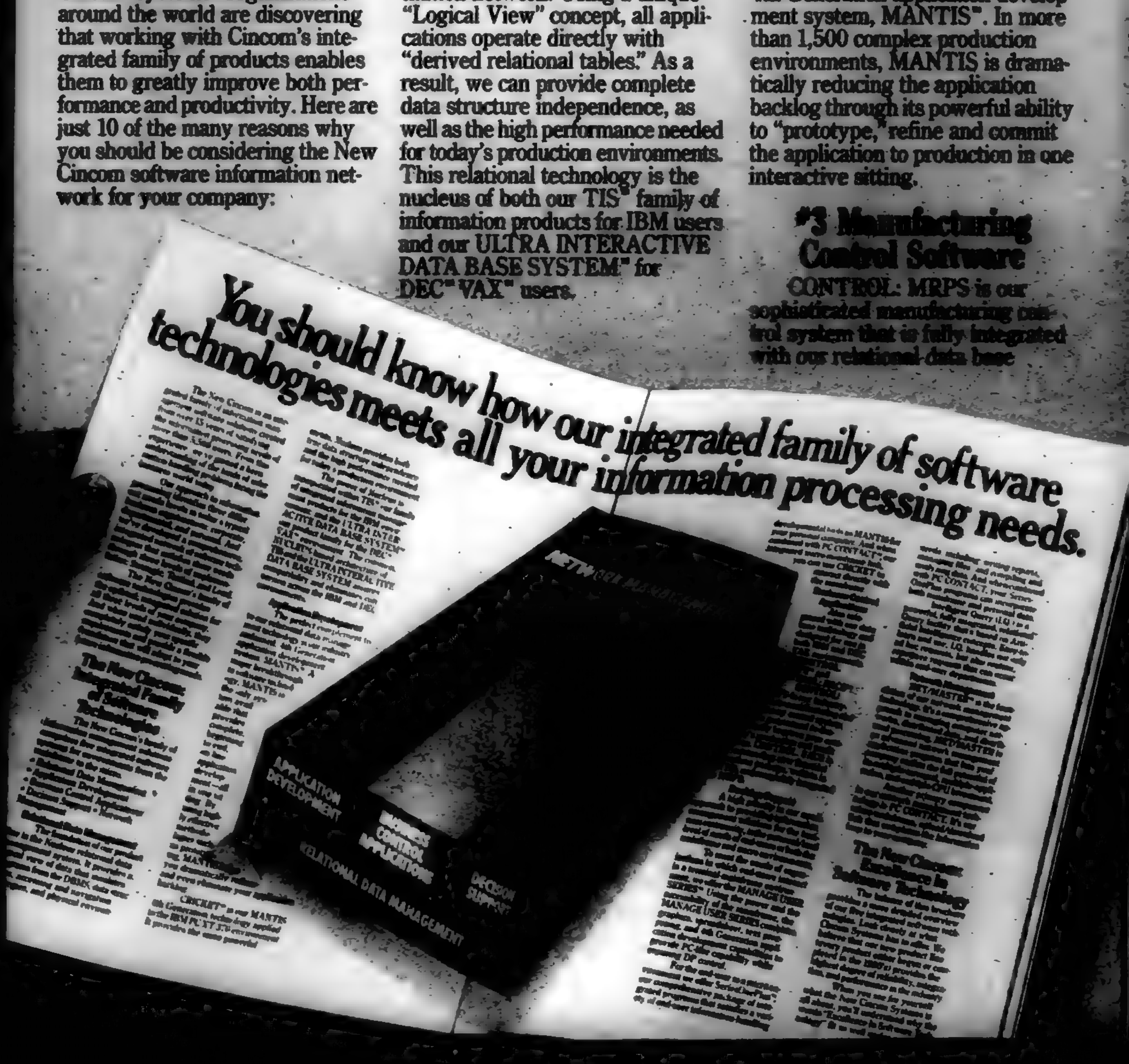

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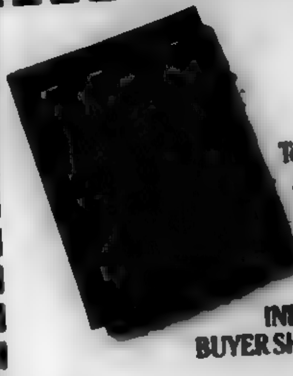

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CW 11/26

A patent is a right granted by the government to an inventor to exclude others from making, using or selling the patented invention in the U.S. for a 17-year period. Thereafter, the public owns the invention. In exchange, the inventor must make a complete disclosure of the invention in a patent application that is published after the patent is granted.

During the period of time when the patent application is being examined at the U.S. Patent and Trademark Office, the invention is maintained in secrecy; there is absolutely no way for the public to gain access to the information in your patent application before it is granted.

Suitable disclosure

Probably the best type of disclosure on computer software is a complete flowchart together with commentary describing the type of computer hardware used with software, the nature of the input signals to which the software responds and the types of output signals generated. A patent attorney will prepare all the necessary documentation for the patent application, but you will have to spend quite a bit of time with your attorney developing a suitable patent disclosure.

Patent attorneys must be registered with the Patent and Trademark Office. You can obtain the names of patent attorneys in your area by writing the U.S. Patent and Trademark Office, Washington, D.C. 20231. Be sure to select an attorney who has had experience with software-related cases.

A patent covers only subject matter that is new and is not obvious from what has been done before. Your patent attorney will have a search made at the Patent and Trademark Office to determine whether your software invention appears to be patentable before a patent application is prepared. You must work closely with your attorney to prepare the patent application because you will probably be more familiar with the technology.

After the application is filed at the Patent and Trademark Office, a patent examiner who specializes in software-related inventions makes a search of his records to determine whether your invention is patentable. You will, in a sense, also be working with the patent examiner, showing him the closest software to yours of which you are aware, reviewing what the examiner locates during his search and, with the help of your attorney, negotiating the scope of your patent.

Patents on software

In the past, there has been quite a bit of controversy over whether software or systems involving software are patentable. The problem is that certain types of subject matter resembling software have been determined by the courts to be incapable of being patented. For example, it is not possible to patent a mathematical algorithm or equation, such as the Pythagorean theorem, although it is possible to obtain a patent on a process or machine that in some way applies that theorem.

It is also not possible to patent a mental process, a method of doing business or a scientific principle. Early court cases were pro-software, finding ways whenever possible to justify patenting computer-related inventions.

Then, in 1972, the U.S. Supreme Court issued an adverse decision in a case involving a program for numerical conversion on the grounds that an invention involving a mathematical algorithm that has no practical application except in connection with a digital computer is not patentable because patents of this type would effectively preempt use of pure mathematics.

There was a concern in the legal community that computer programs, which

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IN DEPTH/SOFTWARE PATENTS

Dean Witter Reynolds attacked the validity of the patent on the grounds that the patent is a method of doing business that traditionally is unpatentable subject matter.

by their nature involve algorithms, are not patentable and that processes and machines involving programs are also not patentable. For a time, some attorneys were actually converting software into hard-wired circuits in patent disclosures to avoid rejections by the patent examiner. It became unclear whether at one extreme all inventions involving software of any type were unpatentable or, at the opposite extreme, only mathematical algorithms were unpatentable. This situation created quite a bit of confusion that was resolved only recently.

In 1981, the Supreme Court heard a patent case involving a program used in a rubber curing system. The temperature at various points within a mold was measured and supplied to a programmed computer. The computer processed the temperature measurements using a mathematical equation to open the mold at the exact time for optimum curing. The Supreme Court held the invention to be patentable, reopening the door to software-related patents.

To determine what types of software inventions may be patentable, the court used a test adopted from a lower court. The patent claim must first be analysed to determine whether it recites a mathematical algorithm. If the claim does not recite (directly or indirectly) a mathematical algorithm, then the invention is patentable if it is new and not obvious over what has been done before. If the claim involves a mathematical algorithm, however, the invention nevertheless may be patentable if the claim does not completely preempt that algorithm. In other words, as in the rubber curing case, which involved measuring temperatures and opening a mold, there must be something in the software that goes beyond merely solving a mathematical algorithm.

The Patent and Trademark Office recently issued program patent examining guidelines endorsing the judicial test. Rather than dwelling on the types of software inventions that are not patentable, the guidelines instruct the examiners how to determine whether the software is new and unobvious and whether the patent disclosure is adequate.

Numerous patents have recently been issued on software inventions of various types. Last year, the District Court of Delaware reviewed a case between Merrill Lynch, Pierce, Fenner and Smith, Inc. and Dean Witter Reynolds, Inc. on a patent owned by Merrill Lynch covering its Cash Management Account program.

Dean Witter Reynolds attacked the validity of the patent on the grounds that the patent is a method of doing business that traditionally is unpatentable subject matter. However, the District Court of Delaware held the patent to be valid because the invention is a machine (programmed computer) and not a business method. The focus of the analysis must be on what the system is (a programmed computer), not on the use to which it is put.

In my opinion, the Merrill Lynch case goes too far. The categories of inventions, such as business methods, traditionally considered unpatentable, should not become patentable merely because they are practiced by a computer rather than by a human being. Nevertheless, the Merrill Lynch case has not, to my knowledge, been appealed, and the patent is being widely licensed.

Patents like the Merrill Lynch one are now being granted routinely by the Patent and Trademark Office. Unless there is a shift in the law, the

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patents will be enforced in the courts.

In addition to the expense and length of time involved in obtaining a patent, the majority of software is not patentable despite liberalization of the law, because the software is not inventive enough. Most software, such as accounting programs, is just a rehash of functions previously done manually, only faster.

There is no guarantee that despite your attorney's best efforts, a patent will ever be issued. The examiner may simply refuse to grant the patent because he considers the software invention to be unpatentable.

Patent pending

Even if you appeal, you may lose. Although you can identify your program as having a "patent pending" while your patent application is before the examiner — and this may discourage some potential competitors — you have no real legal right until the patent is actually granted.

Patents are often criticized as being no more than "licenses to sue." An infringer might contest the validity of your patent in court, as Dean Witter Reynolds did in the Merrill Lynch case, and it is extremely expensive to defend a patent case. Statistically, as many as one-half of all patents that are challenged in court have been found unpatentable (patent opponents like to flaunt this), and appeal has been unreliable since the attitudes of various appellate courts have varied substantially.

On the other hand, fewer than 1% of all patents that are issued are ever litigated. It is only the weakest patents that are litigated; most cases involving the remaining patents are settled out of court. Although only about one-half the patents that are challenged in court survive, remember that in virtually any area of litigation half the parties win and half lose.

A practical problem with software patents is that they are difficult to examine properly. How do you determine whether software is new and unobvious? All software that is maintained as a trade secret and most software in the public domain is not in the files of the Patent and Trademark Office. Bearing in mind that the patent examiner has only several hours to do research, how does he locate and determine how prior software operates, particularly if no flowcharts are available?

This limitation is one reason that the Patent and Trademark Office previously opposed patentability of software inventions. During litigation, however, your opponent may have the resources to hire a small army of attorneys and experts to attempt to locate earlier software as evidence that your patent is invalid.

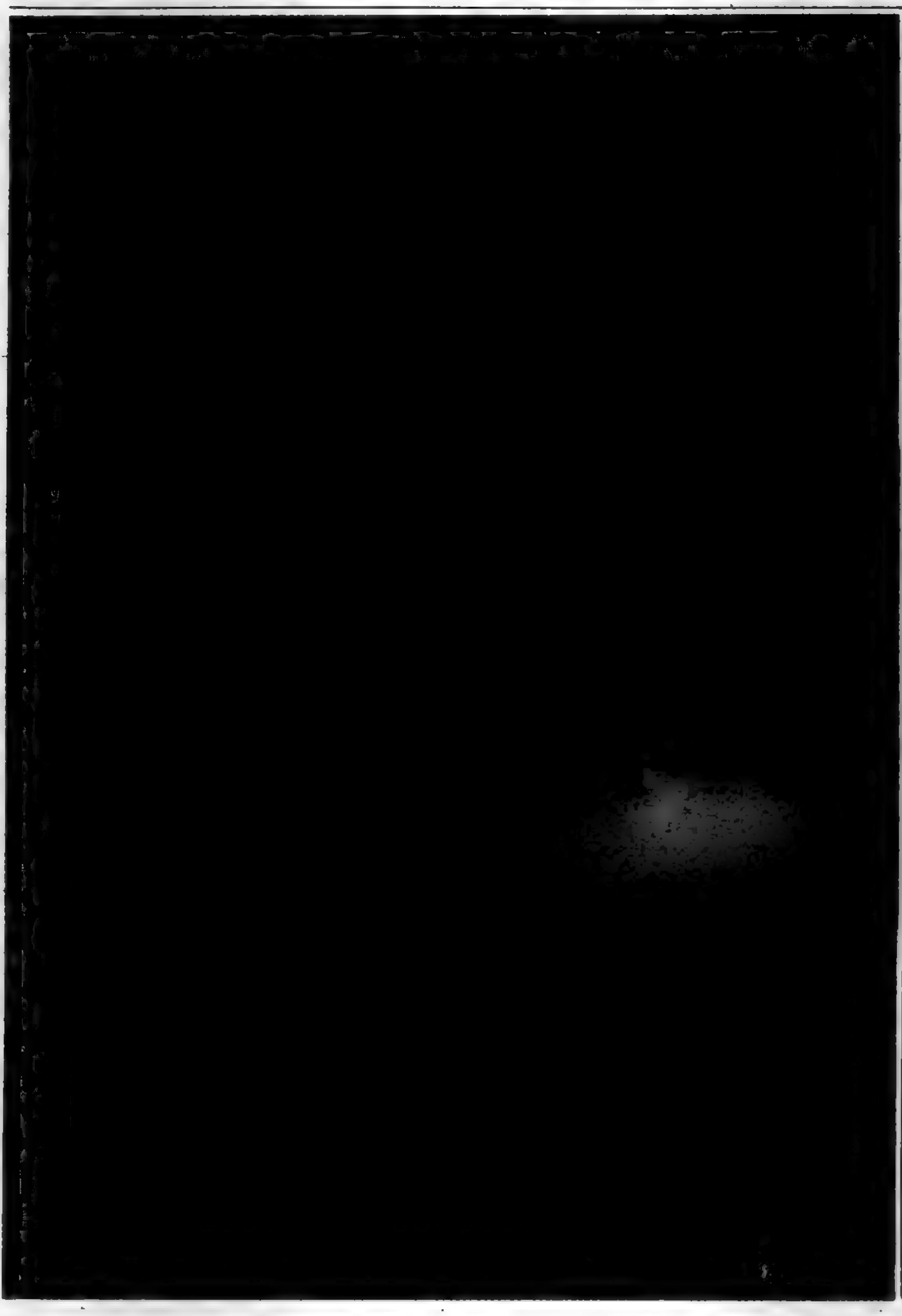
Brighter days

Despite various problems, software-related patents are becoming stronger and more widely used. Patent attorneys are becoming more proficient at drafting software patent applications, and the Patent and Trademark Office has hired a battery of new computer expert examiners. Although patents will never be perfect because all prior software, some protected by trade secrets, will never be before the examiners, new techniques for searching the software literature using data bases are being adopted by the Patent and Trademark Office.

Patent appeals have been consolidated into a single court, the Court of Appeals for the Federal Circuit, which tends to be more pro-patent than the Circuit Court that previously heard appeals. Patents are now more likely to be enforced, and a consistent body of laws will be established.

Because patents are expensive and will not be appropriate in every case, you should consider patent protection only for software that meets all of the following conditions:

- A commercial lifetime greater than about five years.
- Substantial commercial value.
- It involves more than the solution of a mathematical equation.
- It is clearly novel and unobvious — not a rehash of manual procedures, such as bookkeeping.
- It embodies a concept that is likely to be copied. ‡



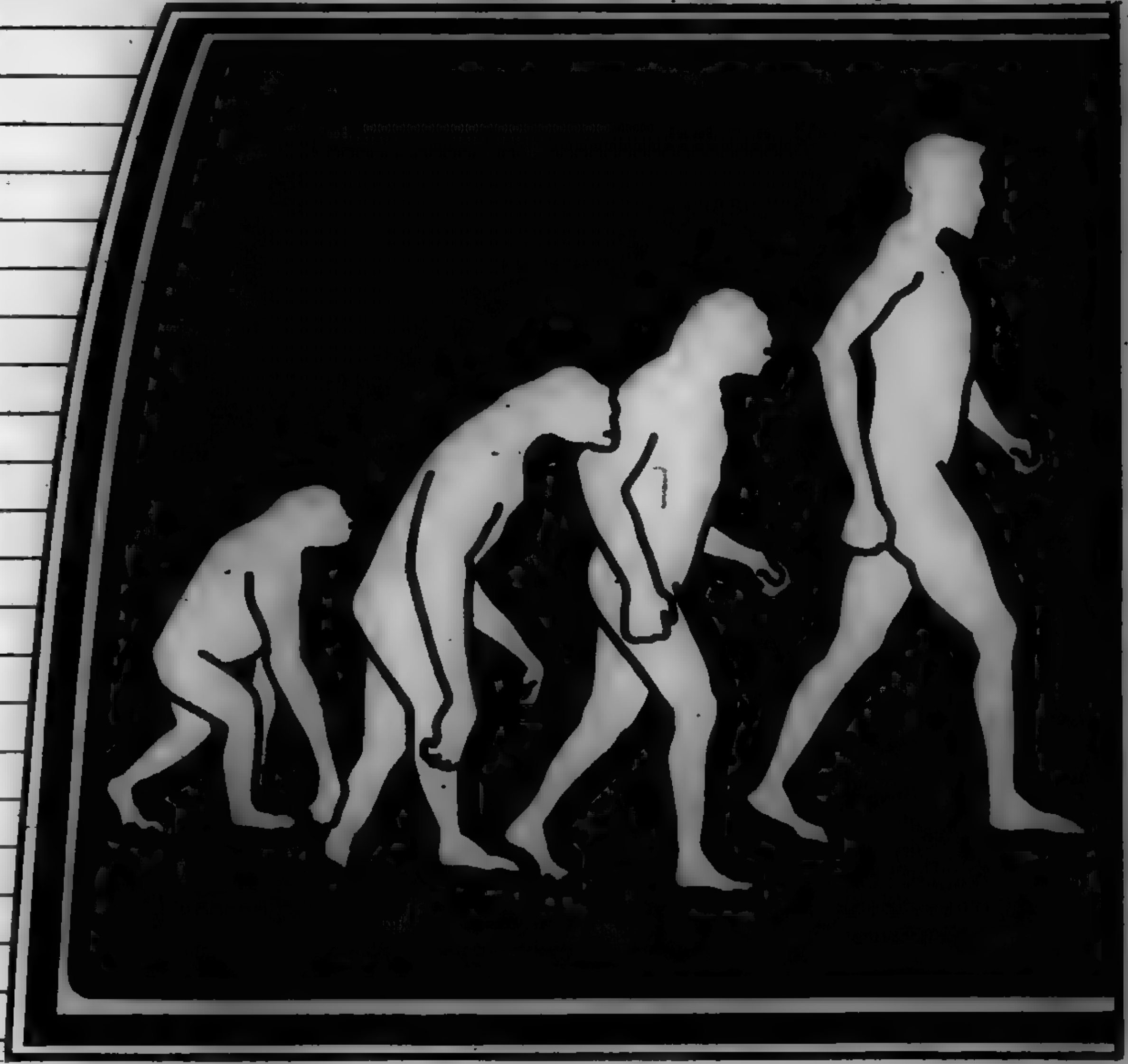
About the author

Stephen Becker is a patent attorney with Lowe, King, Price & Becker in Arlington, Va. He specializes in computers and software.

SPECIAL REPORT

Data communications terminals

The evolving human interface



November 26, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Daunted by bouts with micros, terminals look for niche

By Tom Henkel
CW Staff

The days of the traditional CRT terminal — a unit with little or no intelligence used solely to communicate with a large computer system — appear to be dying. The popularity of desktop microcomputers and the availability of inexpensive off-the-shelf components have permanently altered the way many organizations view data processing. Consequently, there has been an increased user demand for local processing power plus the ability to access data stored in a host processor easily.

But while most industry watchers agree the traditional role of CRT terminals has been irreparably changed, there still is considerable disagreement over when the market for relatively unsophisticated terminals will breathe its last. Some analysts say the demand for microcomputers has already severely limited the use of CRT terminals. Others, however, maintain there is still a huge market for inexpensive CRT terminals, especially among clerical workers who do not really need local processing capabilities.

"People forget just how many terminals there are out there," noted Melody M. Johnson, an analyst with the Seattle brokerage firm of Cable, Howse & Ragen. Just the replacement market for popular terminals like Digital Equipment Corp. VT100 and IBM 3270-type units could generate enough business to keep the industry alive for several more years.

The price gap

Furthermore, Johnson noted, there is still a considerable rift between the price for an unsophisticated terminal and microcomputer systems. That gap is large enough to cause many companies to think twice about putting a micro on every desk.

Ilene Goldman, an analyst with International Data Corp. (IDC), a Framingham, Mass.-based market research firm, noted that an IBM 3270-type terminal can cost roughly half as much as a well-configured microcomputer. Goldman added that many companies, such as banks and insurance firms, use terminals mainly as a means to give workers access to data stored in a host mainframe.

For those users, there is little need for local processing capabilities, Goldman said, adding that few companies are willing to spend extra money to give employees capabilities they do not really need.

Johnson explained the trend toward desktop microcomputers has been very application-specific. For executives and secretaries who need to perform a variety of tasks, microcomputers have been a boon. But for clerical jobs, such as data entry, few companies have switched to using microcomputers over terminals. In fact, Johnson explained, many microcomputer companies don't know how to sell their products for so-called "back-office" applications.

The cost difference between terminals and microcomputers may be a temporary issue, noted Kenneth Bosomworth, president of Norwalk, Conn.-based International Resource Development, Inc. (IRD). Bosomworth said successful microcomputer makers are quickly building sufficient economies of scale into their manufacturing operations to negate the cost difference between terminals and microcomputers.

For example, even though a microcomputer tends to use more expensive components than standard terminals, Bosomworth explained that the microcomputer vendor capable of producing 100,000 processors a month may be able to sell the systems at a lower cost than a terminal manufacturer who makes 10,000 units a month. Currently, Bosomworth said some low-end microcomputers are already priced to compete favorably with terminals.

> *The popularity of desktop microcomputers and the availability of inexpensive off-the-shelf components have permanently altered the way many organizations view DP.*

But the disadvantage of bargain-basement micros is that they often do not allow users to switch between local processing and terminal modes easily. Some, Bosomworth explained, require users to load communications software onto the system before the unit can be used as a terminal. Bosomworth said users must be able to switch easily between terminal and local processing sessions for the system to be convenient.

He also said most microcomputer vendors could, and probably will, adapt their products to include the communications software in read-only memory. This would allow the user to choose either a terminal or local processing mode by flipping a switch.

One solution to the terminal/microcomputer issue is a hybrid product that offers both microcomputer capabilities as well as easy access to a mainframe in a terminal mode. IDC's Goldman noted IBM's 3270 Personal Computer offers such hybrid capabilities, but the unit is still more expensive than some 3270-type terminals.

Terminal makers are not taking the assault from the microcomputer community lightly. Most have taken advantage of off-the-shelf components to give their products some local intelligence.

"There are really no dumb terminals any more," Johnson said, adding that most terminal makers have discovered that producing an intelligent terminal does not typically cost any more than making a dumb terminal. Consequently, Johnson predicted the the already blurred distinction between terminals and microcomputers will become further confused with low-end microcomputers offering the same basic capabilities as high-end terminals.

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Authors should include a brief biography and a telephone number at which they can be reached. The submission deadline for the February Special Report is Dec. 28.

If you have any questions, send them to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham 01701.

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Terminals holding their own against micros

Maintaining position in large data-entry, editing environments

By [illegible] Goldman
Special to CW

A great deal of discussion has arisen among users and vendors alike concerning the possible impact of personal computers on the terminal market. Initially, most analysts predicted that the influx of the personal computer would trigger the decline of the terminal market. Embodied in this prediction was the notion that a terminal user would come out ahead by making the swap for the new device providing access to both worlds — terminal emulation and local processing.

After the novelty of the personal computer wore off, evidence of a different sort became apparent. For large, semidedicated data-entry and local editing environments, the terminal was, and is, by far the most cost-effective tool. This is not to imply that personal computers will not capture any of the high-end terminal market. They will, and have, but not to the degree analysts or vendors expected.

The key to the migration of terminals to the microcomputer is largely a function of vertical market applications. Purchasing schemes for terminals and micros in the banking, insurance, medical, utilities or retail world are often dissimiliar in nature. While one industry may be heavily host-application-dependent, another may have a mixture of host application and local processing needs. In environments where local processing outweighs, or is at least equal to, the amount of host-related applications, the microcomputer is a viable alternative.

More users when costs drop

If a terminal is used solely to interact with the host, replacing the terminal with a personal computer is unjustified. When personal computer costs drop to the point where they can compete head-to-head with the high-end terminal market, then more users, not just top executives, will opt to purchase personal computers. This will hold true for a diversified cross-section of industries. But until this time comes, the terminal will remain a viable and needed instrument.

In 1983, International Data Corp., a research firm in Framingham, Mass., determined that 1.78 million CRT-based terminals were shipped in the U.S. marketplace, as compared with 1.5 million in 1982. Overall, the U.S. terminal market experienced an 18% growth in shipments. These numbers, however, do not tell the whole story. To understand the future of the terminal market, a more comprehensive explanation must be made.

The terminal market is made up of asynchronous and synchronous terminals. On the asynchronous side, often referred to as Ascii, there are low-end, limited-editing terminals and full-editing terminals. On the syndhronous side, recognized by the Ebcdic character code, there are three segmented areas: IBM 3270-type, IBM former General Systems Division-type and non-IBM synchronous. The final category, clustered processing, is made up of both synchronous and asynchronous terminals (see chart 1).

Price decline an important factor

Perhaps the most important factor in today's terminal market, in terms of how it affects the end user and vendor, is falling prices. In the past, price was directly correlated to the capabilities of the box. Dumb, low-end terminals typically fell at the bottom of the pricing scale, while full-featured, editing terminals occupied the high end.

The pricing structure changed with the advent of offshore production and technological advances. Not long ago, full-editing terminals carried hefty price tags and were luxury products. Today, they are practically a commodity. In 1983, the low-end Ascii market had only a 10% growth in shipments (see chart 2), while the full-editing market had 30% growth (see chart 3).

The decline of the low-end asynchronous market has caused some of the market leaders to rethink their strategies. Digital Equipment Corp., the leader and standard-setter in the dumb-terminal world, responded to declining sales of the low-end Ascii market in 1983 by introducing an enhanced, cheaper ergonomic terminal line, the VT200. Already, the VT200 has received an overwhelming response from the user world and is on the road to becoming the new industry standard for the full-editing Ascii market, succeeding the VT100, for years the de facto asynchronous industry standard.

Intense price competition in 3270 market

Similarly, the 3270 market has had its share of intense price competition, which has eroded the profit margins of these vendors. IBM, who set the precedence in this market, upset the applecart in March when it made replacements to the mainstay 3278 terminals and 3279 color display. The 3178, 3179 and 3180 are departures from the standard 3278 CRT, and all three represent a new subfamily of low-priced terminals.

IBM's combination of price cuts, more features and fast delivery has raised the pressures in the 3270 market, leaving compatibles little room for maneuverability (see chart 4). Plug-compatible vendors have traditionally offered their products at prices 10% to 20% below those of IBM. As IBM turns more of its attention to the office, these vendors have had to trim their profit margins in order to maintain a presence in the 3270 market. This action has made them more vulnerable than ever.

At the close of 1983, sales for the CRT-based terminal market reached $3 billion. Sales for 1984 look as strong as ever. However, this does not mean that the terminal market has easy times ahead. In addition to capturing some of the terminal market share, micros have caused a great deal of anxiety among terminal vendors, which has led to some hasty business decisions, such as Televideo System, Inc.'s unfortunate jump into the personal computer market. Even more disconcerting are the fierce price wars going on between the compatibles, leading to an inevitable shakeout.

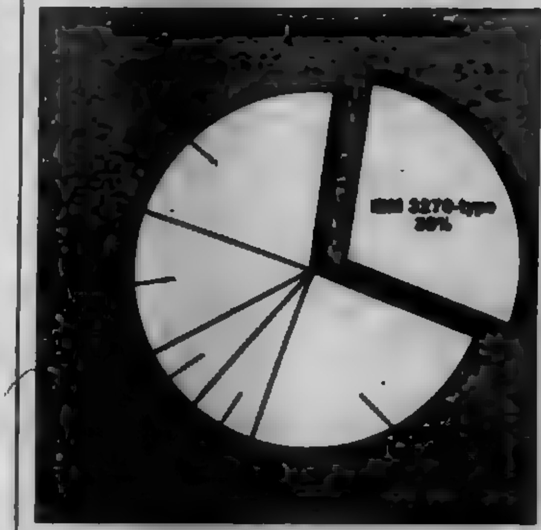

Chart 1. In 1983, vendors shipped 1.78 million CRT-based terminals in the U.S. market. Of these, 45% were low- and high-end Ascii terminals; 48% were IBM 3270-type, IBM General Systems Division-type and non-IBM synchronous terminals; and 7% were clustered processing terminals, including both synchronous and asynchronous machines.

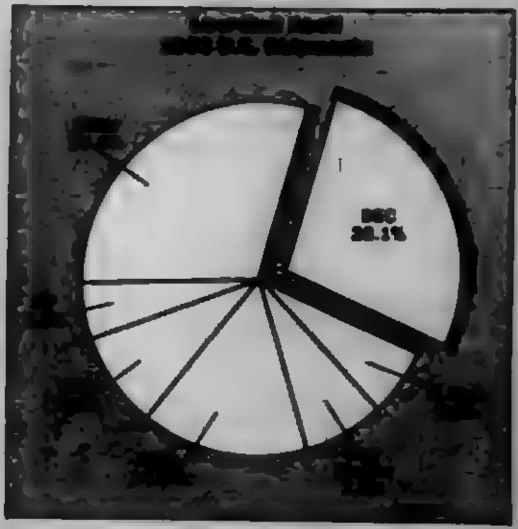

Chart 2. In 1983, vendors shipped 426,850 low-end Ascii terminals, only 10% more than they had the previous year.

Six vendors — Digital Equipment Corp.; Applied Digital Data Systems, Inc. (Adds); IBM; Lear Siegler, Inc.; C. Itoh Electronics, Inc.; and Hewlett-Packard Co. — accounted for 70.6% of those shipments.

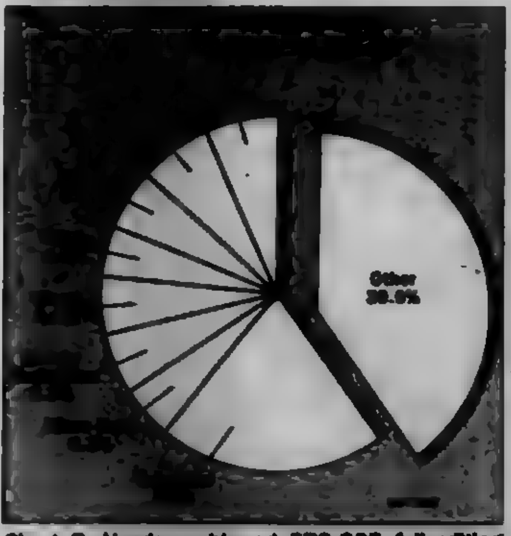

Chart 3. Vendors shipped 379,806 full-editing Ascii terminals in 1983 — a 30% increase over 1982 shipments. Eight vendors — Televideo Systems, Inc.; Hewlett-Packard Co.; Esprit Systems, Inc.; Lear Siegler, Inc.; Liberty Electronics USA; Micro-Term, Inc.; Visual Technology, Inc.; and Wyse Technology, Inc. — accounted for 60.4% of the total shipments.

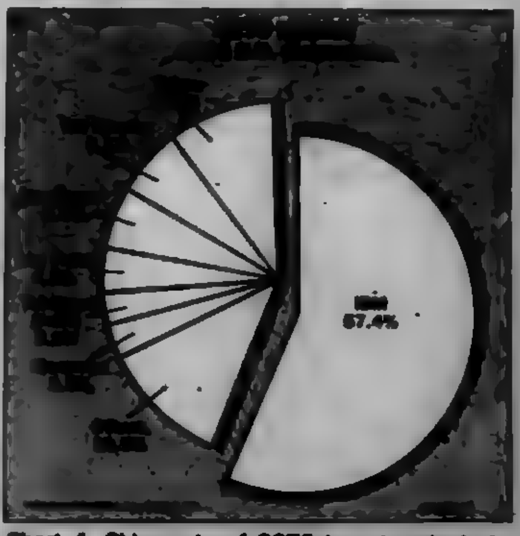

Chart 4. Shipments of 3270-type terminals in 1983 totaled 531,400 machines. Vendors other than IBM accounted for only 42.6% of that number. These vendors — Telex Computer Products, Inc.; ITT Courier Terminal Systems, Inc.; Raytheon Co.; Lee Data Corp.; Teletype Corp.; and Memorex Corp. — accounted for most of IBM's competition in the marketplace.

Goldman is a research analyst specializing in terminals and workstations for International Data Corp., a research firm based in Framingham, Mass.

In battle for terminal, personal computer market

By Joseph Kelly
Special to CWS

Since deliveries began in 1971, the IBM 3270 Information Display System has become the most successful terminal family in the data processing world. Industry estimates placed the installed base of 3270 and 3270-compatible terminals at well over two million units by the end of 1983.

Out of this impressive base, approximately one-half are terminals manufactured by IBM; the remainder are divided among the several plug-compatible vendors that have populated the market, including Raytheon Co.'s Data Systems Division, Telex Computer Products, Inc., ITT and Teletype Corp. The stiff market competition between IBM and the independents recently caused a small shakeout, with Raytheon (formerly IBM's No. 1 3270 competitor) and Mohawk Data Sciences Corp.'s MDS Trivex Division leaving the market.

But what of the predictions of doom for the conventional 3270 display terminal that have been heard in some quarters? Will the terminals disappear in much the same way as punch cards? The answer here is probably not. IBM's market strategy in 1983 makes this clear.

Until 1983, the 3270 product line changed slowly. The initial components consisted of the 3277 cluster display; 3275 stand-alone display; 3271 and 3272 cluster controllers; and 3284, 3286 and 3288 printers. The second generation of products, introduced in 1977, included the 3278 cluster display, 3276 control unit/display, 3274 cluster controller and 3287 and 3289 printers. In 1979, a significant addition to the 3270 family came in the form of IBM's first color display, the 3279. Many users view the 3279 as the product that legitimatized the color terminal as a business tool.

IBM shook up the market in 1983 with a rash of new products. These products signaled that IBM meant to protect its market share from two industry pressures: the rising popularity of protocol conversion as an alternative to 3270 terminals and the microcomputer onslaught.

The most significant of the introductions were the 3178 and 3180 Display Stations, the 3279 Color Display Station, the 3270 Personal Computer and 3278 and 3279 Personal Computer attachment features. Other new products included a large-screen gas plasma display (3290), a terminal multiplexer (3299) and new versions of the 3274 control unit. In addition, IBM reduced prices for several of the older generation products as a first step in phasing them out. IBM's actions directly addressed the two most significant threats to its 3270 installed base.

Many users view the 3279 as the product that legitimatized the color terminal as a business tool.

The display terminal market in which IBM competes is divided into two distinct and equally large segments: the 3270 synchronous terminal market and the Ascii asynchronous terminal market.

The Ascii market has been, for the past three years, involved in a low-end price war. Prices for basic smart terminals fell below the $500 level, with high-end prices dropping to $1,500. By contrast, the IBM 3278 Display Station carried a single-quantity price of more than $2,000 at the start of 1983.

The protocol converter was introduced during this time. With the advent of the

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Kelly is an associate editor/analyst for Datapro Research Corp., a research firm based in Delran, N.J.

How to be in 16 places

share, IBM 3270 product line positioned to survive

protocol converter, Ascii terminals and printers could change their data formats from asynchronous to synchronous, allowing them to transmit to IBM and IBM-compatible host computers. Although the Ascii terminals did not provide all of the functions found on the 3270 terminals, they were significantly cheaper. In some cases the Ascii/protocol converter combination saved costs by as much as 50%.

IBM countered the price advantage offered by Ascii-to-IBM protocol conversion with the 3178. A compact version of the 3278, the 3178 has a purchase price ranging from $1,660 to $1,720 and provides all of the features found on the older model.

In the long run, the most significant area IBM addressed with its product introductions was that of personal computing. The introduction of the IBM Personal Computer in 1981 affected every segment of the DP industry. One of the areas most affected was the display terminal market. As prices for microcomputers fell, many users replaced display terminals with these machines. The classic intelligent terminal has virtually disappeared. Many industry sources predict the same fate for the general-purpose display. IBM, at least for the time being, has shown that it plans to let the microcomputer coexist with the display terminal.

The first moves in this direction came with the unveiling of the 3278 and 3279 Personal Computer attachment features. These options provided the 3278 and 3279 display stations with personal computing capabilities. The products allowed the 3278 or 3279 display and keyboard to be attached to a Personal Computer processor unit.

IBM's key move, however, came with the introduction of the 3270 Personal Computer. The 3270-PC is a version of the Personal Computer that is intended to be used solely as part of a 3270 cluster. Available in color or monochrome versions, the 3270-PC provides the 3270 user with local processing functions as an integral part of the 3270 system. A key feature of the unit is its windowing capability.

IBM also introduced 3270-PC software. Some view the 3270-PC as one step in IBM's long-range plan to make the Personal Computer the universal workstation of its family of computer systems.

IBM made life difficult

The IBM strategy has made life difficult for its competition. The independent vendors have been forced to scramble to keep up with IBM's new products and lower prices. ITT, Memorex Corp., Telex, Lee Data Corp. and many of the other independents have radically overhauled their product lines in efforts to maintain their shares of the market.

Significantly, each of the vendors has added some personal computing capabilities to its terminal systems. ITT provides for the attachment of the IBM Personal Computer, as well as the ITT Xtra and other IBM Personal Computer-compatible microcomputers. Memorex also supports attachments of the IBM Personal Computer. Telex and Lee Data provide their own intelligent workstations or personal computers; Lee Data also provides a workstation that is compatible with the 3270-PC.

At the same time, profit margins have been reduced as vendors have been forced to lower prices on terminals, controllers and printers to meet the new levels set by IBM. Raytheon's Data Systems Division and Mohawk Data Sciences' MDS Trivex Division folded under these pressures. The shakeout may claim more victims.

As for the predictions of doom, for the time being at least, the replacement of display terminals with microcomputers is not economical. In addition, terminals will probably always be needed for basic data entry applications.

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SPECIAL **REPORT**

Multifunction units to expand share of office market

By George Everhart
Special to CW

The role of personal computers and multifunction terminals in office information networks will continue to change in the coming years.

Single-function terminals, with their significantly lower prices, have already made an impact on the market. As the technology improves and schemes for improving resource sharing grow, multifunction terminals will take on different roles by tapping the resources within a net.

Industry observers are watching how desktop computers and multifunction terminals coexist today. There is potential in systems that supply both the economy and flexibility of a multifunction terminal with the standalone processing power of a personal computer tied in to a network.

Resource sharing

In applications where data processing needs do not require full-time access to a personal computer, multifunction terminals have proven their worth. They provide resource sharing of personal computer functions, printing, storage and mainframe access.

New technology has given the multifunction terminal more utility. This was done by allowing displays to access different resources on a coaxial local-area network. In some configurations, terminals, when they have access to a multiuser personal computer server, take on the characteristics of a personal computer. Those terminals can also access a cluster controller to communicate with either local or remote hosts.

Although resource sharing is a cost-effective solution for many, it does not solve all problems. At times, users need unshared computing and printing power.

The recent innovation of an interface board that provides a direct channel between an IBM or IBM-compatible personal computer and a local-area network gave personal computer users unshared processing power on their desks while allowing them to share the other resources available online.

Standards must keep pace

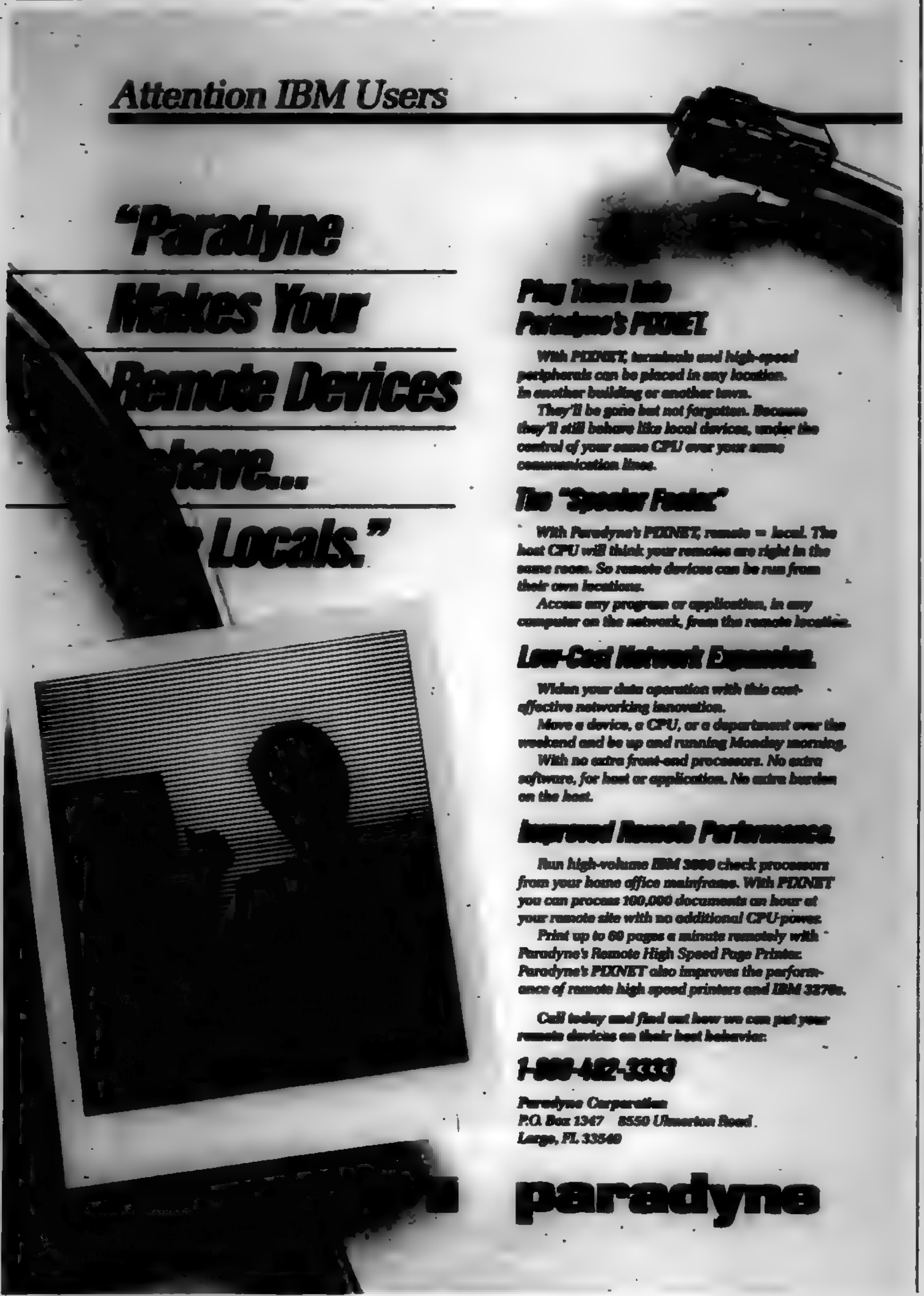
As more users accept the combined use of multifunction terminals and multiuser personal computers on a local-area network, industry standards in this area will be forced to keep pace. The IEEE 802 committees have made significant strides in the search for a common industry denominator.

MIS managers, however, cannot afford to wait years for the solutions to their immediate data processing problems. Managers are confused as to the steps they should take to solve their computing needs while the industry decides on its future standards.

As one solution, some manufacturers have offered resource sharing and local-area network technology using current IBM 3270 coaxial cabling and, where they are in place, gateways to standard local-area networks. This lets users share multifunction 3270 terminals, word processors and personal computers while it saves MIS management from having to make a risky investment in new cable configurations.

If the trend toward sharing resources via multifunction terminals and local-area networks continues, personal computers will be installed only where they are truly needed. There is no reason to install one at every desk. Flexible, multifunction terminals can access communications or applications programs for individuals on an as-needed basis. The terminal will play a dual role in the office information network: that of a personal computer and a data entry/retrieval device.

Everhart is marketing vice-president of Braegen Corp., a manufacturer of data communications terminals based in Milpitas, Calif.



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Communications network keeps freight firm on track

SAN FRANCISCO — A large international freight forwarder here is using a terminal network as a strategic tool to serve its customers' needs.

At the Harper Group, whose customers include General Electric Co., 3M Corp. and other Fortune 1,000 companies, "data processing is really central to the way the business is run," said Jim Smallman, the firm's MIS director. Smallman reports directly to the firm's president.

The Harper Group maintains an on-line freight inventory system that tracks shipments and paperwork for its clients. Three hundred IBM 3270 terminals and printers in 70 of the firm's U.S. offices communicate over private leased lines with an interactive data base that runs on a 16M-byte IBM 4341 at Harper Group headquarters here.

Nine of the firm's major clients have terminals in their own offices connected over leased lines to the freight inventory system; others tie in to the network through dial-up links. Smaller clients rely on the shipper's branch offices to provide them with information from the inventory system.

> *'Data processing is really central to the way the business is run.'*
>
> — Jim Smallman, MIS director, the Harper Group

Clients can reserve space for shipments on planes or ships and can confirm their reservations immediately through phone calls to Harper Group branch offices that are on-line with the freight inventory system. Customers with their own terminals can prepare and revise waybills for the shipments and transmit them for printing to a Harper Group branch or can have waybills that have been prepared by the Harper Group transmitted to them for printing.

The data base enables the firm to provide its larger customers with analyses of shipping routes and orders to help them identify profitable routes and monitor expenses. Additionally, clients who convince their suppliers to book shipments through the Harper Group can use the IBM 3270 terminals or call a local branch office to get information from the data base about shipment schedules, delivery problems and projected costs.

The data base and terminal network give the Harper Group an edge over its competitors. "Everybody in the industry gets the goods from A to B," Smallman explained, but most U.S. shipping firms rely on manual record-keeping systems and cannot provide their clients with as detailed information as they desire.

"There's a lot of pressure to improve the efficiency of our industry," he said.

One of the reasons for the pressure is that large manufacturers — a group that provides the Harper Group with much of its business — are cutting costs by relying on tight order management rather than high inventory levels to keep their plants stocked with necessary manufacturing components. In turn, shippers must provide highly reliable information about delivery dates for goods, Smallman said. "We have systems designed to do that."

Another reason is that customers have begun to buy parts from vendors who provide them at competitive prices, no matter where the vendors are located, rather than purchasing from one supplier in the U.S. The trend requires freight forwarders to provide information to help their clients track shipments.

"If the customer has a problem with an order, he can't just call the local supplier and have it trucked over," Smallman said. "When you're dealing with Hong Kong, Germany and Korea, it's a much more sophisticated, complex control problem."

Fluctuating international exchange rates have also increased the complexity of the services shippers must provide. Increasingly, he said, Harper Group's customers are determining where they trade on the basis of the changing values of international currencies. As these values fluctuate, customers' trade patterns change, requiring more flexible, responsive service on the part of shippers.

"It all boils down to having good data systems," Smallman said. "The future of this business depends on integrated data networks with widespread international coverage."

Harper Group has used the freight inventory system in its domestic offices for about five years. It designed the system with the intention of expanding it internationally as soon as the technology to do so became available. Smallman said the firm wanted to use the 3270 terminals in an international network, but could not justify the cost of private leased data lines for its overseas offices.

The firm considered using a value-added network connected with an asynchronous protocol, but rejected that option because such a network — running over public telephone lines — lacked the high-speed error-checking capabilities Harper Group

See FREIGHT SR/10

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Demand for integrated voice/data tools accelerating

By Sandy W. R. Moore
Special to CW

Technology's challenge is to get more functionality into the integrated voice/data terminal's compact package design.

Whether or not a market exists for integrated voice/data terminals is no longer questioned. In the past three years, users have not only accepted the idea of the integrated voice/data terminal, but they are also finding new applications and better software for their use. And what's more important, manufacturers are listening to them.

In early 1984, a number of players, including Rolm Corp., Zaisan, Inc. and Televideo Systems, Inc., announced they were entering what they saw as a high-potential market, while others like IBM, Data General Corp. and Digital Equipment Corp. began making noise about their future participation. With so many players entering the field, it is clear that the market will continue to expand.

The early integrated voice/data terminal market was unstructured and lacked direction. The first integrated voice/data terminal, introduced in 1982, was targeted at the corporate executive.

The principal parties in the early integrated terminal market, Northern Telecom, Inc. and GTE Telenet Communications Corp. were producing voice-oriented devices engineered by voice designers. When the market expanded to include MIS managers and business professionals, manufacturers found themselves trying to sell a voice-oriented integrated voice/data terminal to a DP person. The unit did not meet his needs, so the integrated voice/data terminal market shifted to meet new demands.

Early 1984 was a watershed for both integrated voice/data terminal marketing and technology. Technologically, the emphasis shifted from voice to data. These new terminals had increased access to computer systems and current personal computer-compatible systems that can share fields, software and data simultaneously.

From an applications standpoint, the integrated terminal was no longer strictly targeted toward the corporate executive. It emerged as a tool for anyone looking for ways to improve office productivity.

The integrated voice/data terminal market will continue to expand as more applications are developed. Office workers are finding the voice/data terminal an efficient device. Already, the banking industry is a big voice/data terminal user. At Citibank, for example, employees use these terminals with an 81-number directory to call up key customers or data bases. While talking to the customer, they can scroll necessary data onto the screen.

Doctors use voice/data terminals to access medical data bases for information on new drugs and drug incompatibility, while lawyers use them to tap law data bases for research or recent court decisions. The trucking industry, too, is finding these terminals useful, relying on combined voice and data devices to keep track of pickup, delivery and general disposition of loads.

New uses will progress logically to accounts receivable, purchasing and expediting functions. When a seller, using a voice/data terminal, can scroll up who owes money, automatically dial and then talk to the person, efficiency is increased.

Or, consider the telemarketing industry. With a voice/data terminal, the seller can call up information on a particular client, telephone that client and say, "Our records show you last ordered this product and that data. Do you need to reorder?" The possibilities are endless.

The market will also expand as users begin to appreciate the differences between the voice/data terminal and the personal computer. Voice/data terminals cost less than a personal computer, and while most micros are single-station units, through hardware and software combinations a single IBM Personal Computer can become a multiuser system. In addition, the voice/data terminal offers an element of security control in the office that is sometimes lost through personal computer usage.

As the integrated voice/data terminal market expands, user preferences will occur. Currently, standalone voice/data terminals — those that can be used with key systems, private branch exchanges (PBX) and central office lines — have a market edge. But in the near future, perhaps the 1985-86 period, proprietary voice/data terminals, those that op-

See VOICE SR/11

Moore is vice-president, terminals, for Northern Telecom, Inc., a maker of integrated voice/data terminals.

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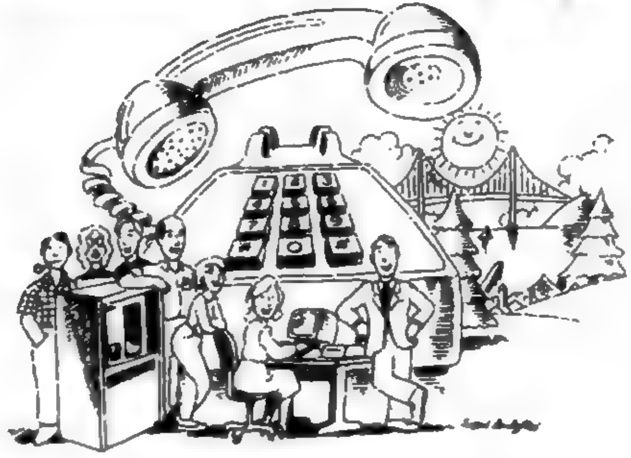

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> *'We like to buy the best terminal to fit the job.'*
>
> — W. J. Cole, vice-president of operations, Atlantic National Bank of Florida

JACKSONVILLE, Fla. — Until recently, the commitment a bank here made to use specific terminal equipment — regardless of its communications protocol — saddled the bank with an abundance of leased telephone lines and an overabundance of monthly bills.

Atlantic National Bank of Florida, a statewide institution with 110 branch offices and $3.4 billion in total assets, purchased terminals from different vendors to suit its varied needs. "We like to buy the best terminal to fit the job," according to W. J. Cole, Atlantic's vice-president for operations.

The bank used three types of terminals, which operated under three different communications protocols and utilized different transmission speeds:

- TRW Corp. Teller Assist terminals, which allowed tellers to mark up checks and perform inquiries about customer balances. Atlantic's branch banks operated about 1,100 Teller Assist machines. The machines communicated asynchronously at a rate of 1,200 bit/sec.
- IBM 3270-type CRT terminals from Memorex Corp., Harris Corp. and other vendors. The branch banks operated about 350 CRTs, which communicated using IBM's 3270 bisynchronous protocol at 2,400 bit/sec.
- Diebold, Inc. 910 and 911 automatic teller machines (ATM). Atlantic's branch banks had a total of 185 ATMs, which used bisynchronous protocols to communicate at either 2,400 or 4,800 bit/sec, depending on volume.

"Because of the different protocols and different line speeds, we ran three leased lines from each of our branches," Cole said. Atlantic spent about $100,000 per month on leased telephone lines over which branch banks communicated with headquarters.

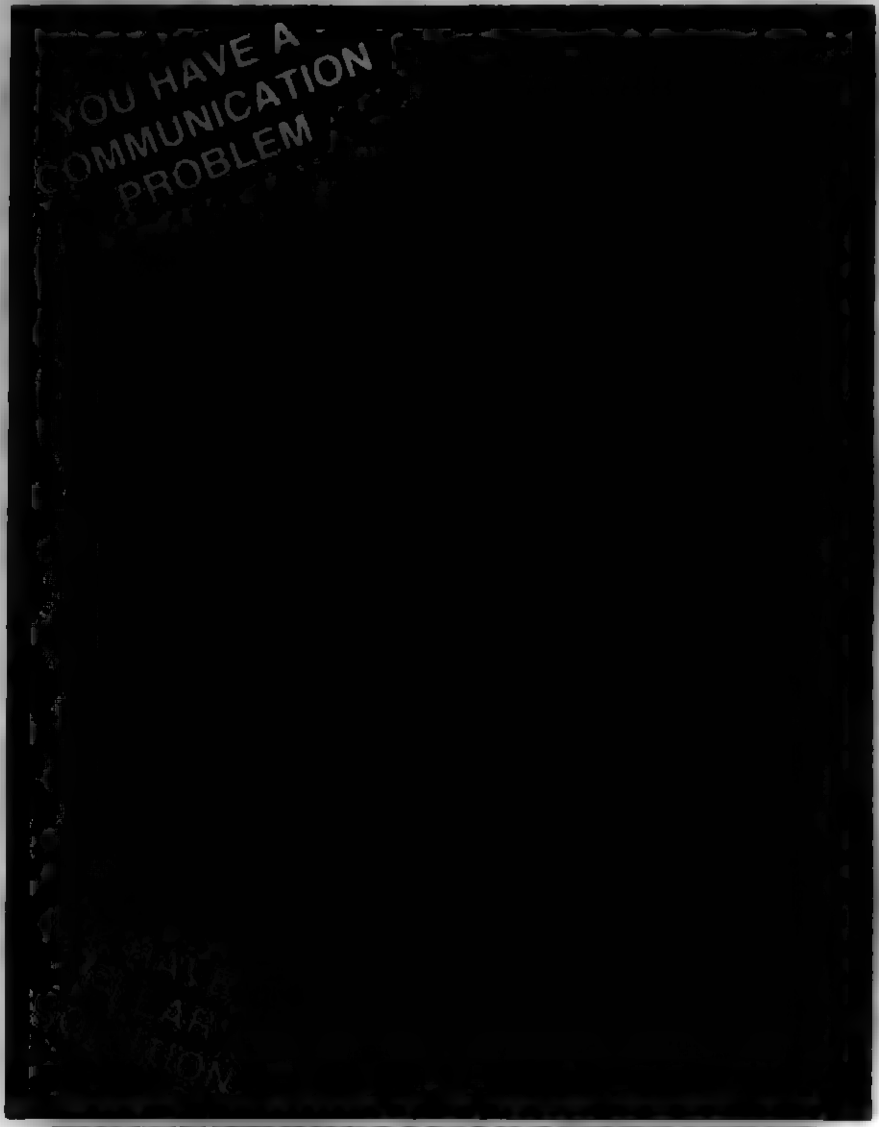
Last year the bank helped Datamaxx USA Corp. develop a host-independent network processor to solve the problem of different protocols. The Communications Management Device (Command) takes inputs from a variety of devices and outputs a signal that Atlantic's front-end processor and host read as IBM 3270 bisynchronous protocol. Atlantic finished installing Command in its branch banks in August.

Cole said use of the units allowed the bank to cut the number of leased telephone lines running from each bank branch from three to one, without changing the terminal configurations at its branches. Atlantic now saves 30% to 40% — between $35,000 and $40,000 per month — in leased-line charges, according to Cole.

Data from the Teller Assist, CRT and ATM terminals at Atlantic's branch banks goes through the Command unit and is transmitted 9,600 bit/sec over a leased line to one of Atlantic's 18 Tandem Computers, Inc. Nonstop II front-end processor nodes.

The nodes, located at one of four regional communications centers, feed the communicated data to the bank's mainframe, a 16M-byte National Advanced Systems, Inc. AS/9050, at its headquarters here.

Besides allowing Atlantic to save



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FREIGHT

from SR/7

wanted, Smallman said. "You've got to have fully error-checked protocols when you're moving the kind of financial and technical data we are."

He said the firm chose to wait for a more reliable means of connecting its international offices to its information network.

Immediate purchase

This year, Computer Sciences Corp. began offering a value-added network with an error-checking high-speed bisynchronous protocol and virtual circuits. "When that became available, we got it immediately," Smallman said.

The Harper Group will bring offices in London, Hong Kong and Sidney, Australia, on-line this month over the value-added net. Branch offices in Japan, South Africa and Germany are scheduled to go on-line by March.

According to Smallman, in the future, the company may install dedicated leased lines in some foreign offices if business volumes increase enough to justify the expense of the lines.

With the foreign Harper Group offices' current volume, dedicated lines would cost about five times as much as the value-added network, Smallman said.

cutting costs

money, the processor also gives the bank more options when it looks to buy new equipment. Before it installed the Command units, Atlantic required new equipment to have a protocol that matched one of the three already in use, Cole said. "Now we don't have to worry about that anymore."

The Command unit allows data that communicates over standard communications systems to be transmitted over the single phone line that runs out of each branch bank, so restrictions on new equipment are minimal, Cole said.

Each command unit includes a CRT terminal from which analysts can run diagnostics on the system. The terminal also provides on-line access to information in Atlantic's mainframe. Cole said this feature allows small branch banks that could not justify the cost of a CRT terminal for on-line use to purchase a terminal that allows both access and communications savings.

Each Command unit costs Atlantic $6,000, including the CRT terminal. Atlantic receives a discount from Datamaxx because it helped develop the unit and it buys in volume. Per-unit prices for the unit range from $6,000 to $8,200, depending on configuration and number purchased.

Atlantic has equipped all of its bank branches with Command units and has installed 120 of the network processors.

The bank keeps about 10 spare units in storage in case operating units break down in the field. Cole said the bank saves time by installing the spare units, rather than waiting for repairs. When a faulty unit has been replaced with a working one, Datamaxx repairs the broken machine, and Atlantic puts the repaired unit in storage to serve as a replacement machine later.

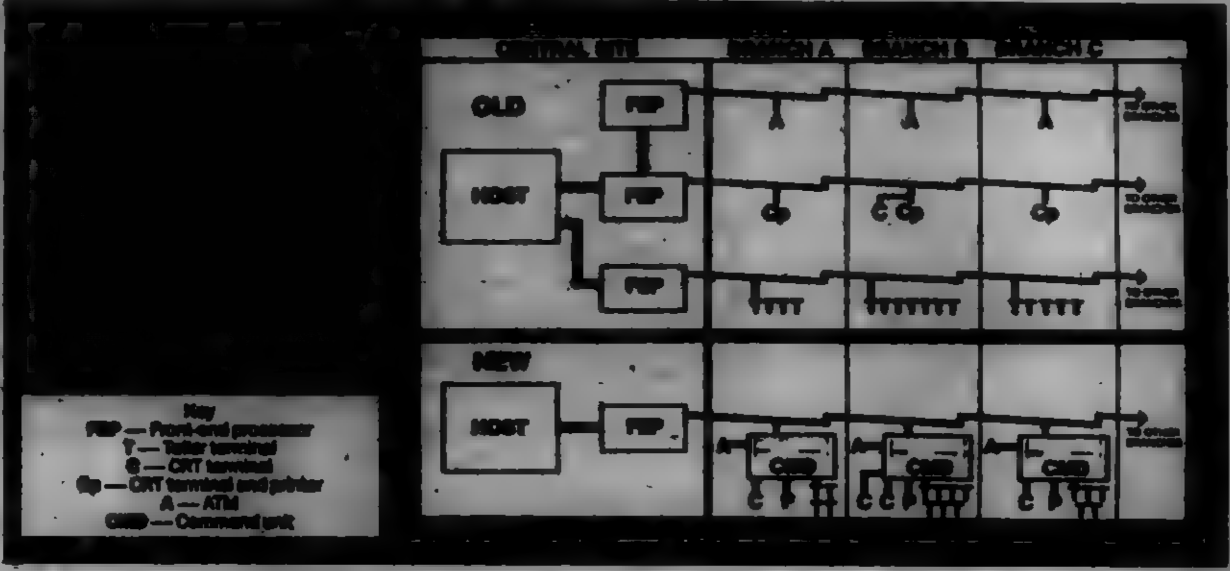
VOICE from SR/8

erate, for example, with a Rolm or a Northern Telecom PBX, will see a greater market edge. This will be partly because of the potential for messaging systems.

By 1987, the market will likely shift back to stand-alones, provided the technology does not slow down and integrated voice/data terminal prices decrease. By then, manufacturers will be able to put more processing power and other features into a smaller space and reduce heat and ventilation problems. Technology's challenge is to get more functionality into the integrated terminal's compact package design.

The marketing challenge for the future will be to find new integrated voice/data terminal applications. Those industries that deal with renewals, such as insurance, and the general consumer market can benefit from integrated terminal applications. The market has proved that users will pay over $1,000 for these terminals. Manufacturers must lower that figure for users who will want to use electronic mail systems and to tap into a wealth of data bases.

In its short history the integrated voice/data terminal has come a long way. One point does seem certain: The integrated voice/data terminal is here to stay.



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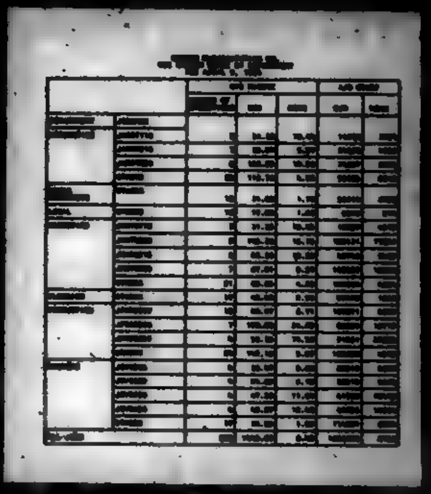

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Software lets firm keep track of leases, anticipate bills

NEWPORT BEACH, Calif. — When an equipment upgrade forced the data center of an insurance firm here to take a hard look at its equipment accounting practices, it found them lacking.

"We really had no idea how much book value was left on certain items, which items were purchased and which were leased, where we stood on investment tax credits and what the various components of the data center were really costing us per month to operate," said George Beveridge, an independent consultant on retainer for Pacific Mutual Life Insurance Co.

PACIFIC MUTUAL

During its equipment upgrade in 1982, Pacific Mutual brought in a 24M-byte IBM 3081 to replace two National Advanced Systems, Inc. machines. It has since added peripheral components, and the firm's data center now includes about 400 Lee Data Corp. terminals, including 1216s, 1230s and 1220s; seven IBM 3287 and 3289 terminals; and other equipment.

The 400 Lee Data terminals, with their associated controllers and keyboards, represent at least 900 discrete components.

The firm realized it would have to change its accounting practices to keep track of financial information for all those components.

Beveridge said few item-by-item records had been kept on equipment in the old configuration after it had been acquired. Record keeping had been turned over to accounting, which handled it according to corporate financial needs.

On the books, components were grouped in categories that were too general for the data center's accounting needs.

He began looking for a network management software package that would allow Pacific Mutual to manage finances for the equipment in the new system. He decided on Netman from California Software, Inc. because it offered the financial capabilities the data center needed and features for tracking components. Pacific Mutual installed Netman in early 1983, shortly after installation of the new hardware.

The software package tracks information such as vendor, terms of the contract for lease or purchase, maintenance contract details, date of order, delivery and installation.

Pacific Mutual leases its Lee Data terminals from a third-party lessor and has been ordering about 25 new terminals each month.

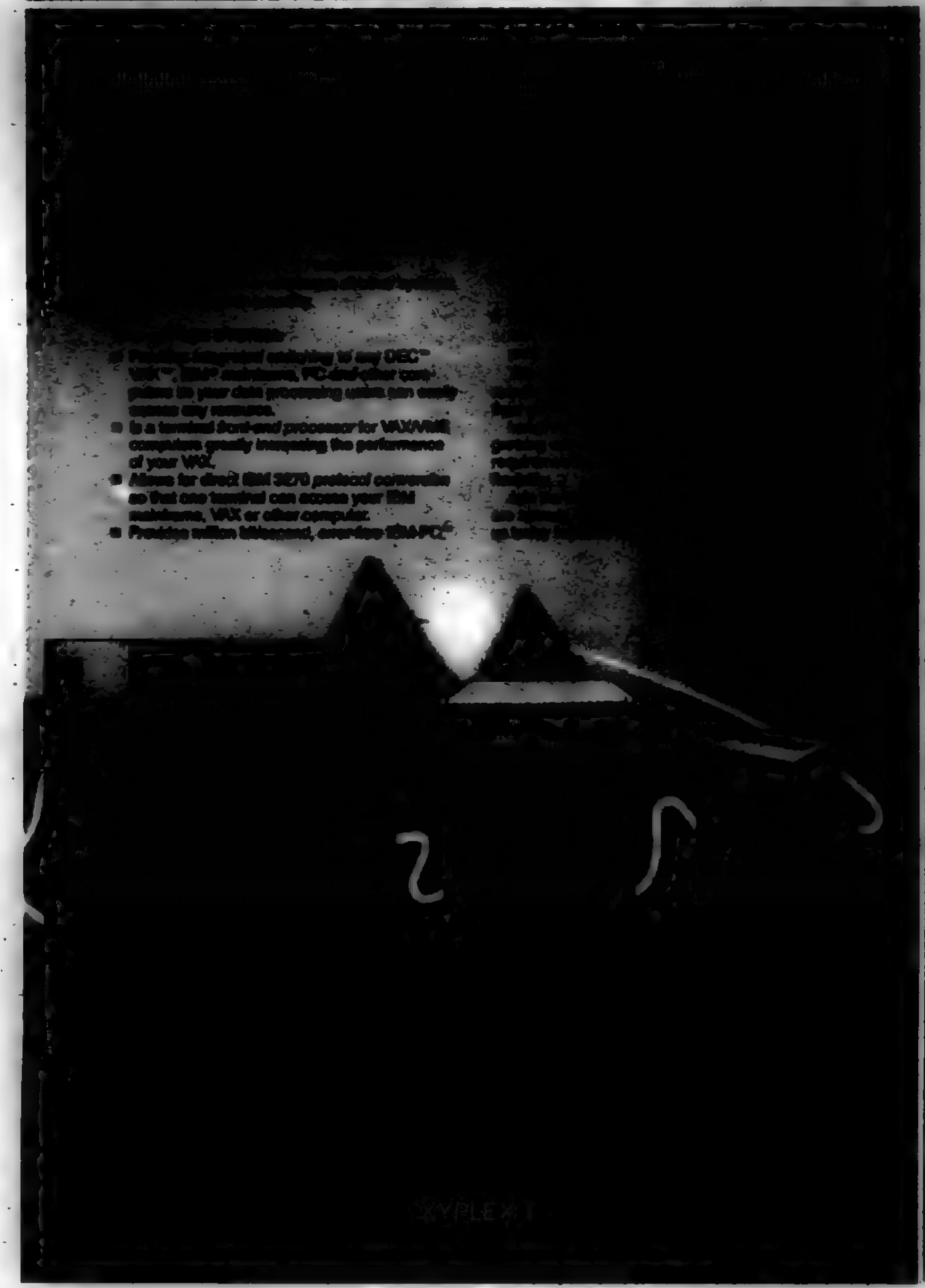
Because the firm enters data on new leases when it orders equipment, rather than when it installs them, it can anticipate what lease invoices it will receive in any given month, Beveridge said. When invoices arrive, the data center staff checks them against expectations and notes any discrepancies.

Keeps track of money

Beveridge said this capability is important for Pacific Mutual because it has leases on hundreds of terminals and controllers. If the firm loses track of the money it has agreed to pay for this equipment, it cannot check whether its vendors are billing it according to contract specifications, Beveridge said.

For the IBM terminals, Pacific Mutual uses the package to monitor its credit accruals toward purchase. Beveridge said that credits maximize at 50% of the purchase price. Netman's monthly reports list where the IBM accruals stand, and when they approach 50%, the firm decides whether to purchase the terminals. If the terminals will be in use for a while, purchasing generally makes economic sense, he said.

Pacific Mutual also relies on the package to keep track of contract expiration dates, investment tax credits on its terminal leases and internal chargeback to user departments.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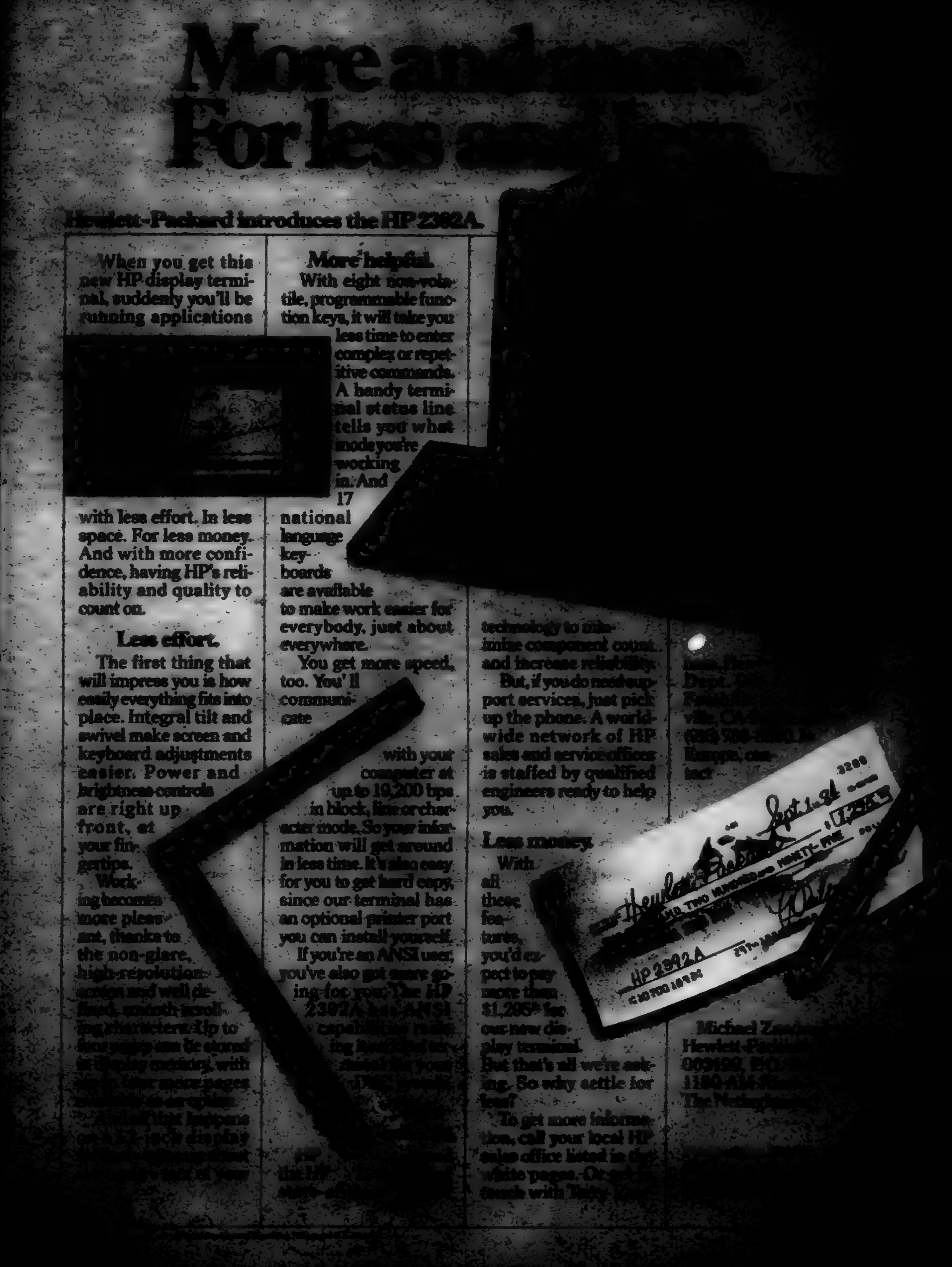

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Purchasing gear need not cause terminal headaches

By Jack R. Rule
Special to CW

Tomorrow's workplace will require office machines that communicate easily with each other and that are compatible with any data base.

Determining a company's data processing needs was once the domain of the MIS or central DP department. This is not so today. Today, managers at the local departmental level are often faced with the task of selecting the hardware and software that will meet their departmental needs.

How does a manager with little experience in purchasing hardware and software, in this case terminals, cope with the myriad systems choices that are currently on the market? One key fact to remember is that five types of terminals will be needed for the office of today and tomorrow:

- Dumb terminals.
- Word processors with access to personal computers.
- Terminals with graphics capability.
- Terminals that combine the previous three categories.
- Computer-aided design and manufacturing systems that can interact with all the above categories.

There is a rationale behind this selection of terminals: It does not make sense to put expensive data terminal equipment, such as a personal computer, on every desk. If the application calls for a dumb terminal (for inventory control, for example) or a dumb terminal with a personal computer attachment (for a manufacturing application), then these terminals should be used.

Tomorrow's workplace will require office machines that communicate easily with each other and that are compatible with any data base. Departments will be custom-tailored by managers using a combination of equipment and software resources. Furthermore, staff will be able to communicate data, voice and video pictures from their individual terminal workstations. Equipment will be easily expandable.

Presently, terminals are available that go a long way in this direction. Some current models are capable of accessing many sources of information, including multiple mainframes. To manage data flow, local-area networks have been developed that use gateways to allow terminals to access data base sources. Local-area networks are now available that allow up to 500 data processing devices, including those manufactured by different vendors, to communicate with each other. Trends are moving toward fully integrated and expandable offices that let users access information from any office.

Today's local department manager has more responsibility and has assumed an important role in office automation. The manager's decisions can make a vital difference in company productivity and market share.

Local managers assumed the responsibility for equipping their offices slowly as DP became less localized and the demand for full OA increased. Also, as software packages emerged that made applications development by the nontechnical user possible, it became clear that the department that was going to be using the application software should have the final decision over its purchase — not the MIS manager.

It should come as no surprise, however, that some department managers accepted these duties with discomfort. Many had relatively little experience with the sophisticated technology.

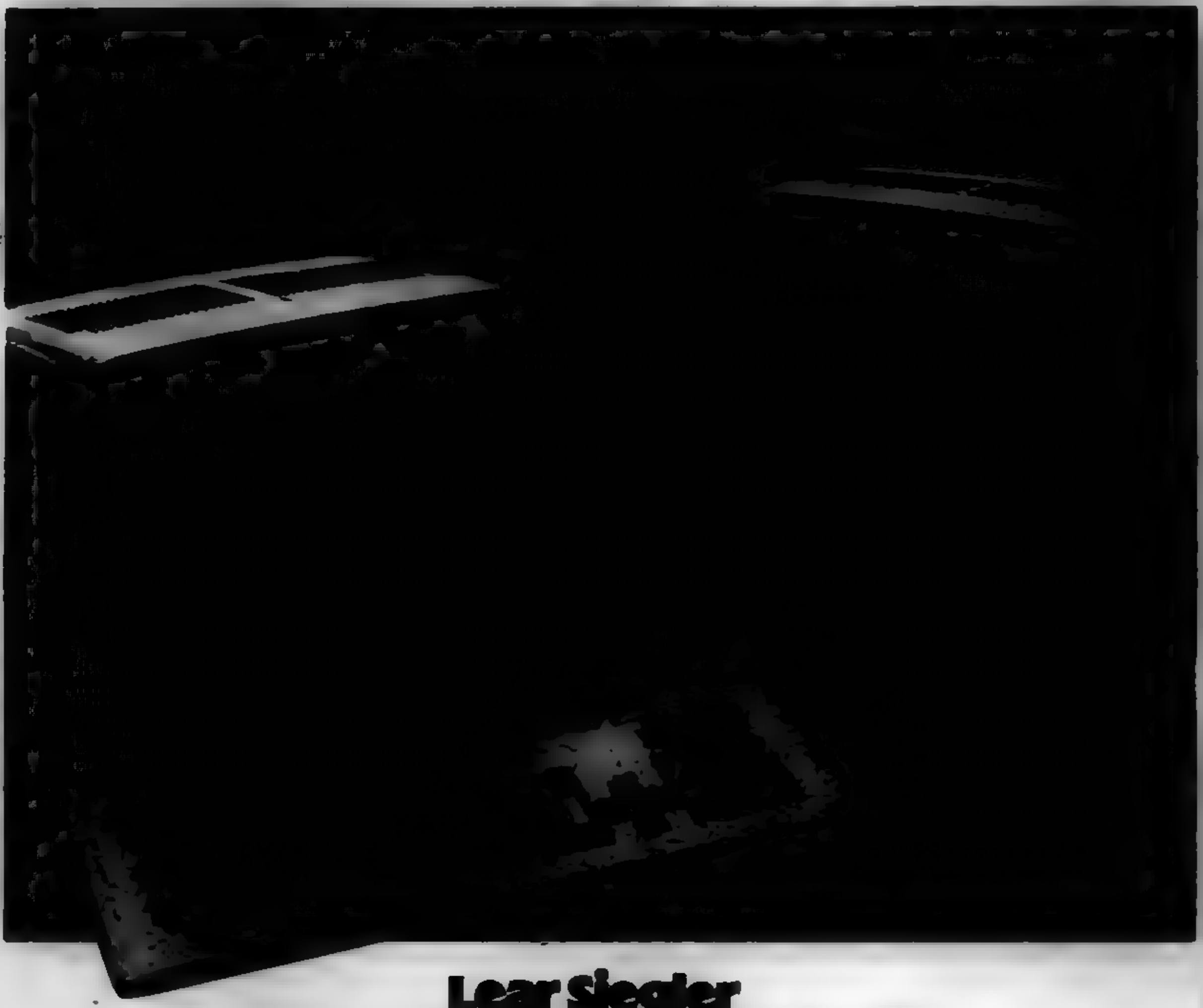
In the early days of the first mainframes, the task of managing a company's automated resources resided in the hands of an army of central DP gurus, about whom the rest of the company knew little. At that time, DP configurations were fairly inflexible. The mainframe performed maintenance and updates on data as well as the heavy-duty processing.

In those days, most terminals were dumb, asynchronous types, which could only accept information and perform light analysis functions. Productivity boosters that we take for granted today like real-time, online processing and multitasking were unknown. The mainframe was used to process scheduled jobs consisting of large amounts of raw data. End users typically received the processed results of their work at month's end.

Defining and implementing application programs and finding the hardware that could run these programs, as well as planning the allocation of resources for the future, was

See GEAR SR/18

Rule is a senior product manager for Racal-Milgo, Inc., a manufacturer of data communications terminals based in Sunrise, Fla.



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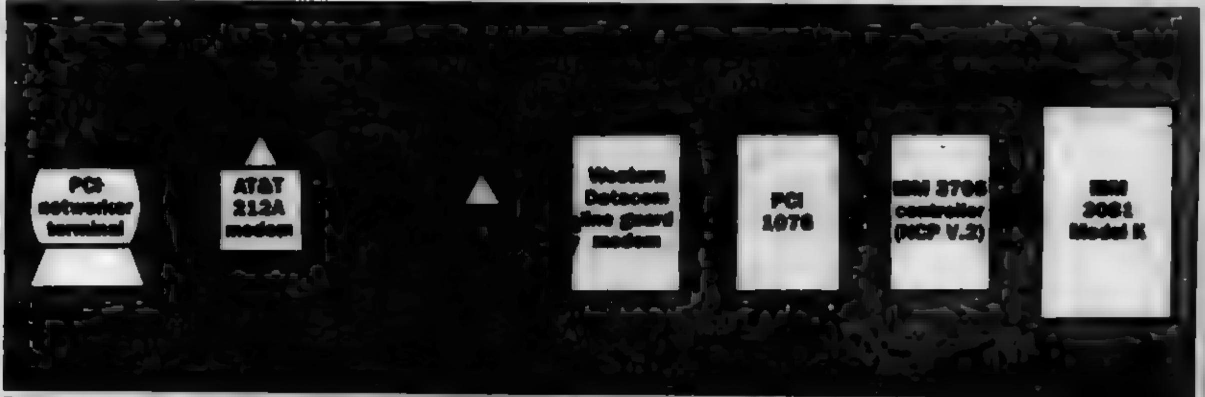
Bargain net helps DP staff get system on-line on time

By Raymond Bugg
Special to CW

ARDSLEY, N.Y. — Starting from scratch, the data processing shop at a division of Ciba-Geigy Corp. acquired terminals and a communications network for a newly acquired plant in Delaware and brought them on-line with the corporate data center here within about three weeks, in time to transmit data on its first day of operation under its new owner.

The data processing shop, the information systems department of Ciba-Geigy's Plastics and Additives Division, managed the speedy setup even though the equipment it had deemed necessary for a communications link between the plant and the firm's data center arrived a month and a half after the acquisition took place.

The solution that allowed the information systems department to accomplish its task was an interim communications network that cost the firm only $3,000, plus communications line costs.


PCI networker terminal
AT&T 212A modem
Western Datacom line guard modem
PCI 1076
IBM 3705 controller (NCP V.2)
IBM 3081 Model K

The interim communications system linked Ciba-Geigy Corp.'s plant to its data processing center through a series of steps designed to maintain security. A user at the Delaware plant initiated a voice telephone call to the data center via one of two direct business lines attached to the Protocol Computers, Inc. (PCI) Networker Terminals. A Western Datacom Co. Line Guard modem at the data center received the call and issued a password request to the user, who entered his password on the terminal. If the password was accepted, it caused a line disconnect and initiated a callback to the user's predefined business line. When the callback was completed, the Line Guard modem passed control to the PCI 1076 protocol converter, hooked to the data center's IBM 3081 Model K through an IBM 3705 controller running IBM's Network Control Program Version 2. The protocol converters allowed IBM 3270 emulation, giving the user access to applications that resided on the host.

The Plastics and Additives Division of Ciba-Geigy develops a range of specialized industrial products, such as chemical and light stabilizers. Its information systems department consists of a small staff of consultants, which elicits assistance for specific projects from Ciba-Geigy's corporate data processing shop, the management services department.

Ciba-Geigy's corporate data center here, located approximately 10 miles from the division's headquarters in Hawthorne, N.Y., maintains a 12M-byte IBM 3033 that the division accesses through remote job entry and a 24M-byte IBM 3081 Model K that it accesses via an on-line, real-time 3270 network. The mainframes provide CICS, TSO and IMS facilities.

On Dec. 15, 1983, the information systems department learned that Ciba-Geigy Plastics and Additives was contemplating a business acquisition. Ciba-Geigy's corporate management had signed a letter of intent to acquire a portion of the E. I. Du Pont De Nemours & Co. organic pigments business.

The acquisition was to include the Delaware plant, which would continue its role as the primary source of product production. The final agreement date was to be sometime during the first quarter of 1984.

The acquisition was to include only one piece of the plant's hardware — a Hewlett-Packard Co. HP 3000 — and no operational systems for inventory management and other critical applications. The plant had operated a manual inventory and pricing system, and its staff was unfamiliar with on-line technology.

Yet the division needed applications to be up and running on the first day of postacquisition operation to minimize any disruption in customer services and production processes and to maintain data as accurately as possible on the new product line.

Once the acquisition was imminent, the management services department developed the definition and scope of the project to link the plant with Ciba-Geigy's data center and assembled an acquisition team. The project team consisted of members from several of Ciba-Geigy's corporate MIS departments who took responsibility for application development, hardware procurement and installation.

An analysis by the team determined that the newly acquired business should, whenever possible, be incorporated within divisional and corporate systems. In line with this plan, the team decided to reconfigure the HP 3000 to provide a remote job entry link to the data center's 3033 and to install a leased-line 3270 network to provide access to CICS and the Plastics and Additives Division's order entry and inventory system, which ran on the company's 3081.

For accessing the 3081, the team chose a network consisting of IBM 3270 equipment — one 3276 display controller and four 3278 CRT terminals — which would access the division's host processor via leased, private data lines.

In February, a final acquisition date of April 12 began to surface, and the team placed orders for the hardware and communications lines.

But Ciba-Geigy's Telecommunications Group, which held responsibility for equipment acquisition, pointed out to the project team that the targeted installation dates for the ordered hardware and data lines were in jeopardy: The projected ship dates for the IBM equipment fell more than a month after the acquisition date, and the AT&T divestiture caused delays in the installation of the data lines.

With the assistance of the Telecommunications Group, the project team established criteria for a viable setup the division could use until equipment and lines for its permanent system arrived and could be installed. The following were the criteria for the interim setup:

- It should be a 3270 look-alike to reduce the need for redundant training once the permanent-environment was in place.
- It should consist of easily installed, off-the-shelf equipment because of the time frame.
- It should also be as inexpensive as possible because the effort would represent a short-term solution.

With these criteria in mind, the Telecommunications Group recommended the use of a dial-up terminal that would allow 3270 emulation.

The corporate data center had a Protocol Computers, Inc. (PCI) 1076 protocol converter resident on its 3081 mainframe, and the Telecommunications Group advised the project team to use an associated terminal, the PCI Networker Terminal, as the dial-up 3270 look-alike.

The Telecommunications Group ordered all the required equipment and received it within a matter of days. The interim configuration consisted of:

- Two PCI Networker Terminals, chosen because of their resemblance to the 3270s the firm had on order.
- Two Penril Corp. 212A 1,200 bit/sec modems, chosen because they were available immediately.
- Two direct nondata business telephone lines. Ciba-Geigy chose the nondata lines because they could be installed within 10 days after they had been ordered. The 9,600 bit/sec data lines the firm had ordered for its permanent configuration required a 100-day waiting period from order to installation.

Within three weeks of the decision on the interim processing setup and about a week before the acquisition date, the configuration was up and running. The interim configuration resulted in a totally functional off-site operation that met the targeted acquisition date.

On April 12, the plant's first day of operation under Ciba-Geigy management, the facility sent data on inventory levels to the division's mainframes.

By June, the permanent leased data lines had been set up and the IBM terminals installed. The information systems department replaced the interim network with the permanent one.

The PCI Networker Terminals are now being used by some of Ciba-Geigy's technical employees as home terminals that tie in to the corporate mainframes.

Ciba-Geigy' Plastics and Additives Division plans to include the use of the PCI Terminals in future acquisition plans.

Bugg is a senior systems consultant with Ciba-Geigy Corp. at the firm's Hawthorne, N.Y., plastics and additives division.

[redacted]

Expanding ATM networks draw consumers' interest,

By Robert W. Mahoney
Special to CW

Our financial delivery and payment systems are radically changing. The rapid growth of electronic funds transfer (EFT) has been spurred by the consumer acceptance of automated teller machines (ATM), the growth of shared ATM and EFT networks and the proliferation of credit and debit cards.

In the near future, consumers will use ATM debit cards and self-service terminals to buy fuel for their automobiles, obtain coupons electronically for discounts on brand name merchandise, buy airline tickets, buy tickets to sporting events and concerts and even buy lottery tickets.

The customer will use an ATM debit card, which interacts with a terminal on-line to a data base, to pay for groceries at the supermarket, to purchase items from electronic catalogs and even to receive government benefits such as food stamps, aid to dependent children and unemployment compensation.

By the end of 1983, over 40,000 ATMs were in use across the U.S. More than 100 million ATM debit cards are now in consumers' hands. They are used to perform more than 3.4 billion transactions a year. These transaction numbers are projected to reach 10 billion annually by the year 1990.

The future scenario for ATM debit and credit cards includes automated ticketing to purchase transportation, entertainment and gaming tickets. Currently, Avis Rent-A-Car Systems, Inc. uses transaction terminals for its automated Avis Rapid Return service, letting customers return cars and receive a printed record of expenses.

Avis plans to extend that program to "Rapid Rental," wherein the customer can make reservations, receive a finalized contract and learn the parking location of the rented car by using a self-service terminal.

Self-service technology also offers the potential to automate government benefits distribution.

The distribution costs of government welfare programs are increasingly expensive. Studies conducted in several states revealed that the distribution costs for unemployment checks is $2 to $5 for each check; welfare checks are $7.50, and food stamps are $1.75 to $3.00. Couple these costs with transaction volumes that range from 150,000 to 200,000 per month in Arizona to 3.5 million to four million per month in New York, and the magnitude of this problem becomes more visible.

Add one more dimension to these numbers. There are 10.5 million people in this country receiving welfare benefits, 22.7 million on Medicaid and 21.6 million receiving food stamps. Both ATMs and point-of-sale (POS) terminals can reduce the costs of check dispersal and reduce fraud, which is a major problem with today's distribution system.

Perhaps a more current ATM issue is the growing number of joint ventures between financial institutions and retailers.

Today, there are approximately 245,000 convenience stores and gasoline stations. These locations are suited for self-service EFT devices because they are fast-service operations and many are open 24 hours a day. As a result, many large chains are installing direct debit scrip terminals, cash dispensers and automated fuel systems that allow customers to pay for their gas and convenience items either by cash, debit or credit card either at the island through an automated fuel system or in the store with a POS terminal.

Island fuel terminals operate like the ATM. Automated fuel systems control fuel delivery and pricing as well as payment.

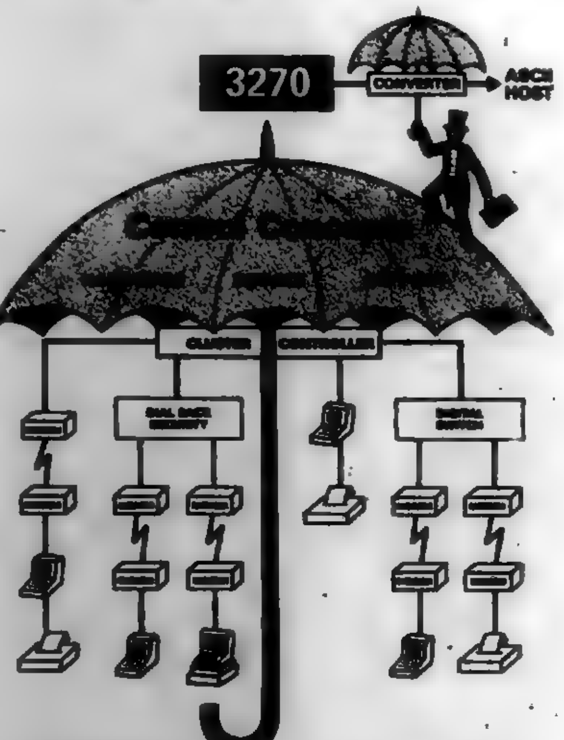
Cash dispensers are becoming popular with retailers who have high customer traffic. Why cash dispensers and not full-service ATMs? Facts indicate that cash dispensers are more cost-effective in this environment because of their lower purchase price and service costs.

The 29,000 supermarkets now in the U.S. are

Using an ATM, Avis customers that are returning cars can automatically process their rental agreements and receive a record of charges without talking to a rental agent.

Mahoney is president and chief operating officer of Diebold, Inc., a Canton, Ohio, manufacturer of automated teller/electronic funds transfer machines.

Everything Under the Umbrella



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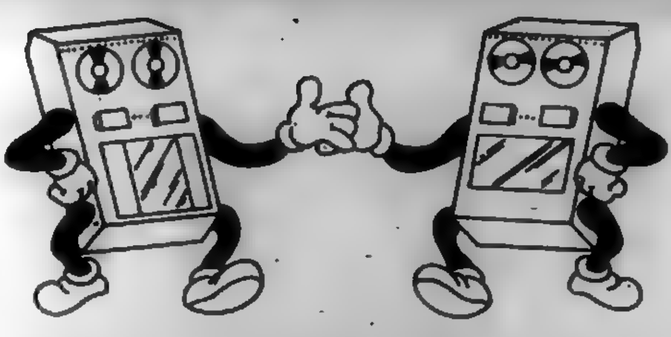

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probably best positioned as delivery points for financial services.

Another possible use of ATMs in the future is the placement of direct debit and check/credit authorization terminals in specialty stores within shopping centers. These networks would broaden the base of automated payment services and produce communications cost savings.

Clustering ATMs, cash dispensers and other payment terminals in a kiosk at the supermarket entrance, for example, in addition to preauthorization of debits, would allow a user to get cash, make a deposit, pay a bill, transfer money, authorize a check, obtain cents-off coupons and purchase items from an electronic catalog. The same system would provide the retailer with electronic security, access control and energy management systems for the store.

These self-service applications could double the projected annual ATM transaction levels to 20 billion transactions by 1990. If these assessments are correct, and some experts believe they are conservative, we are rapidly approaching a self-service, transaction-driven society.

This round-the-clock, consumer-operated fuel dispensing system can be activated by debit or credit cards.

GEAR from SR/16

a trial-and-error procedure for the DP department. Fortunately, vendor firms were involved in the process.

Despite the liabilities associated with early DP, user demand for system access steadily grew. Mainframe systems were overloaded as more lines were fed into the system. At the same time, operation and maintenance costs escalated. As work backed up, it became clear that a new configuration was needed between computer and terminals to make DP more cost-efficient.

The temporary solution was the distributed clustering of terminals to the minicomputer. This off-loading of the mainframe meant that not only could current work be done, but also that more users could access the system. As the number of users accessing the system grew, however, the resulting traffic problem produced exorbitant communications line costs and once again overloaded the host system. More complicated applications and higher application costs continued to add to the MIS manager's work load.

A better solution was a flexible synchronous terminal that saved transmission costs by capturing current data from the mainframe or mini and processing it right on the terminal itself.

Synchronous terminals became a cost-effective way to get work done. As more and more nontechnical users sought computer experience, user-friendly technology mushroomed. This development went hand in hand with across-the-board demands for flexible, tailored applications. And, invariably, as soon as a new application was developed by MIS, the local department manager requesting the application found one more task for MIS to fulfill.

The introduction of faster data speeds, multitasking, data integrity, shared data base information and on-line computing further broadened the appeal of new technology. Office automation was well on its way. Today, many local department managers are solely responsible for seeing that the department needs are met.

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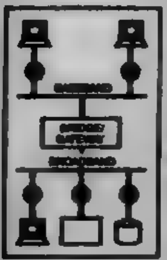

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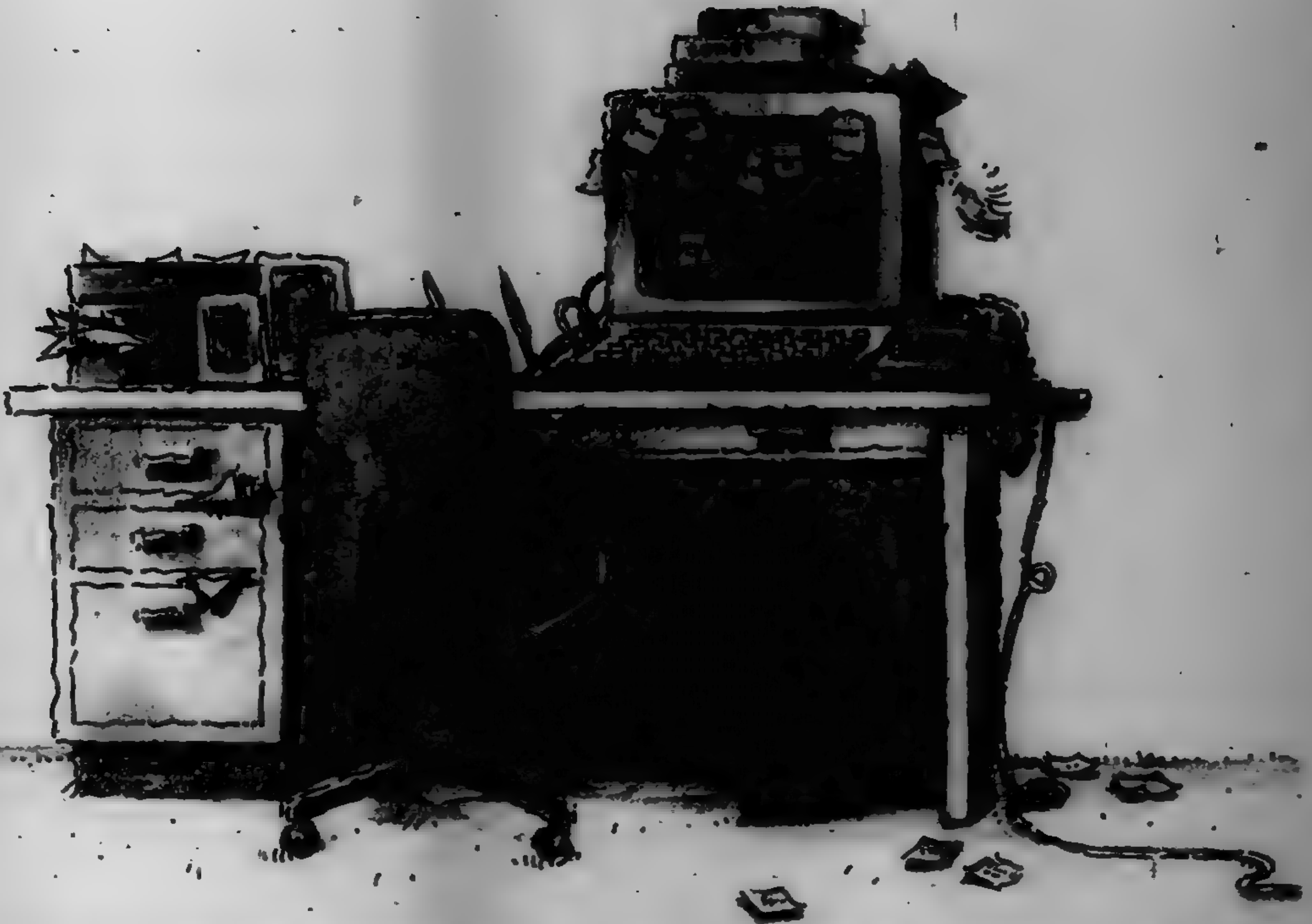

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Migration path from VDTs key in agency's choice of micros

ALBANY, N.Y. — When users at New York's largest state agency here began asking for personal computing power, their data processing center gave it to them without giving up the advantages of a terminal system that was already installed.

The New York State Department of Mental Hygiene consists of the Office of Mental Health, the Office of Mental Retardation and Developmental Disabilities and the Division of Alcoholism and Alcohol Abuse. It is the largest government employer in New York, with about 70,000 employees, and has an annual budget of more than $2.7 billion.

The data center that oversees operations for the entire department, the Information Support System (ISS), has for two years operated a network of 440 IBM 3270-like terminals — mostly Mohawk Data Sciences Corp. (MDS) 2192s and some other VDTs from Racal-Milgo, Inc., Raytheon Co., Memorex Corp and IBM.

Terminals in the network are controlled by 187 MDS Series 21 distributed processing systems. The network is linked over bisynchronous data lines to an 8M-byte IBM 4341 and a 12M-byte Honeywell, Inc. DPS 8/70.

Agencies within the department use the terminal system to maintain patients' medical histories and to track drugs that are administered, so as to prevent the possibility of adverse interactions.

The department also keeps track, through the mainframe data base, of the $800 million in billings it sends out annually for its health care.

George Syrett, director of technical services and systems operations for ISS, said providing users with access to such mainframe data is crucial. "I don't believe people are islands," he said. "They have to connect."

When users asked for personal computing power, ISS chose MDS Hero networked personal computers over other products, chiefly because the machines could provide a migration path from the current network.

He explained that just about any box can provide desirable personal computing abilities, but that none but the Hero allowed the department a convenient migration path from its terminal system.

ISS installed [illegible] Heroes this spring and plans ultimately to link them and other Heroes it has ordered to the mainframes over private leased data lines and to eliminate the Series 21 controllers. But the switch to the private lines will take about two years, in part because of AT&T's line installation backlog.

"Part of our problem is that we can't get telephone lines, so we can't get a network," Syrett said. ISS is relying on the Series 21 migration path to pull it through the interim.

It is working to tie some of the Heroes into the terminal-mainframe system through the Series 21 controllers. A Zilog, Inc. Z80 chip in the Series 21 switches the Hero's asynchronous transmissions to bisynchronous so the information can travel to the mainframes over data lines.

Mainframe access

"The MDS Hero accesses the mainframes' host computing resources and data bases, allowing users to interrogate the data locally then integrate it into an MDS Hero application," Syrett said. This gives users the freedom of a [personal computer] and the power of the mainframe."

Four Heroes currently access the mainframe as 3270 look-alikes through a drop network. The machines are fitted with emulation software that makes them appear to the IBM and Honeywell mainframes as 3276s.

Until they can be linked to the network through the Series 21s or through the permanent data lines, most of the other machines will serve as stand-alone systems for word processing, for spreadsheets and for evaluating different health programs.

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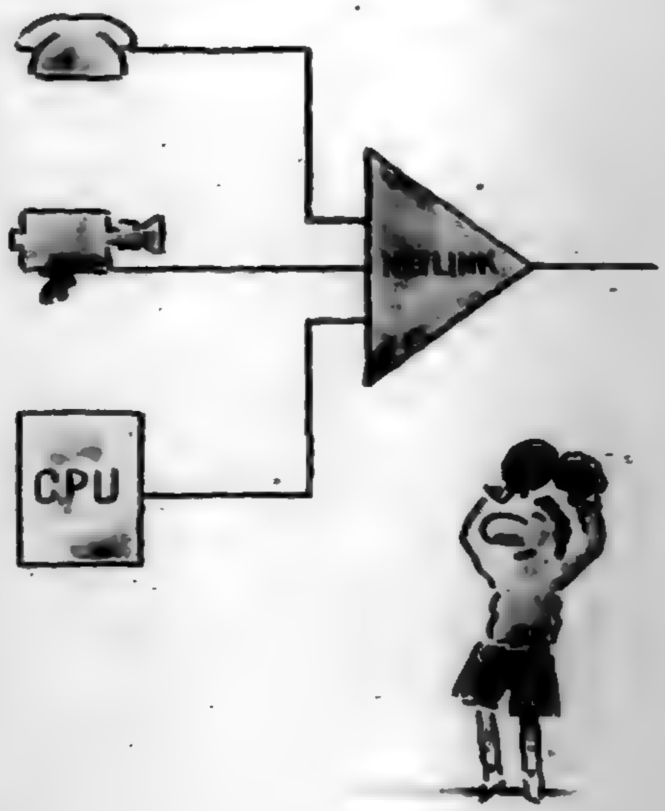

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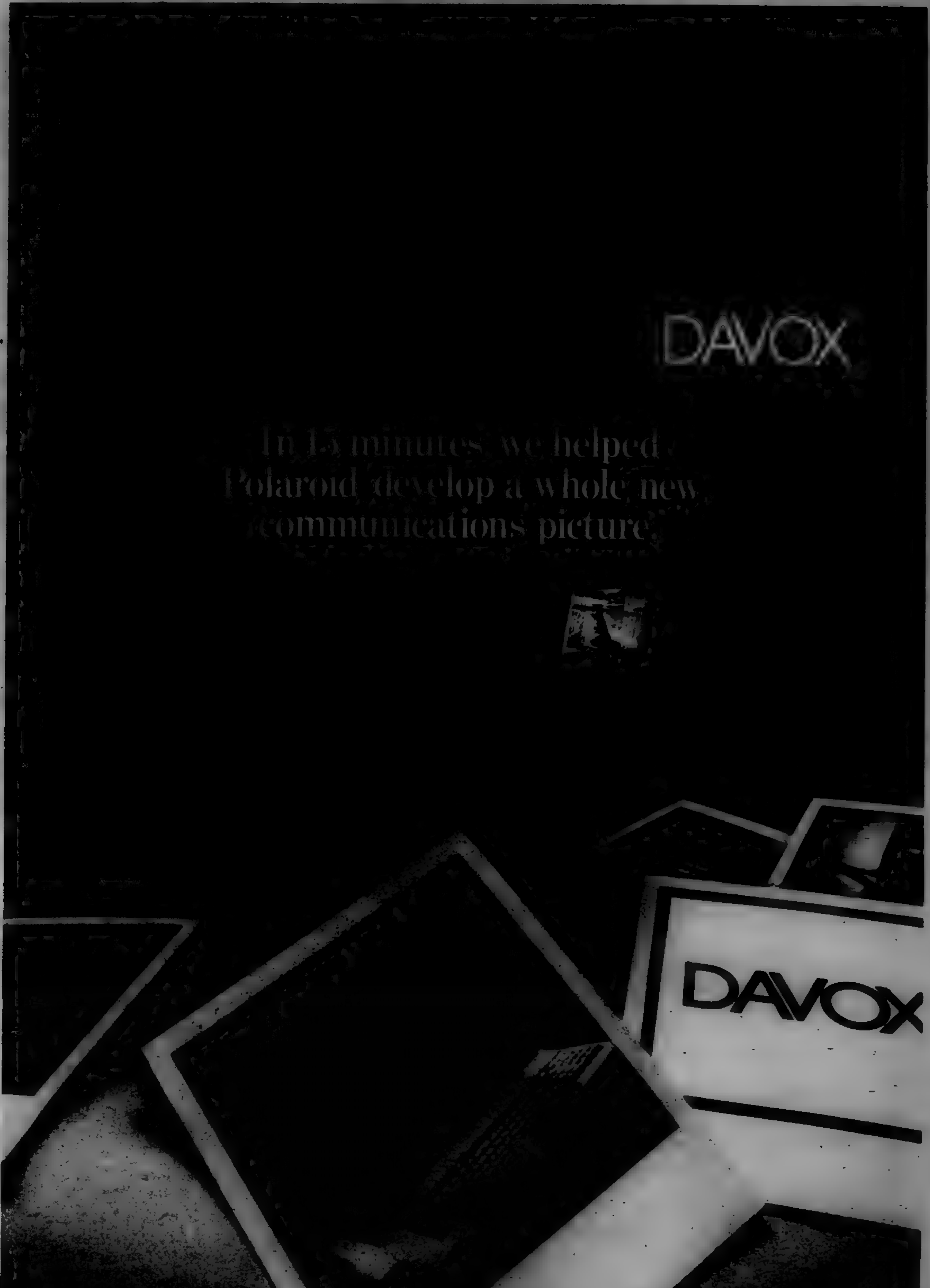
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Wise terminal makers will heed end-user demands

By Allan Maurer
Special to CWS

The times are changing for VDT suppliers. The rapidly maturing end-user market is demanding more than a dumb box and is looking increasingly to multifunctional, interactive desktop devices and personal computers for its data processing and communications needs. The trend is definitely toward smart.

Demand for personal computers and intelligent workstations continues to grow at an astounding rate. An estimated 25.5 million personal computers will have been sold in the U.S. by 1987, according to a prediction by Dataquest, Inc. The demand for conversational and editing terminals is also growing, but much more slowly. Approximately 5.5 million such terminals will be installed by 1988, according to a study by Advanced Resources Development, Inc.

What all this means is an increased demand in the next five years for systems rather than terminals. CRT terminal suppliers will either have to branch out to satisfy workstation needs or become casualties of the inevitable shakeout in the terminals market.

The terminals market is not faltering, however. Personal computers cannot answer all the needs of business systems users. The two factors that will favor the growth of terminal products are cost and the need to disperse information and functions among a number of workers. But it is clear that the market must adapt.

The largest segments of data entry terminals comprise three distinct groups of equipment and represent 63% of the domestic data entry terminal base: Editing CRT terminals (IBM 3270-type compatible) have roughly 24.5% of the overall market; conversational CRT terminals represent about 23% of the market; and editing CRT terminals of the non-IBM 3270 type have about 15.5%. These numbers exclude key-to-storage-oriented units that represent approximately 3% to 4% of the overall data entry market.

A growth rate of 69% is expected in this market by 1988 with growth expected in these three areas:

- 25.9% in 3270-type editing terminals.
- 23.4% in non-3270-type editing terminals.
- 19.2% in conversational terminals (representing a 4% drop in share).

Clearly, the non-3270-type editing terminals will show the strongest growth, with conversational terminals taking a drop.

The increasing use of business graphics points to growth in the graphics terminals market as well. A study by Venture Development Corp., based in Wellesley, Mass., shows a projected 29.9% compound annual growth in dollar shipments of graphics terminals. Inexpensive raster-scan graphics displays will no doubt have the lion's share of the market, provided a high resolution is offered. In the meantime, graphics terminals continue to offer smaller suppliers a means of competing with larger, more established firms.

Some producers of terminals have tried to find a new profit niche for themselves in the personal computer market. The danger, of course, is in entering a market that is chock-full of competition and one that is already dominated by a few of the big guys who leave little room for others The diversion of energies and resources from terminals manufacturing and marketing to computers can be a fatal drain. The workstation and intelligent terminals market represents a more effective course for a terminal producer to take.

Industry studies indicate that by 1988, the market will be dominated by devices designed specifically for workstation functionality — true management workstations. The proliferation of workstations is attributed to several cited trends. Among them is the increasing availability of multifunction, interactive products. The ease with which components can be integrated and interchanged, particularly with the emergence of the [illegible] communications protocol.

Advances in technology have increased performance to such a point that intelligent workstations can now be adapted to virtually any application. Fewer compatibility barriers and emerging standards will make it easier to choose a multiuser system over a personal computer.

An additional factor that cannot be ignored is the new awareness on the part of the end user that these technologies can be useful at all levels of office operations.

This new, aware market will find terminals with local intelligence and graphics attractive. Word processors that are multifunctional and supermicros such as the IBM Personal Computer AT and others have increased the options for communications and expansion. Small systems in particular, with easily integrated components and software supporting a number of users with different needs, should continue to be a significant portion of the multiuser mart.

Maurer is the vice-president/marketing for Esprit Systems, Inc., a manufacturer of graphics and data communication terminals based in Melville, N.Y.

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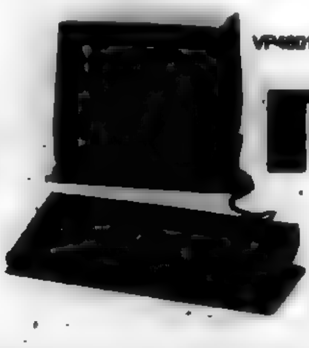

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Rise of automated office accompanied by continued

By C.S. Thachenkary and S.E. Harris
Special to CW

The emergence of the automated office has brought with it a bevy of purported VDT-related ailments and a controversy over VDT health hazards. In a survey conducted by the Data Entry Management Association (Dema) in 1984, over two-thirds of those responding had experienced eye strain, back pain, fatigue and neck/shoulder pain; over one-third reported burning eyes and general irritability.

In West Germany, over one-third of the health insurance costs for women office workers are due to an increased incidence of back- and neck aches. In both the U.S. and Canada, women operators have questioned VDT emmitance of low-level radiation and its possible effect on pregnant women.

In 1983, the Canadian Center for Occupational Health and Safety found that some VDT models leak extremely low-frequency radiation and linked exposure to low-frequency radiation with reproductive defects in laboratory animals. Research in 1982 by Dr. Jose Delgado in Madrid claimed that exposure to extremely weak pulsed magnetic fields, similar to the magnetic field pulses from a VDT's fly-back transformers, caused changes in chicken embryos.

Because the more serious health problems are suspected to be caused by the emittance of low-level radiation, government agencies such as the National Institute of Occupational Safety and Health (Niosh) and the National Academy of Sciences have carried out preliminary studies. A major advocate for closer monitoring and testing of VDTs is 9 to 5, the National Association of Working Women. At this time, significant evidence of VDT links to radiation and health problems has not been established.

While the controversy continues, mounting pressure from employee organizations has prompted close to two dozen states to consider legislation regarding the use of VDTs in offices. Some states, such as Connecticut and Maine, have already passed bills; others are still discussing them.

As legislatures across the nation consider the issues pertaining to the use of VDTs in the workplace, the Computer Business Equipment Manufacturers Association (Cbema) has formed a heavily financed lobbying group that has lobbied against VDT bills in California, New York and Ohio. The bill introduced in California was defeated.

Obviously, management needs and user concerns must be addressed. An ergonomically designed office promotes both user comfort and productivity. The cost of providing ergonomically improved systems can be readily justified in terms of better health and greater productivity of office workers.

The modern workstation has three principal components: the user, the VDT-based office information center and office and office furniture.

- **The user.** To ensure user comfort and health, be aware of any pre-existing health problems on your staff that might be aggravated by working in an automated office. Encourage periodic physical examinations and health maintenance.
- **The VDT.** Progress is being made in VDT-based office information systems. This includes the advent of detachable keyboards, tilting/swiveling screens with amber or green displays, and screens and keyboards constructed of glare-reducing materials. Detachable and modular components significantly improve a system's ergonomics.

A 1984 study conducted by Niosh found that data entry workers using ergonomi-

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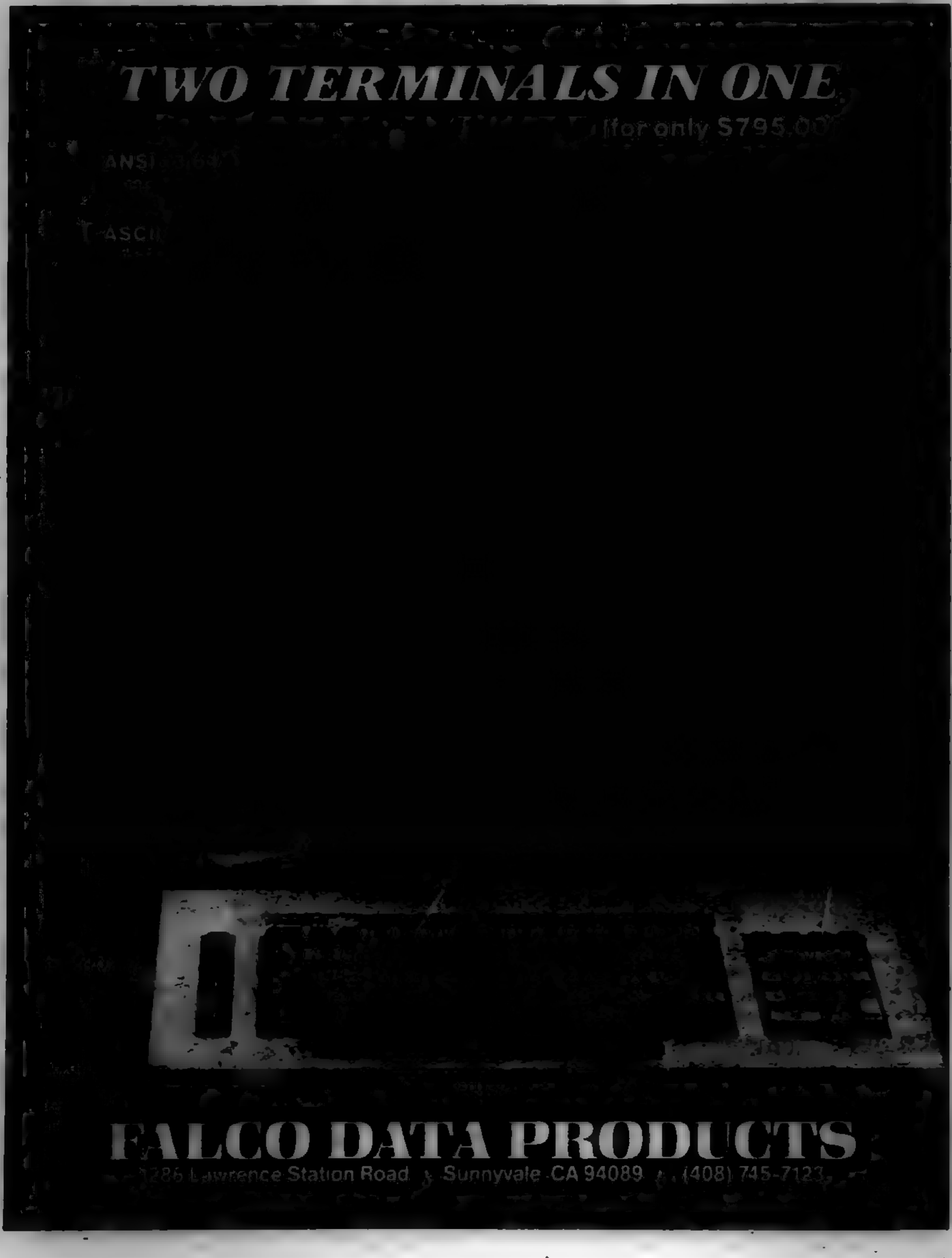
Thachenkary and Harris are members of the decision sciences faculty in the College of Business Administration at Georgia State University in Atlanta.



debate over possible VDT-related health hazards

cally designed terminals were measurably more productive.

A drawback of the CRT found in today's VDTs is the flicker of the image on the screen. Furthermore, VDT screens display information on a vertical plane. Most people read naturally on a horizontal plane with their necks slighty bent forward. When users are working on a VDT, their necks are forced to be in a straight and upright position. Flickering VDT images and postural stiffness can cause eye irritation and body aches.

Flicker-free images

Recent developments in plasma display technology, for example IBM's 581, make use of neon and argon gas enclosed between thin glass plates to produce stable, flicker-free images. These screens do not emit electromagnetic radiation, and they have the added advantage of being flat panel displays rather than boxy CRTs. They can also be moved easily and are less bulky.

■ The office and office furniture. Office furniture should feature orthopedically designed chairs that provide firm support for the back and allow individual height and seat adjustments. The most radical of such designs is the so-called balance chair, which has no direct back support.

An American Productivity Center survey of large organizations found that improved furniture design can increase productivity by about 12%. Additional payoffs include fewer sick days, better labor-management relations and the reduced potential of litigations and court actions to resolve health complaints. A number of organizations, including TRW, Inc. and the Canadian firm London Life, Inc., have begun to assess the ergonomic soundness of their systems and physical facilities.

The design of an ergonomic environment also includes a comprehensive physical facilities-planning program. This program helps to focus management attention on the problems of acoustics, heating and cooling, lighting, air circulation and the layout of power cables in an ergonomically designed building.

Another trend to watch is that of the so-called intelligent buildings, such as the Citiplace in Hartford, Conn., operated by Building Systems Co., a United Technologies Corp. subsidiary; and the Concourse in Atlanta, managed by MCC Powers and the Landmark Group.

The cost of ergonomically improved systems can be justified in terms of better health and greater productivity of workers.

Intelligent buildings are fully wired office complexes. Their construction includes a complete package of computer and communications facilities, including local-area networks, digital private branch exchanges, a mainframe computer center, satellite antennas and a host of end-user support services such as user training, security and energy control.

Organizations with a high level of OA should consider appointing a chief ergonomics officer. The ergonomics manager, with a background in human factors engineering, man-machine interface, physical facilities planning and environmental psychology, should develop and enforce ergonomic standards throughout the entire corporation.

This new approach to corporate management stresses not only the use of advanced technologies to increase productivity in the office, but also the development of a physical facilities plan that addresses ergonomic issues.

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POS system keeps bookstore personnel in the know

KNOXVILLE, Tenn. — The bookstore at the University of Tennessee here uses a point-of-sale (POS) terminal system to help it prepare for and survive a quarterly onslaught of students. "Speed and accuracy are essential when nearly 30,000 students hit the bookstore in three or four days to get their books," said Wade D. Meadows, the school's director of bookstores.

> *'We can gather any information we want and report it in virtually any way.'*
> — Wade D. Meadows, director, University of Tennessee Book and Supply Store.

The University of Tennessee Book and Supply Store, which carries 3,800 textbook titles during each scholastic quarter and registered $7.3 million in sales last year, uses a system based on 31 NCR Corp. Model 2152 POS terminals. The system also includes two NCR Model 761 concentrators; a 512K-byte Honeywell, Inc. Level 6 supermini, fitted with Ultimate Corp.'s Ultimate operating system; and Applied Information Systems, Inc.'s Ratex software for bookstores. It has been in place since April 1983.

During the rush of student book buying, the POS terminals allow cashiers to check students out within an average of four minutes, according to William C. McCarter, the bookstore's assistant director and operations manager. In those four minutes, the automated system enables the bookstore to gather data that allows it to monitor its inventory and make informed decisions about what books to order, in what quantity, for the future. Cashiers pass wand readers over book tags that are printed in optical character-recognition type. Information includes the book's price; its 12-digit International Standard Book Number (ISBN), which identifies the book by title and edition; and its sales class, such as whether it is a new, used or reference book. The POS terminals transmit the data to the two Model 761 concentrators, which pass it through an interface and onto a disk of the Honeywell supermini. The bookstore updates its inventory and other records nightly, McCarter said.

From this information, the store's system produces reports that help its two textbook buyers plan future orders. Because the school is on a quarter system, the bookstore must order books four times a year. The longest lead time allowed to the buyers is about 10 weeks before a quarter starts, which McCarter said "does push things a little bit."

Once every quarter, the buyers have the system generate a course history report for their use. The report includes information about textbooks from courses offered during the past 10 quarters. For all courses from those prior quarters, the report lists the estimated enrollment and actual enrollment along with the number of books purchased by students in the class. The buyers use the report and requisition forms provided by the school's academic departments to help predict the number of books a scheduled class will need.

One of the buyers, Mitchell P. Borden Jr., assistant director and textbook manager for the bookstore, said the reports provide him with "the data I need to make intelligent buying decisions — not data just in raw form, but in the format I need."

He said information from the report has allowed the store to reduce its inventory by about 10% and to increase its inventory turnover from six times a year to seven.

Another report, one the system generates daily, gives the bookstore current information about inventory levels. For each title the store stocks, the report subtracts the number of books that the terminals record as having been sold during the day from the number of books the store had in inventory at the beginning of the day. The report also includes information on how many copies of the book have been sold in the month to date and the year to date.

Other information the system generates daily includes:

- An accounts receivable update.
- A record of cash discounts, accounts receivable and proof reports from each terminal, which is used for balancing.
- Buy-back reports.
- Data on use of bank cards and checks.
- Cash over or under and voids, listed for each cash register.
- A sales error report, which lists incorrect, illegible or missing ISBN numbers from the day's sales.

The system also generates reports on demand to monitor credit card transactions, purchases made by check and other variables. "We can gather any information we want and report it in virtually any way," Meadows said. "Consequently, reporting overall is much better than in the past, [as] is cash control."

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To begin work on any production process, a worker must log on to a Honeywell 3305 terminal and key in information about the work he plans to do.

Food lab's work flow monitored by terminals

ALSIP, Ill. — A laboratory here that supplies seasonings and ingredients to the food industry depends on a system of data entry terminals to make sure its many chefs do not spoil the broth (or the pancake mix or meat tenderizer, for that matter).

Griffith Laboratories USA, Inc. is one of the world's largest suppliers of seasonings and food ingredients. At its manufacturing plants here and in Union, N.J., Union City, Calif., and Lithonia, Ga., Griffith produces about 15,000 different seasonings and ingredients for 8,000 commercial processed food manufacturers, distributors, restaurants and institutions. It has 38 recipes for barbecued potato chip seasonings alone.

About 600 employees at the four manufacturing plants produce the ingredients, and a shop floor data collection system, the Factory Management System (FMS) from Honeywell, Inc., coordinates the employees' work through every step of production.

The FMS at each manufacturing plant consists of:

- A 1M-byte Honeywell DPS 6 minicomputer.
- Ten Honeywell 3305 terminals that guide employees through the production process.
- Twelve Honeywell 7200 CRT terminals used for data entry and work-in-process inquiries.
- Two Honeywell 3301 terminals that monitor employee attendance.
- Honeywell's FMS software, which runs the different terminals in the system.

To begin work at any stage in the production process, an employee must log on to a Honeywell 3305 data collection terminal and key in his intentions. FMS keeps track of each stage, so if an employee tells the terminal he wants to perform work that has already been completed or perform a step out of order, the system advises him against it.

According to Robert Brunson, Griffith's MIS director, "One particularly helpful aspect of FMS is that it helps avoid conflicting labor reports, and it tracks job progress according to our preset standards."

When employees in Griffith's customer service department receive an order from a customer, they enter information about the order into the DPS 6 via one of the 7200 terminals. The mini produces documents, such as recipes, to guide production work. A production scheduler receives these documents, and he schedules production work at the manufacturing plant. Most orders go into production within three days after they are received, Brunson said.

At the manufacturing plants, each order follows a production process that has seven set stages:

- Staging. Employees gather standard-size packages of ingredients from warehouses for use in the recipe.
- Batching. Employees gather the remainder of an ingredient called for in the recipe.
- Mixing. Employees follow the recipe to put the correct amount of ingredients into a mixer at specified times.
- Quality testing. A sample of the product is sent to Griffith's laboratory, where it is tested against the client's standards.
- Dumping. The mixture is unloaded from the mixer and loaded into bulk containers or sent via conveyor belt to the packaging department for division into smaller containers.
- Packing. The mixture is packaged according to customer specifications.
- Weighing. Each case of the product passes over a scale, and cases that do not pass muster are pulled from shipment until their weight is corrected.

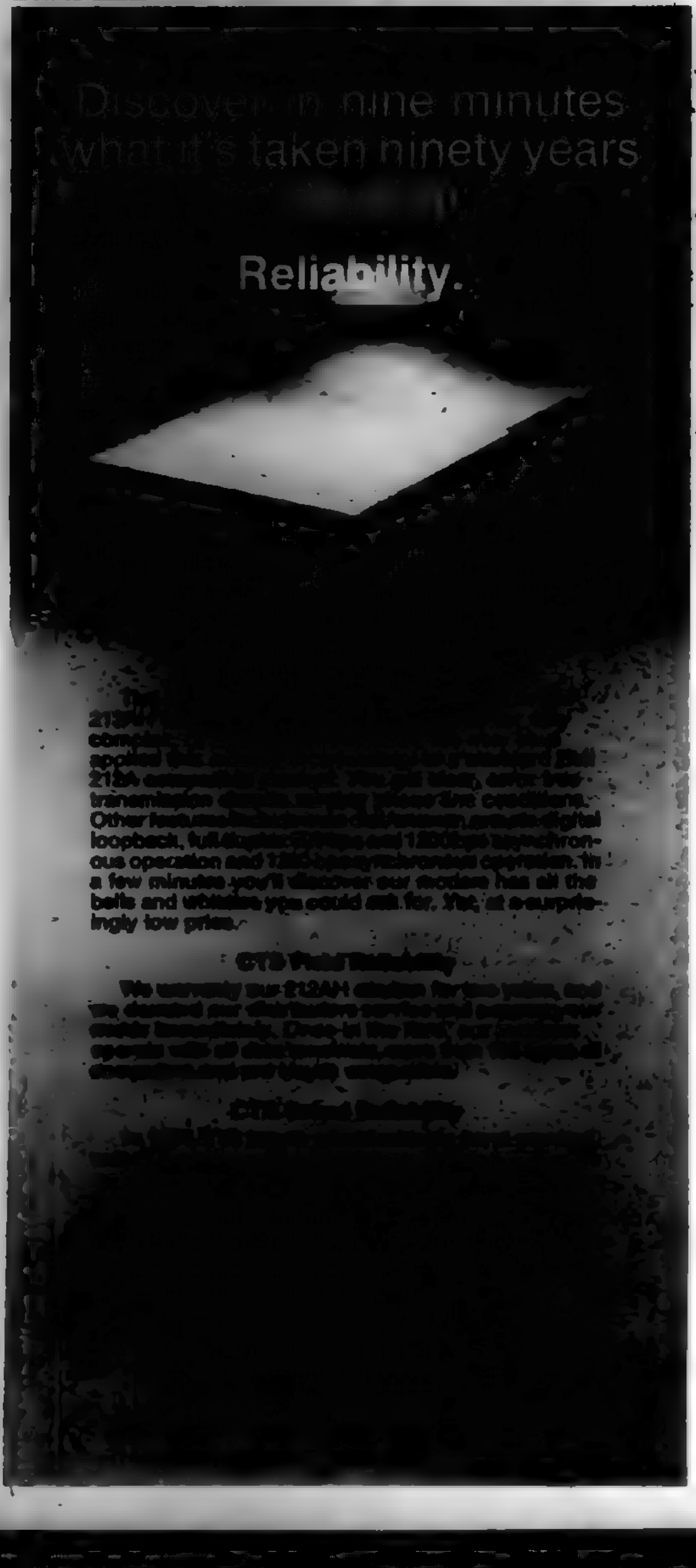
Employees key information into the shop floor system via their 3305 terminals to signal the beginning and end of each task within each production stage, and the information is recorded on the minicomputer. When customers call to check on work in progress, customer service employees make inquiries through their 7200 terminals and provide up-to-the-minute reports, Brunson said.

He said the system also keeps track of the time employees take to finish each task, and customers' bills reflect the amount of time it takes the firm to process an order from beginning to end.

Employee attendance data is recorded on the system through the 3301 terminals. Whenever an employee enters or leaves the manufacturing plant, he must insert a punch card — bearing his employee number — into one of the 3301s. The machines read the employee number and time of entry or exit and register the data on the DPS 6. Griffith uses the information to process its payroll and to keep track of employees' sick days.

The firm transmits information daily from the DPS 6 over Wats lines, through a Honeywell Datanet 8 front-end processor and into a 3M-byte DPS 7/55 mainframe at headquarters here. Brunson said Griffith's management uses information from the shop floor data collection system to help it measure production.

The firm plans to integrate the shop floor system into an overall manufacturing resource planning system within two years, according to Brunson. The system Griffith envisions will provide resource management from the time the firm orders raw materials through the time it ships a finished order to a customer.



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Fiber optics offers prudent alternative to EIA choices

Communications speed, distances increased without degrading signal quality

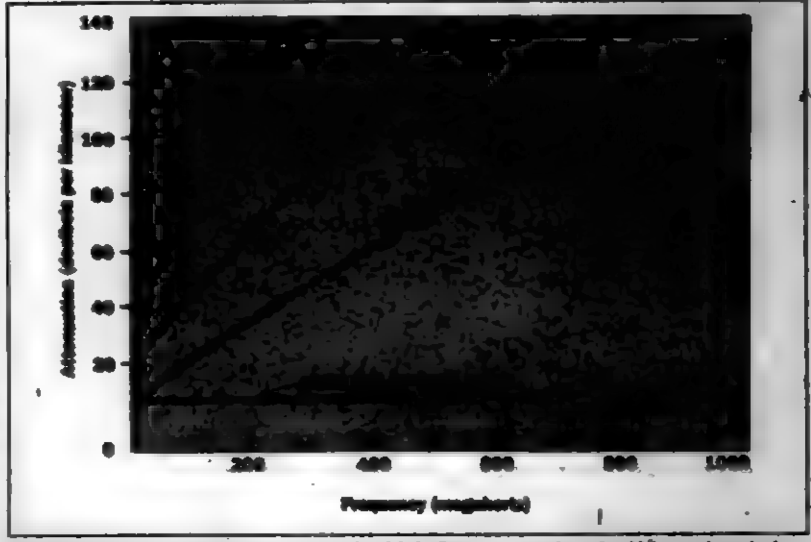
By James B. Bartula
Special to CW

With the advent of fiber-optic communications in the computer industry, managers are now faced with choosing between fiber-optic VDTs, communications boards and cables and their more traditional Electronic Industries Association (EIA) counterparts.

The advantage of using fiber-optics hardware and cables is the increased distance from one communications point (such as a VDT) to another (such as a host computer) that they provide. The need for many short-haul modems is eliminated when fiber optics is used. Current fiber-optic VDTs can be located 1,000 meters or 3,280 feet from a host without the need for short-haul modems.

Another advantage of fiber optics is the speed that light pulses can travel through a fiber cable. Fiber-optic products can communicate at top speeds from 19,200 to 38,400 bit/sec over a 1,000-meter fiber-optic cable. This can be contrasted with the 1,200 bit/sec speed for a 914-meter EIA RS-232C cable, which is the maximum length of cable allowed by the Texas Instruments, Inc. EIA Distance Policy (see story below).

Light is divided into different frequencies. When light is passed though a prism, each frequency emits its own color varying from red to violet. Each light frequency or color is several orders of magnitude higher than the highest frequencies that are now used in the copper wires of computer communications. The higher a given frequency of light, the more information that frequency can carry. For example, a single 125-micron diameter (about the size of a human hair) fiber-optic cable can carry the same amount of information as 900 pairs of copper wires.



High data transmission rates require high-frequency signals. When signals between VDTs and their host computers are carried through copper cables like RG-58/U, 59/U, 62/U, 14/U and 19/U, the signals suffer increased degradation as frequency increases.

As the distance from a VDT to a host computer increases, the signal carried by copper wires is degraded. This signal degradation or "attenuation" occurs because copper wires offer resistance to the flow of the electrical signals they carry. Also, attenuation in copper wires increases as the frequencies going through them increase (See figure 1). Because faster data rates require higher frequencies to carry additional information, these faster data rates result in a high attenuation. This characteristic of copper wires makes them difficult to use in high-speed, long-distance communications.

In contrast to copper wires, the attenuation of fiber-optic cables remains flat as the frequency of the light going through them increases.

Fiber-optic cable with less than one decibel (a decibel is a measurement of loss) of attenuation per kilometer is now available. It is the ability to carry high frequencies with low attenuation and more data at faster data rates over longer distances.

Another advantage of fiber optics is that is it dielectric; it does not emit electromagnetic energy. Fiber-optic cables do not require special shielding to comply with the Federal Communication Commission's electromagnetic interference regulations.

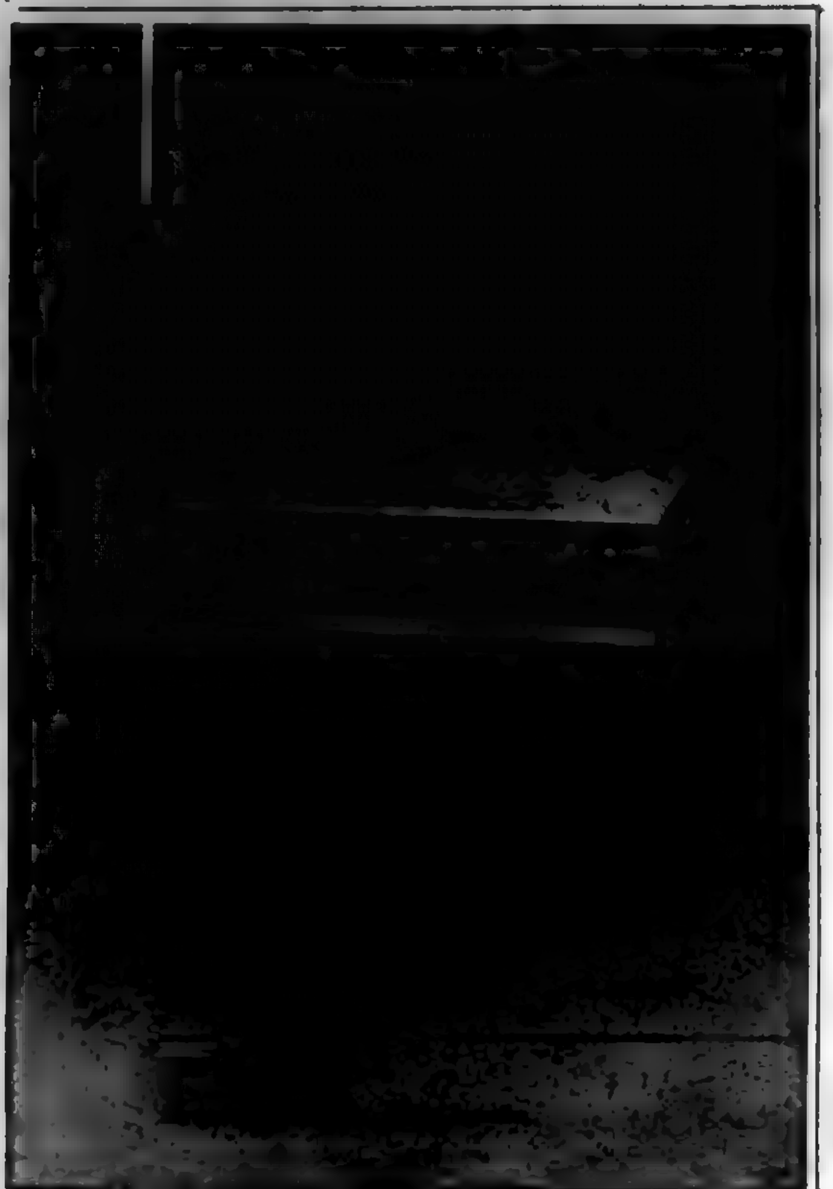
Its dielectric properties make fiber optics suited for use in electrically "noisy" environments. Copper wires can pick up electrical energy emitted by machinery in a noisy environment, transmit it to a host computer or VDT and thus cause malfunctions.

Additional advantages of fiber optics include:

- Increased data communications security: It is almost impossible to tap into fiber-optic communications without affecting the transmission enough to be detectable.
- Space constraints. Fiber-optic cable is smaller and lighter than copper cable.
- Fiber-optic products are safer from electrostatic discharges or electrical storms.

Fiber optics has made its debut in the computer industry. Its advantages will lead many computer users to consider and select fiber-optic equipment.

Bartula is a Product Manager for business system computers with the Data Systems Group of Texas Instruments, Inc. in Austin, Texas.

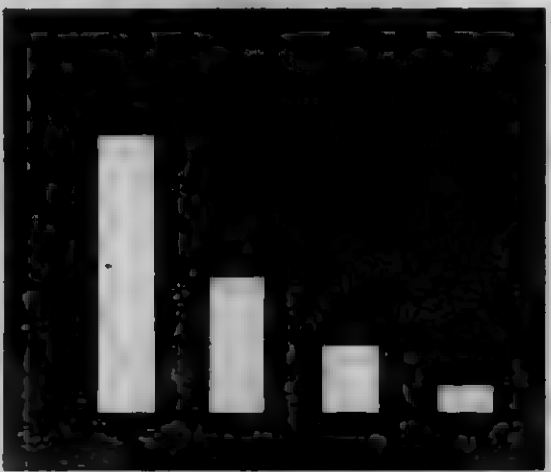


Cable distances for TI products

Texas Instruments, Inc's. Electronic Industries Association (EIA) Distance Policy states recommended distances between terminals and printers and their host when EIA RS-232C cable is used. TI sanctions operations at distances up to 15 meters, but does not guarantee error-free operation beyond that distance.

The table to the right lists the maximum lengths of EIA RS-232C cable and the associated maximum speed that is used with TI products. To operate at maximum distances, end users must meet restrictions on the types of data equipment used, electrical environment, cable construction and cable wiring.

The table shows that the maximum EIA RS-232C cable length is 914 meters, but this distance can only be attained when using a communications speed of 1,200 bit/ sec. The fastest speed available over EIA RS-232C cable is 9,600 bit/sec; this speed can only be attained at a maximum distance of 122 meters.



The maximum speed at which terminals and their hosts can communicate over TI's EIA RS-232C cable decreases as the distance between the machines increases.

Investment in ergonomics can pay healthy dividends

By Robert L. Barcus
Special to CW

Office ergonomics can affect productivity and profits as well as employee morale, safety and health. The National Institute of Occupational Safety and Health reported that an ergonomically sound automated workstation can boost productivity by more than 20%.

The expansion of computer technology into every facet of office activity has dramatically changed the character of today's office. Local-area networking and word processing, for example, have made marked improvements in office output. The human factor in office automation, however, was neglected in the rush to automate the workplace. As a result, complaints of eye- and back strain and questions of radiation-related pregnancy and eye complications have cost U.S. businesses millions of dollars (see story SR/26).

Many corporations now carefully evaluate their seating, lighting, computer-support furniture, acoustics and wire management systems to ensure that new and existing OA installations are ergonomically sound as well as cost-efficient and profit-boosting. The following topics should be considered when designing an ergonomically sound office environment.

■ Seating is a primary concern for worker comfort. Offices should be equipped with chairs that fit user, not designer, specifications. Chairs should be adjustable at the seat and back to fit the user and provide proper lumbar support. Furthermore, a chair's design should reduce pressure on the arms and upper legs and behind the knees. A properly fitting chair and regular rest breaks away from the workstation (some industry groups suggest 15 minutes every two hours) are effective ways to reduce back strain and provide greater comfort.

■ Computer support furniture, such as tables and desks, should be another management concern when designing an ergonomically sound office. Tables and desks should be adjustable. In addition, tables that support VDTs should include mechanisms, such as a cantilever, for altering the work surface and the keyboard shelf positions.

Currently, retractable articulating keyboard shelves are popular with occasional computer users. These devices support the computer keyboard and can be adjusted both vertically and horizontally. When the computer is not being used, the shelf retracts and rests under the work surface. Unfortunately, many of these shelves protrude four to seven inches below the work surface, restricting leg movement. The best option in a keyboard shelf is one that retracts, then swivels to a 90-degree angle below the work surface, freeing the legs to move as needed.

■ Lighting and acoustics play a major role in worker comfort. Poor lighting can cause eye strain, which can lead to headaches and dizziness. One way to cut down on eye strain is to select terminal screens that tilt and to outfit the screens with glare-reducing filters and hoods. Also, consider the light source. Lights should be positioned so that they are neither directly behind nor directly above the seated worker.

Ambient lights are one way to provide low-glare lighting. Ambient lights reflect light off the ceiling, creating an umbrella effect of softer light, which reduces glare and shadow. Ambient lighting offers other benefits as well. Because they are not necessarily stationary, these lights can often be moved to accommodate a new office layout. In addition, because, for tax purposes, these lights are recognized as furniture, their amortization schedule is attractive.

> *The most reliable method of determining if your staff is comfortable in the automated office is to ask them.*

One cost-efficient solution to lighting problems in an open-plan office is to use properly designed ceiling fixtures supplemented by panel-hung task lights. Task lights also brighten shadowy work surfaces.

■ Excessive noise can affect worker productivity. One way to reduce noise in this situation is to use wider, 3½-in. thick, sound-absorbing divider panels and situate furniture and lighting fixtures to reflect and dissipate sound.

■ Wide panels also increase an office's wire management options. Increased panel widths have a greater capacity for both designated and dedicated power lines at the base of

See HEALTH SR/38

Barcus is director of national accounts for Shaw-Walker Co., a Muskegon, Mich., manufacturer of office furniture and systems.

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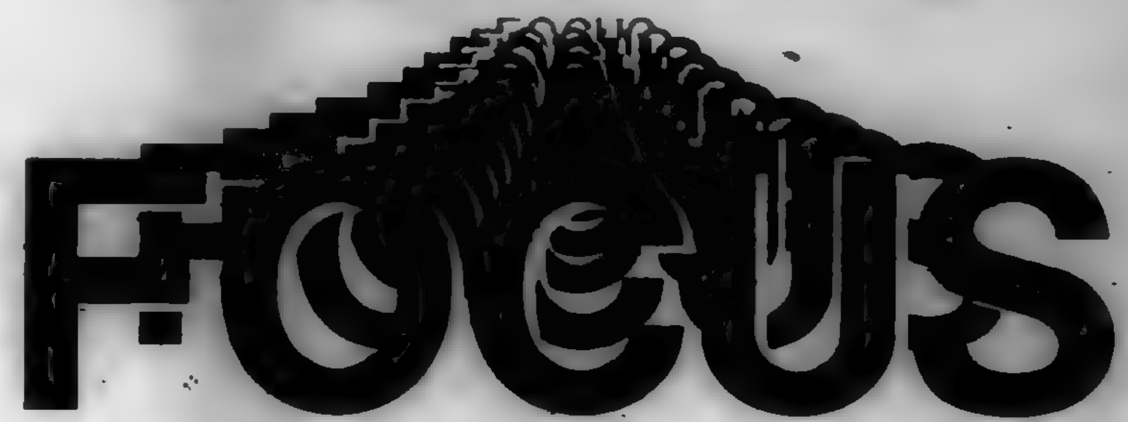

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Device upkeep maximizes benefits, minimizes costs

By Steve Aaron
Special to CW

To maintain terminals, companies must establish basic preventive maintenance procedures that can be easily executed by terminal operators.

Whether a company has 200 terminals or a single user, the benefits of good service and proper terminal maintenance means maximized uptime and cost-effective servicing.

Technological advances and the increased user dependence on computer systems has changed the way terminals are maintained and serviced. Ten years ago, terminals were periodically overhauled. Today's improved manufacturing standards and advanced electronics have made the scheduling of major and lengthy maintenance obsolete. Terminals in use today require more preventive maintenance and vendor support.

Many vendors have reacted to this need by including service options as an integral part of their selling packages. Service organizations, which share the maintenance responsibilities with the operator, are also more prevalent.

To help maintain a network of terminals, companies must establish basic preventive maintenance procedures that can be easily executed by terminal operators. In addition, they must select an equipment service contract that will meet all maintenance contingencies.

The investment of time needed to become versed in the simple preventive maintenance procedures outlined here will pay significant dividends in the form of optimal performance and uptime. The first step to take is the proper installation of terminals and customer training for those who will use them. Most computer failures occur during the first 90 days after an installation, oftentimes because of users' unfamiliarity with the system. Computer terminals are increasingly complex, and customer training helps to prevent downtime.

During training, a good service technician will explain the procedures and precautions operators must take. A good operator will take the time to listen and ask questions.

Operator's manuals are a good source of information for users. When reading, users should pay close attention to key parameters, including bit/sec rate, parity and duplex. This information should be kept handy, as it can serve as a quick reference for the basic operation of the equipment. The information is particularly helpful if the terminals are part of a shared system.

No training program is complete without a mention of the habits that can jeopardize electronic equipment. Although terminals, printers and electronic typewriters should be kept clean, care should be taken. Standard commercial cleaners can be used on most equipment, but spills will short out the unit. Similarly, placing a coffee cup on top of a terminal is a risk. Spills are referred to as "abuse" in most maintenance agreements.

In addition to spills, dropped staples, paper clips and other desktop paraphernalia can also damage a keyboard by shorting the circuit cards beneath the keys. Symptoms of this abuse include repeating characters or sticky keys.

Excessive heat can also cause terminals and other electronic equipment to malfunction. For this reason, air vents in CRT terminals and printer covers should not be blocked. Blocked air vents can cause a terminal to overheat, increasing the chances of failure. For the same reason, a terminal should not be placed in direct sunlight.

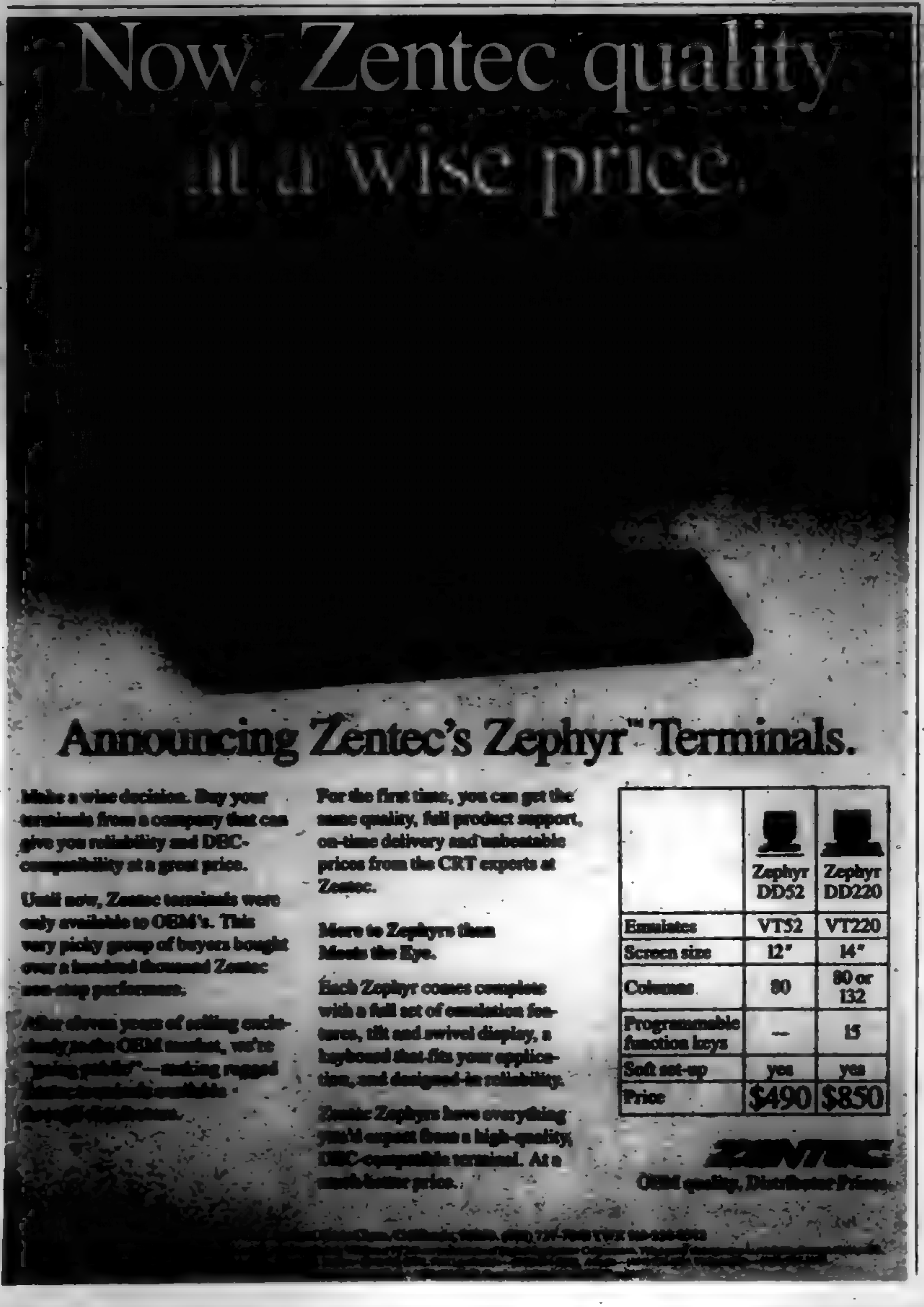
Another factor that can play a part in a terminal's possible malfunction is the use of improper cabling and electrical outlets. Plugging terminals into ungrounded extension cords is dangerous. These ungrounded cords can cause imperceptible shorts and related problems such as glitches and garble.

Environmental conditions also affect the performance of terminals and printers. Humidity, smoke and dust can impede the smooth operation of the terminal. Micros are especially sensitive to these elements.

A capable service technician can easily pinpoint and correct many problems over the telephone. The key here is patience. If you must make a service call, explain the problem to the technician and let him ask questions. Questions such as "Did you plug in the system?" or "Have you flicked the 'on' switch?" may sound

See SERVICE SR/38

Aaron is a national field service manager for Data Access Systems, Inc., a Blackwood, N.Y., distributor of terminals, personal computers and peripherals with service, leasing and supply capabilities.



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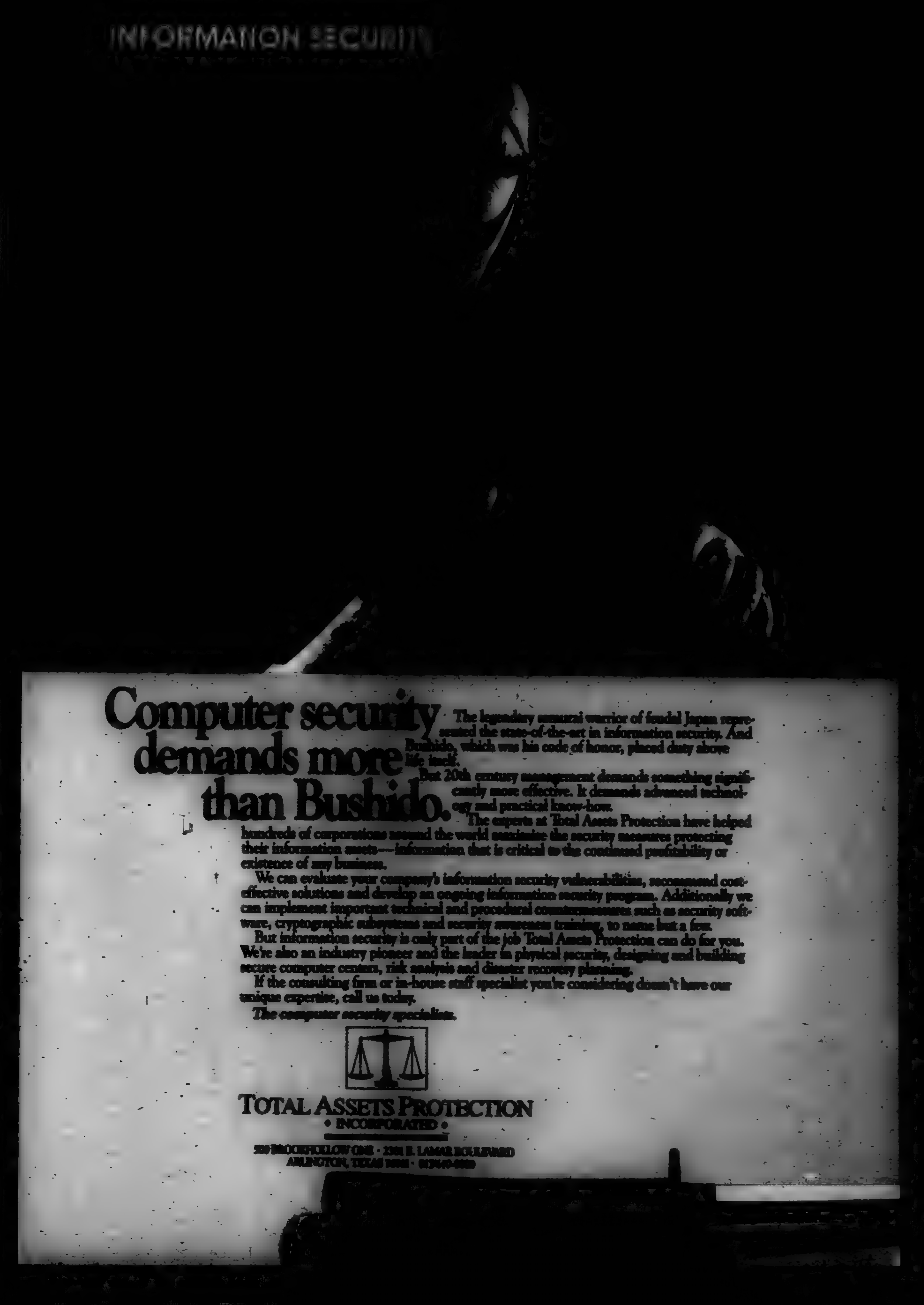

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Scholar praises electronic fellow

Vartanian uses his Total Talk terminal to prepare class work and to compose his personal correspondence.

SAN DIEGO — A blind scholar of American thought who teaches at San Diego State University here has great esteem for a colleague he calls "the fellow," even though this fellow speaks not with learned authority, but with a Swedish accent.

"The fellow" is one of two talking computer terminals that Pershing Vartanian uses to help him write correspondence, course outlines, exams, article drafts and manuscript summaries. Vartanian types information into the machines using a standard keyboard. The terminals then read back the information word by word, line by line or a screen at a time, depending on instructions Vartanian enters on the computer terminal's numeric keypad.

The machines, Total Talk terminals from Maryland Computer Services (MCS), are Hewlett-Packard Co. 125s fitted with speech synthesis boards, speech control panels and software that allows them to turn any group of characters into a spoken word. Vartanian uses one Total Talk machine at home as a standalone workstation and another at San Diego State as a terminal that accesses the school's three mainframes.

Vartanian said the terminals' ability to read back prose he has written allows him to regain the control over his writing that he enjoyed before he lost his sight. "The MCS equipment is a built-in pair of eyes that I can use for immediate response," he said.

Vartanian had prided himself on his scholarly writing, but could not carry it out alone after he went blind. "I had to rely on others to help me," he said. "For a writer like myself, it was an aggravating intrusion on a very personal experience."

Vartanian lost his sight through a degenerative disease called retinitis pigmentosa in 1958, when he was 26 years old. He had been working as a high school teacher and continued to teach for three years. Assistants helped him type class material, correct papers and perform tasks he was no longer able to handle alone.

During the summers, he studied toward a master's degree at Columbia University. As he composed his thesis for the degree, a treatise called "The Puritan Symbol in American Thought," his handicap intruded on his work.

"Most of the time I had to rely on an assistant," he said. When he worked alone, he left scrambled notes for his typist and hoped the typist could decipher what he had written. "It wasn't the most efficient or pleasant way to write a thesis, to say the least," he said.

In 1968, Vartanian began work as an assistant professor of history at San Diego State and was completing work on his Ph.D. in American history from the University of Michigan. He grew increasingly frustrated at his dependence on others for help in his scholarly pursuits.

In 1980, he began looking for a tool to help him regain independence. "By then I had been teaching at the college level for about 15 years and was more than ready for a talking computer," he said.

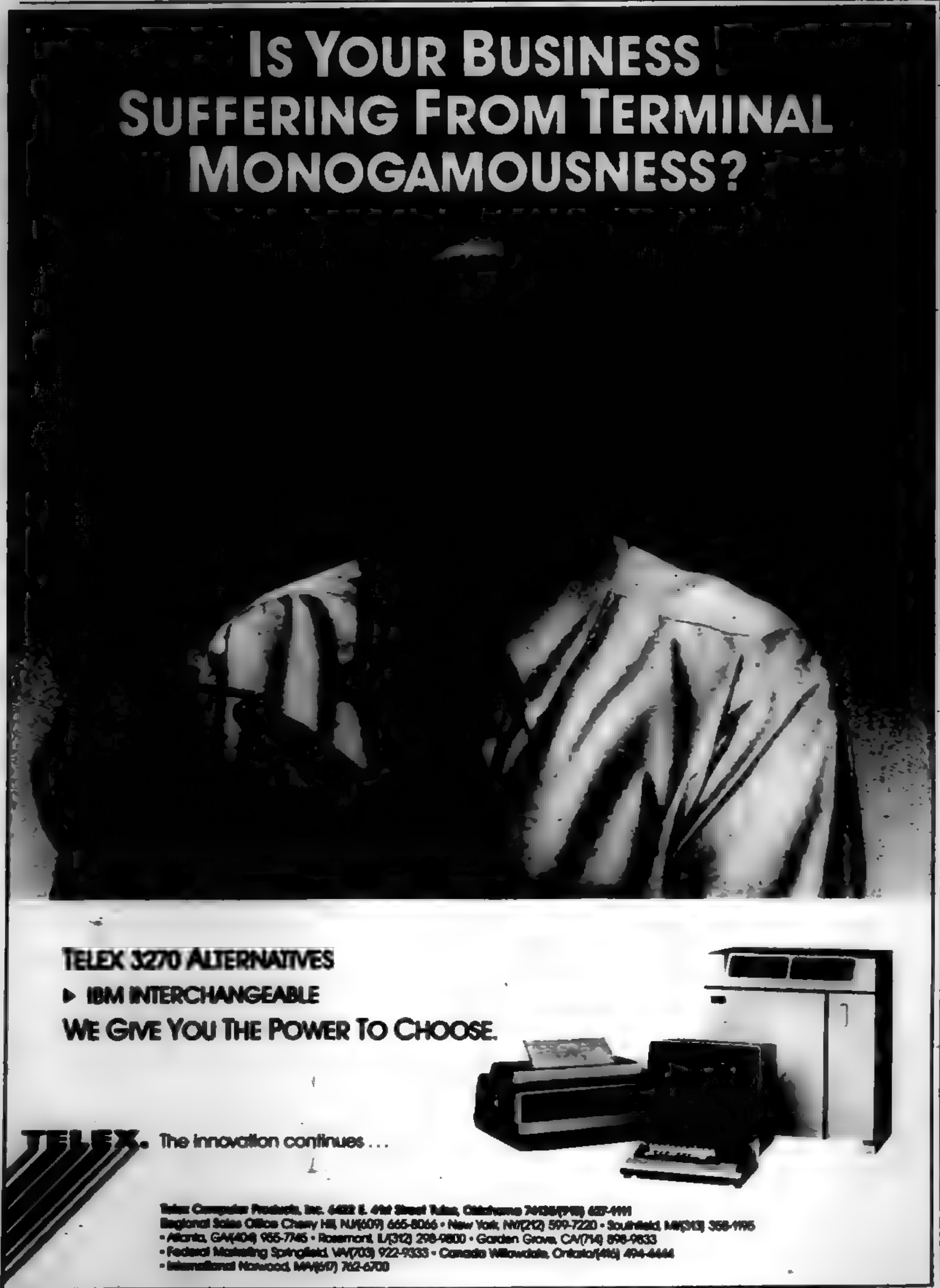
He called MCS' president and explained his needs. "I told him I wanted the machine to be able to spell a word on demand, to speak one word at a time, a line at a time and a page at a time," he said.

Vartanian said Total Talk met his specifications, and he purchased his first terminal shortly afterwards. He later traded that terminal for the one he now calls "the fellow," an upgraded version called Total Talk II, which he uses at home to perform about 80% of his work.

In his office at the university, Vartanian works on another Total Talk, which the school purchased for his use. The machine has access, via a modem, to the school's three mainframes, a Control Data Corp. Cyber 170/150, a Digital Equipment Corp. VAX-11/780 and a DEC PDP-11/45. The school has a second Total Talk in its handicapped student center.

Vartanian said that some blind people have difficulty adjusting to the machines because they have relied on braille and other tactile aids throughout their lives. "But for me," he added, "[the terminals] relieved a lot of frustration and anger that I had built up in regard to writing and independence."

He is currently using the machines to help him compose a book that traces the trend toward specialization in American education and the reaction against that trend.



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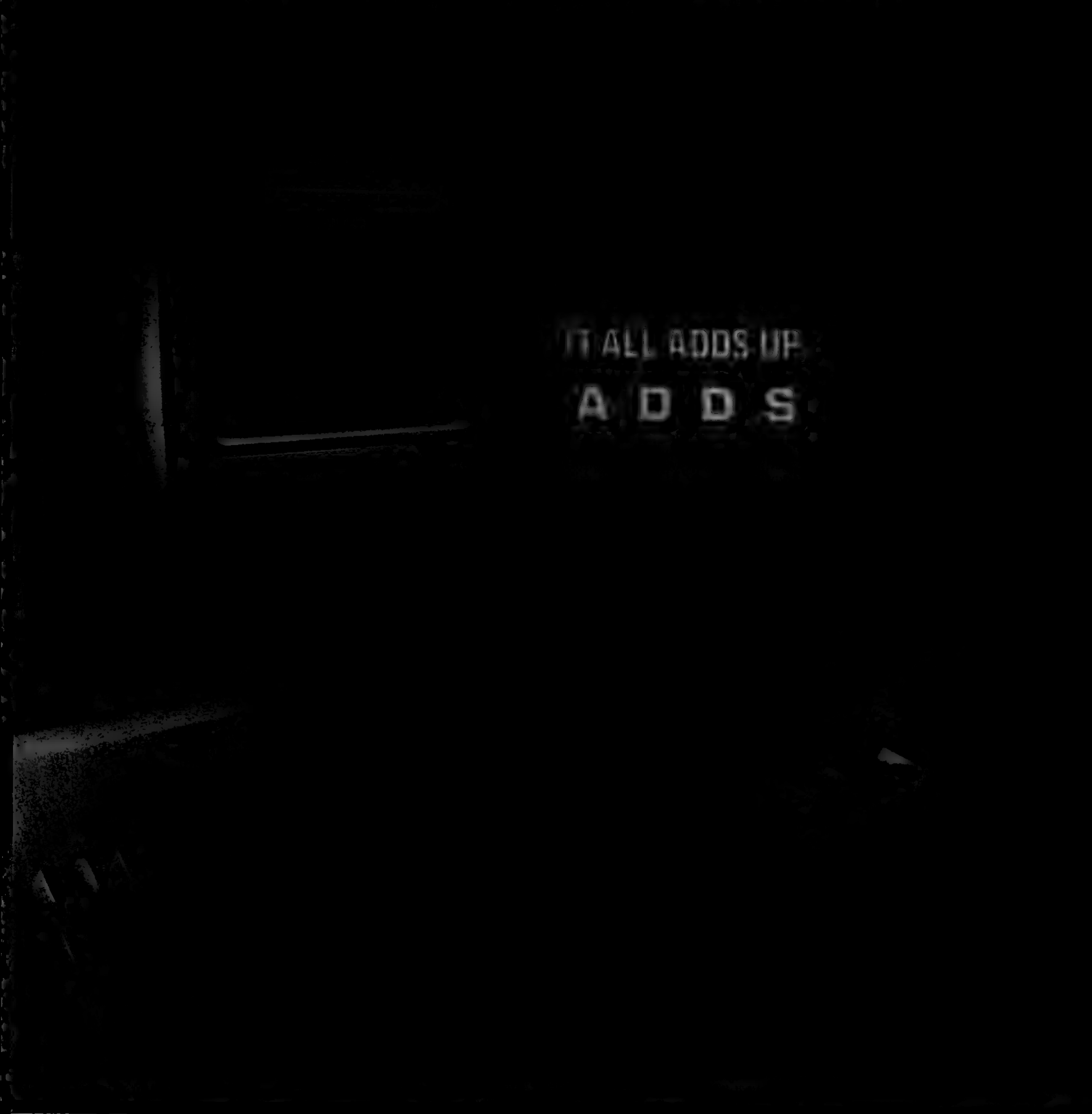

SERVICE from SR/34

simplistic, but these points are sometimes easily overlooked. Data Access Systems, Inc.'s service division has found that 10% of their service calls are attributed to these oversights.

Prevent unnecessary service calls

To save the expense of unnecessary service visits, make sure terminal operators check with the systems operator before calling a service technician. Often what is perceived as an individual terminal problem can actually be an entire system failure or a temporary shutdown.

There are many forms of service contracts to satisfy different end-user needs. When considering the purchase of a service contract, ask the vendor or manufacturer these questions:

- Do they have their own service technicians?
- Do they offer a 90-day warranty, preferably on-site with complete vendor responsibility for problems during this period?
- What facilities does the manufacturer or vendor have?
- Does the service organization have a center for refurbishing circuit cards and terminals?
- Does it have a central dispatch toll-free number?
- Does it have national coverage with service centers in key metropolitan areas? Do the local centers offer walk-in service to avoid technician travel time and expense?

Service agreements are available in the following forms:

- Maintenance contract. This type of policy provides one-year, on-site maintenance; the prepaid fee is typically based upon the price of the unit.
- Return-to-depot contract. This contract is considerably less expensive than the maintenance contract because repair work is done at a service center. While the unit is in for repair, better service vendors do light, preventive maintenance such as clean the keyboard.
- Time and material. Some computer terminal owners are willing to risk having no service coverage; when a unit fails, they call for on-site service and pay a portal-to-portal rate on an hourly basis as well as the price of a part, if a new part is indicated. An alternative would be to deliver a failing unit to a service center; the charge is based on actual time and material necessary to repair the unit with no travel time charges.
- In-house servicing. Some companies find it cost-effective to establish internal service capabilities. These are typically large companies with a great number of computer terminals. Today's simpler and smaller units require no more effort than to replace a defective board with a new board at an exchange rate.

A careful analysis of the capabilities and services offered by a manufacturer or vendor is well worth the effort. At the very least, a service organization should have appropriate and ample facilities manned by capable service technicians. A 90-day warranty, preferably for on-site service with the vendor assuming complete responsibility for problems during this period, might be considered standard.

The ideal service package will also include a center for refurbishing circuit cards and terminals, a central dispatch toll-free number and national coverage with service centers in key metropolitan areas that offer walk-in services.

If your vendor or manufacturer offers most or all of these capabilities and services, and your operators develop a habit of preventive maintenance, you can be assured that your computer terminals will provide the performance they were designed to give.

HEALTH from SR/33

the system. Some open office panel systems are internally wired, bringing electrical outlets to the actual work surface. By internally routing computer wires and cables, lines running down the exterior of the panel, as well as tombstones (floor-mounted electrical outlets that limit rearrangment of the office layout) are eliminated.

Flat wiring

Flat wiring is an inexpensive and concealable means of managing the various wires and cables needed in an automated, conventional office environment — one furnished with stand-alone desks. Here, flat wires are run along the floor, under the carpet, to deliver electrical support where needed. These wires are rerouted by taking up the carpet. Many offices now use removable carpet tiles, which makes rerouting, if needed, easier.

Although focusing on the physical characteristics of the office will undoubtably improve its ergonomic fitness, the most reliable method of determining if your staff is comfortable in the automated office is to ask them. Find out if glare is a problem. Ask if desks and tables are appropriately fitted, and try alternatives if necessary. If possible, arrange for a prepurchase trial period to test the computer equipment under consideration.

The National Office Products Association 1983 survey on "The Future of the Office Furniture Industry" reported that personnel expenses now account for approximately 40% of the total cost of doing business. Expenditures for furniture and equipment consumed only an estimated 1% of the total.

It is essential, therefore, that personnel are comfortable with office automation and that investments in computer upgrades do not drive away valued employees. While the computer vendor will have a replacement on the shelf, the available labor pool may not be so bountiful.

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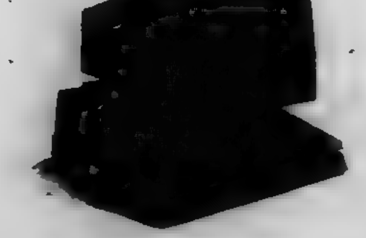

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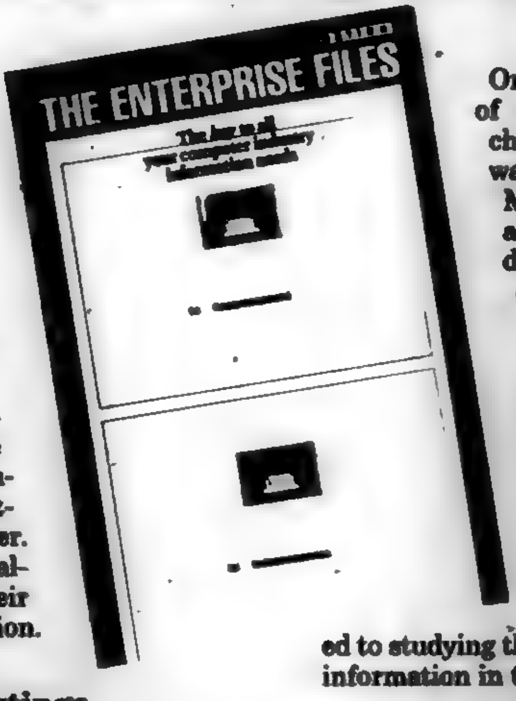

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SOFTWARE & SERVICES

Utility's DBMS overhaul keys DP modernization

POUGHKEEPSIE, N.Y. — Entering the 1980s, Central Hudson Gas & Electric Corp., an investor-owned utility here, was having increasing difficulty providing rapid, accurate response and service both to its 285,000 customers and to its internal corporate users.

Faced with a small DP staff, more than 80% of whom had less than one year's experience; a corporate five-year plan for new systems development; 20-year-old tape systems; development lead times extending beyond reason and acceptability; and increasing demands for improved customer service by regulatory agencies, it was clear to Robert Berger, director of electronic data processing at Central Hudson, that a new approach was needed. After just three years of effort, Central Hudson's DP staff solved those problems and created in the process what it believed to be one of the most complete, flexible and responsive customer information systems in the utility industry.

At the root of Central Hudson's problems was its reliance on batch autocoder systems developed in the 1960s to process the core of the utility's customer, financial and plant accounting data. Remedies to provide on-line query to files refreshed nightly were straining under a daily load of more than 1,800 service-related calls as well as 20,000 billing, payment and main-

See REMEDY page 71

SOFTALK
Paul Gillin
CW Senior Editor

Users group boom: Food for thought

Users groups are taking off. Based on observations from attendance at eight of them this year, it appears this concept of getting together to meet your fellow users is more popular than ever. Many users groups are seeing attendance double each year. And with their new popularity, planning has become more critical than ever.

The following, in no particular order, are some of the issues that arise most frequently:

- Should your group be independent or vendor-sponsored? This is the most critical decision the users can make. Groups that the vendor pays for are

See [illegible] page 75

Integration tops SI plans

GE software division plans several releases

By Paul Gillin
CW Staff

SAN DIEGO — GE Software International Corp. (SI), which has suffered from charges of poor integration and documentation of its application software packages, is planning major new releases of virtually all of its products next year with a new focus on common functions and ease of use.

Speaking at the 15th Software International Users Group held here recently, Robert Tatum, vice-president of technology at Software International, said the integration will focus on seven areas: Smart Link, Software International's microcomputer-mainframe link; common screens and transaction processing; security; Help messages; navigator aids; queries; and doc-

See SI page 76

SOFTLINE
Scott A. Kukin

Phase systems in gradually

Businesses are spending billions of dollars each year to implement information resource management systems. Due to their size and complex nature, these systems commonly take from five to 10 years to implement. But with a strategy in which systems are phased in gradually, the organization can have usable systems within 12 to 18 months.

The possible ramifications of improper implementation decisions on projects of this magnitude can include a doubling or tripling of the original budget, not to mention the chaos and disruption an improper decision can cause within an organization.

This article presents some critical success factors related to the phasing-in of major information management projects, which corporate MIS managers should bear in mind. Before any business decision can be made, it is necessary to gather a minimum of information, including an understanding of how the existing system functions, how the proposed system will function, the data model required to support the proposed system and the effect the proposed system will have on the organization.

Any implementation decisions made without this minimum knowledge could have catastrophic effects on the organization. Once this information is gathered, there are also organizational, cultural and technological critical factors that must be addressed.

Every system, large or small, must be

See PHASING page 76

Kukin is executive vice-president of Helix Corp., located in Westlake Village, Calif.

- Software Research Corp. has introduced a package said to interface a variety of OA systems with IBM's Distributed Office Support System/64
- Digital Equipment Corp. beefs up its VAX VTX videotex software/66
- Database Utility Group unveiled a new version of its [Software AG of North America, Inc.] Adabas Performance Analysis System/66
- Index Technology Corp. announced that IBM will market its Excellerator information systems development tool/67
- Pansophic Systems, Inc. announced enhancements to its Gener/OI application generation system/67

INSIDE

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Productivity Aids/66
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IBM Disoss interface out

NATICK, Mass. — Software Research Corp. has introduced an IBM Distributed Office Support System (Disoss) interface software package intended for use with non-IBM office automation equipment and IBM's Disoss document library and distribution software.

Residing on an IBM host mainframe, Docupower is implemented in IBM's CICS/VS operating environment, the vendor said.

Supporting IBM Systems Network Architecture and binary synchronous protocols, Docupower enables users to format an IBM Document Interchange Architecture command from a non-IBM OA product and allow it to be interpreted by Disoss, according to the vendor.

Information dispersal

As a result, information reportedly can be disseminated to all office automation equipment linked via a network — including systems from Honeywell Information Systems, Inc., Lanier Business Products, Inc. and Wang Laboratories, Inc.

The price of Docupower is $15,000 for the first copy and $5,000 for subsequent copies.

For further information, Software Research is headquartered at One Natick Executive Park, Natick, Mass. 01760.

VisiCorp

has sold Communications Solutions, Inc. to

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a division of

Control Data Corporation

The undersigned initiated this transaction and assisted VisiCorp in the negotiations.

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SYSTEMS SOFTWARE

KISCO INFORMATION SYSTEMS
F1 Manager

Kisco Information Systems has announced F1 Manager, a disk space management package for the IBM System/36 minicomputer running under IBM's SSP operating system.

According to a spokesman, the F1 Manager spotlights inefficient disk uses and searches out poor file and library placements. It also analyzes changes in disk usage. A time analysis feature forecasts when the next disk upgrade may be required, up to three years in the future.

F1 Manager is said to leave a descriptive record of all files and libraries located on a System/36 fixed disk. When disk upgrades are installed, the package recognizes them automatically and readjusts output reports to show the expanded disk resource.

A one-time license fee is $250.

Kisco Information Systems, 120 Beverly Road, Mount Kisco, N.Y. 10549.

GRANADA SYSTEMS DESIGN, INC.
PC/Sail

Granada Systems Design, Inc. has announced an interactive IBM Personal Computer communications hardware and software product that permits communications between asynchronous devices — such as cash registers, audio response units and optical character recognition/bar code wands — and an IBM System/34, System/36 or System/38 minicomputer in a real-time, on-line mode. The communications link from the IBM Personal Computer to the IBM minicomputer is via a native IBM 4251/12 protocol.

According to a spokesman, the PC/Sail system provides the necessary intelligence and multitasking required to read data from an asynchronous device, transmit the data to the host minicomputer in real-time and, at the same time, translate the asynchronous protocol to a standard IBM 5251/12 synchronous protocol.

The package includes a Synchronous Data Link Control board, an asynchronous communications board and a diskette with the software. It is priced at $1,600.

Granada Systems Design, 303 Fifth Ave., New York, N.Y. 10016.

COMPUWARE CORP.
DOS/CICS Abend-AID

Compuware Corp. has introduced a version of its Abend-AID for IBM's 4321 or above processors and compatibles running under IBM's DOS/CICS environment.

According to a spokesman, DOS/-CICS Abend-AID provides on-line access to English diagnostics explaining the cause of system abends, as well as a solution to the problem. CICS data is formatted so that no hexadecimal calculations or address chaining are required. The output is written to DOS/CICS Abend-AID's self-contained data set. All file areas are formatted by record, and file input and output statistics are provided. The system's trace table contains only those entries associated with the abending task.

The price of DOS/CICS Abend-AID ranges from $4,800 to $7,500, depending upon the computer.

Compuware, 32100 Telegraph Road, Birmingham, Mich. 48010.

PROGRAM ACCOUNTABILITY & EVALUATION, INC.
Timer/38

Program Accountability & Evaluation, Inc. has announced a job scheduling system for the IBM System/38 running under IBM's CPF 2.0 operating system.

According to a spokesman, Timer/38 controls System/38 installations around the clock and submits jobs from powering up or down to reorganizing files.

The price of Timer/38 is $500.

Program Accountability & Evaluation, Seven Riverway Road, Salem, Mass. 01970.

AK, INC.
Trace

AK, Inc. has announced a program debugger that operates on IBM processors under IBM's MVS, MVS/TSO or VM/CMS operating systems.

According to a spokesman, the Trace debugger prints the results of the execution of machine language instructions of the traced program as they are being executed. It reportedly prints in a fixed format, including information on condition code, whether a branch was taken, contents of involved registers and contents of storage areas referenced by the instruction.

The price of the Trace program debugger is $2,500.

AK, 1671 McBain Ave., San Jose, Calif. 95125.

MICHAELS, ROSS & COLE LTD.
MRC-Maintainer 4.0

Michaels, Ross & Cole Ltd. has announced enhancements to its MRC-Maintainer application generator for the IBM System/38 minicomputer.

Designed for nontechnical users, the product reportedly provides fourth-generation language capabili-

Continued on page 66

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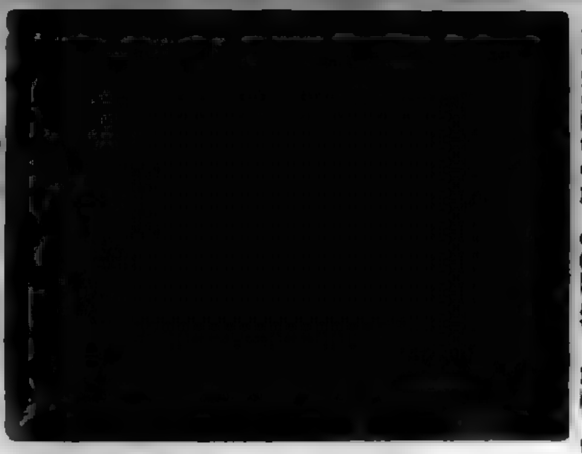

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CCA EMACS and Elisp are trademarks of CCA Uniworks, Inc.

SOFTWARE & SERVICES

Continued from page [illegible]

ties to the System/36, according to the vendor.

MRC-Maintainer features on-line help, multifile lookup and edit capabilities, an audit trail, field editing and message file interface, according to the vendor. The program is said to work with existing System/36 data bases.

MRC-Maintainer costs $1,140 per CPU.

Michaels, Ross & Cole, P.O. Box 4532, Oak Brook, Ill. 60521.

DIGITAL EQUIPMENT CORP.
VAX VTX Videotex Software Version 1.1

Digital Equipment Corp. has announced a version of its VAX VTX videotex software that adds support for British Telecom's Prestel (Level 1) terminals and Ansi North American Presentation-Level Protocol Syntax (NAPLPS) graphics display protocols on DEC's Professional 350 workstation running PRO/NAPLPS, Sony Corp.'s VDX-1000 videotex unit and Norpak Corp.'s Mark IV videotex decoder, as well as DEC's Dectalk text-to-speech terminal.

VAX VTX videotex subscribers also can use the IBM Personal Computer as a videotex terminal using Microstuf, Inc.'s Crosstalk XVI Ascii/VT100 emulation package. VAX VTX runs under both DEC's VMS and Micro VMS operating systems and supports all of DEC's VT100 and VT200-compatible terminals.

VAX VTX Version 1.1 videotex is a multiuser, layered software product that provides distributed videotex services in a business environment.

The price of a full license for the VAX VTX Version 1.1 is $25,000, and it will be available in December 1984.

DEC, Maynard, Mass. 01754.

SYNAPSE COMPUTER CORP.
Synapse Program Generator

Synapse Computer Corp. has announced the Synapse Program Generator which works with the company's N+1 On-Line Transaction Processing System.

The product accelerates the development of Cobol transaction application programs and screen forms, according to the vendor. Synapse Program Generator is nonprocedural and only requires that the programmer answer screen prompts, the vendor said.

With the product, a user reportedly can create interactive programs that read, write and update relational data base rows; batch programs that process large numbers of data base rows; programs that create listings of selected portions of a data base; and file-transfer programs that move data from other systems to a Synapse system.

The Synapse Program Generator is priced at $7,500.

Synapse Computer, 801 Buckeye Court, Milpitas, Calif. 95035.

PRODUCTIVITY AIDS

OXFORD SOFTWARE CORP.
UFO/Cobol 1.1

Oxford Software Corp., has announced that its UFO/Cobol application generator will now work in an IBM VM/CMS operating environment.

UFO/Cobol 1.1 is said to allow the UFO Cobol programmer to develop IBM CICS applications in the VM/CMS operating environment. The new release reportedly allows the user to transfer control of UFO/Cobol programs to other CICS programs and allows a CICS programmer to communicate with UFO/Cobol programs.

A new clause allows the cursor to be positioned by field name in the program, the company said. With the enhancement, the program reportedly can do a compile from multiple libraries.

Cost of the program under IBM's CMS and DOS operating system is $24,000. Cost for IBM's OS operating system is $33,000, according to Oxford Software.

Oxford Software, 174 Boulevard, Hasbrouck Heights, N.J. 07604.

DATABASE UTILITY GROUP
Adabas Performance Analysis System 2.0

Database Utility Group has announced enhancements to its Adabas Performance Analysis System (Apas) which runs under IBM's MVS and DOS operating systems.

The product works with Software AG of North America, Inc.'s Adabas data base management system. Enhancements include fields for summarizing descriptor and field usage, user-defined fields and nucleus statistics fields for interactive display and interval reporting.

Apas reportedly features a histogram output format, an improved history system, the ability to selectively copy fields and improved recovery and operating system interfaces. Apas is priced at $8,750.

Database Utility Group, P.O. Box 4012, Federal Way, Wash. [illegible]

SOFT WEAR MANAGEMENT, INC.
Service/36

Soft Wear Management, Inc. has introduced a documentation and object management program for use on the IBM System/36.

According to the company, Service/36 has more than 50 commands, organized into four modules, each with its own user reference manual, providing both on-line and hard copy.

The four modules, Object Analysis, Object Management, Text Writer and Report DOC, sell for $1,275.

Soft Wear Management, 11161 Greenhurst Drive, Riverside, Calif., 92506.

SOFTWARE & SERVICES

PANSOPHIC SYSTEMS, INC.
Version 3.5 Gener/OL

Pansophic Systems, Inc. has announced an enhanced version of its Gener/OL fourth-generation language for interactive, on-line program development. Gener/OL is designed for use with IBM's 360, 370 and 4300 series and compatible computers under IBM's DOS or OS operating systems with CICS 1.5 and higher.

According to a spokesman, Gener/OL 3.5 is said to support the blending of applications written in Gener/OL with applications written in CICS Command Level, cross-referencing of maps and programs and full support of temporary storage. Additional features include a handle condition to intercept the clear key and a security system which allows multiple users to log on to a single user identification.

The enhanced version of Gener/OL is available at no cost to domestic Gener/OL users under current maintenance agreements. Price of Gener/OL 3.5 for DOS is $36,000 and for OS is $48,000.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

INDEX TECHNOLOGY CORP.
Marketing contract with IBM

Index Technology Corp. (Intech) has announced that it has entered into a contract with IBM, through which IBM will market Intech's Excelerator system for the IBM 3270 Personal Computer.

Excelerator provides facilities for analyzing, designing and documenting information systems on the 3270-PC. It allows users to develop and revise data flow diagrams, structure charts, data model diagrams and other components of a system specification document.

Excelerator's mouse-driven graphics capabilities allow users to create diagrams, and the system's presentation graphics provide for the production of documents for client or management review. In the graphics mode, the system can draw icons representing terminals, floppy disks and people.

The spokesman said all information about system design is stored and integrated through the product's data dictionary. The dictionary includes descriptions of programs and processes, data elements, data records and files. Excelerator reportedly can also transfer data to and from the 3270-PC and a mainframe or other workstations on a local-area network. Through the product, an analyst can develop an integrated system specification document, including report layouts, screen definitions and record and file layouts.

Excelerator software is priced at $8,500.

Intech, 5 Cambridge Center, Cambridge, Mass. 02142.

SOFTWARE CONNECTION, INC.
Kwic-File

The Software Connection, Inc. has developed a text indexing and search productivity aid called Kwic-File for use with Wang Laboratories, Inc.'s VS line of computer systems.

Kwic-File is said to allow users to enter certain words or phrases and retrieve all documents in the system that contain those words or phrases. The system is recommended for litigation support, as well as a bill tracking, research, credit and property records maintenance.

The price of Kwic-File is $6,000.

Software Connection, Suite 200, 5455 S. Yosemite St., Englewood, Colo. 80111.

APPLICATION PACKAGES

MCBA
Dibol Release 7

MCBA has announced that its Dibol accounting and distribution software is now available for Digital Equipment Corp.'s VAX-11 computers.

According to the company, the nine software packages that make up Release 7 of Dibol are modular, integrated systems. The package consists of accounts payable, accounts receivable, bill of materials processor, customer order processing, fixed assets and depreciation, general ledger, inventory management, payroll and purchase order and receiving.

Prices range from $900 to $4,500, depending on the hardware model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

SOFTWARE INTERNATIONAL CORP.
Fixed Assets Management enhancement

Software International Corp., has announced an on-line version of its Fixed Assets Management software package.

The new version runs under IBM's OS and DOS operating systems and is said to feature real-time edit and update of the Asset Master File. It reportedly allows users to add records to the file, update records already in the master file and inquire on the field. According to the company, an on-line Help facility is provided with the system.

The company's Fixed Assets Management System is a book and tax system that reportedly helps accounting, finance and tax personnel fulfill internal and external asset accounting, property control, tax accounting and information control requirements. It includes a multicorporation, multicompany structure, asset accounting, property and locations control, depreciation projection, tax control and insurance valuation.

Continued on page 90

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And we'll tell you more about all IRMA products.

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dca

[illegible]

Continued from page 67

The on-line Fixed Assets Management system is $45,600 for DOS and $47,700 for the OS. It is scheduled for delivery in February.

Software International, 1 Tech Drive, Andover, Mass. 01810.

SPERRY CORP.
Airline Revenue Enhancement Package

Sperry Corp. has announced a market analysis system for airline marketing and reservations departments.

According to the company, the Airline Revenue Enhancement Package enables airline management to extract summary inventory data from the on-line passenger service system and analyze the data using Sperry's Mapper programming language and color graphics.

The package works with either an IBM Passenger Airline Reservation System/International Passenger Airline Reservation System or a Sperry passenger reservation system running on Sperry 1100 series mainframes.

Input for all functions is done through menu selection, fill-in-the-blank screens or expert mode. The data is analyzed using predefined Mapper 1100 functions and Mapper color graphics. A series of standard functions, exception reports and situational reports are then produced, the company said.

Cost of the package is $125,000 for the Sperry Series 1100/60 and 1100/70 configurations and $137,500 for Series 1100/80 and 1100/90 configurations.

Sperry, Information Systems Group, P.O. Box 500, Blue Bell, Pa. 19424.

CENTURION COMPUTER CORP.
Service Industry System

Centurion Computer Corp. has introduced an integrated, multiuser, multitasking automation system for service contracting businesses using Centurion Series 6000 and Series 7000 minicomputers.

According to the company, the Service Industry System automates a variety of activities in service contract maintenance, including service contract preventive maintenance, service dispatch, labor and parts allocation, inventory, vehicle maintenance, job costing, accounts receivable, invoicing, mechanic time accounting, payroll, accounts payable, general ledger and financial statements.

A complete audit trail is maintained by the system on original estimates, change orders, purchases and final costs, the company said. Reports on job status, job cost, vendor invoices and weekly labor assignments are also produced by the system, the vendor said.

Service procedures are assigned standardized codes. Business not under contract is billed the same day, with a description of the performed service printed on the invoice.

Base price of the system is $12,500 and can range up to $18,000, depending on software modifications.

Centurion Computer, 111 S. Sherman, Richardson, Texas 75081.

WESTMORELAND SYSTEMS, INC.
Bar Graph Utility enhancement

Westmoreland Systems, Inc. has announced enhancements to its Bar Graph Utility for the IBM System/34 and System/36 that allow the user to set up bar graphs for display on terminals and that format the graphs for printing.

The Bar Graph Utility interfaces with the company's Calc 34/36 financial modeling system and Applications Design and Development System. Cost of the Bar Graph Utility is $300.

Westmoreland Systems, Suite 1, 228 Park Ave. N., Winter Park, Fla. 32789.

NBI, INC.
Juris-NBI

NBI, Inc. has announced an automated legal billing system for the company's 4100 series microcomputer and its clustered Oasys 2000 Personal Computing Work Station linked to an Oasys 64 central controller.

Juris-NBI reportedly provides up to 99 user-defined bill formats; four personnel-type codes; five types of billing agreements including flat-fee, standard rate, contingency, agreed and no-charge, as well as time codes, expense codes and practice class codes.

According to the company, the system allows direct ac-

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cess to account information with client/matter master reference, cross-reference lists and client inquiries on the screen.

Through Jan. 31, the Oasys 4100 series bundled with Juris-NBI will be available for $8,999. Juris-NBI will be available for the Oasys 2000 at $4,695. The software is regularly priced at $4,500 for the Oasys 4100 series and $5,500 for the Oasys 2000.

NBI, P.O. Box 9001, Boulder, Colo. 80301.

HMS COMPUTER SYSTEMS, INC.
AIM/3000 Fixed Assets System

HMS Computer Systems, Inc. has announced a fixed assets system for Hewlett-Packard Co.'s HP 3000 series computers.

The AIM/3000 Fixed Assets System is said to maintain asset records and calculate depreciation for financial, federal and state reporting. According to the vendor, the system is code-driven and can permit local or consolidated asset management.

Transactions can be changed through the system without returning to a menu, the vendor said. Users reportedly can permit broad inquiry capability without losing control of update functions. The system is said to be fully on-line with an automatic interface to the company's AIM/3000 General Ledger System.

Price of the system ranges from $4,000 for the HP 3000 Series 37 to $12,000 for HP Series 68 mainframes.

HMS Computer Systems, 4524 E. 67th St., Tulsa, Okla. 74153.

MCBA
Payroll enhancements

MCBA has enhanced its Payroll system, which was written in Wang Laboratories, Inc.'s VS Cobol and runs on Wang's line of VS minicomputers.

According to the vendor, the enhancements include interactive state and local tax tables, expanded federal workman's compensation capabilities, a direct deposit feature and a variety of methods for handling vacation and sick hours. The package is said to allow a user to define a general ledger account number format that uses up to 21 characters and provides five levels of security.

Prices for source code licenses for the Payroll package range from $2,000 to $4,500, depending on the Wang VS model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

AMERICAN SOFTWARE, INC.
Distribution Resource Planning systems for Honeywell DPS 8, DPS 88

American Software, Inc. has announced that two of its Distribution Resource Planning (DRP-8) subsystems are now available for Honeywell, Inc.'s DPS 8 and DPS 88 computers running under Honeywell's Gcos 8 operating system.

According to a spokesman, the DRP-8 Demand Forecasting System enables marketing management to tailor forecasts according to time, geography, product, volume and dollar requirements. Demand Forecasting includes three standard modules: Basic Forecasting, Item Forecasting and Product Group and Item Forecasting.

The DRP-8 Inventory Management System consists of four modules: Inventory Planning, Distribution Requirements Planning, Inventory Deployment and the Vehicle Scheduling & Loading module.

The initial license fee for the basic DRP-8 Demand Forecasting System ranges from $20,000 to $80,000. For the DRP-8 Inventory Management System, initial license fees range from $20,000 to $65,000.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

ENTERPRISE TECHNOLOGY CORP.
Generalized Reporting System 2.02

Enterprise Technology Corp. has enhanced its Generalized Reporting System (GRS), which runs on Digital Equipment Corp.'s VAX-11 line of superminicomputers under DEC's VMS operating system.

GRS Version 2.02's query language uses one or two commands to produce formatted reports that include page numbers and column headings, according to the vendor. Data summarization statements and an advanced set of calculations allow the user to aggregate data and perform complex analyses, Enterprise Technology said.

The enhanced product reportedly supports applications written in VAX Cobol, Basic, Fortran and Dibol. GRS is said to support standard sequential, relative and indexed file structures.

GRS is priced at $6,500.

Enterprise Technology, 306 Madison Ave., New York, N.Y. 10165.

PARA RESEARCH, INC.
Accounts Receivable

Para Research, Inc. has announced its accounts receivable package designed for the IBM System/34 and System/36 minicomputers.

The product is designed for a large customer base, multiple entity businesses and small businesses.

With the product, a user can follow the day-to-day work flow of an accounts receivable department and examine customer accounts by using a customer inquiry feature that displays open items and customer balances, the vendor said.

A cash application screen displays 10 open invoices and allows the user to mark one of several for payment, Para Research said. The system will then automatically produce a balance for the accounts.

The package is priced at $2,500, the vendor said.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

See PACKAGE page 70

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PACKAGE

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JOHN FLUKE MANUFACTURING CO.

Progen

John Fluke Manufacturing Co. has introduced an application software package to handle data acquisition, monitoring and control.

Used in conjunction with the vendor's 2452 Measurement and Control System turnkey computer system, Progen reportedly allows the user to program up to 500 I/O channels for a wide range of applications including batch processing, process control and automated testing. No programming knowledge is required to use the menu-driven Progen.

Progen enables the user to divide applications into separate parts or task groups consisting of related channels, which can then be prioritized by the user.

The software also performs scan tasks together and limit checking, and it executes predefined procedures. Errors are automatically displayed in an error file, the vendor said.

The price of Progen is $2,990.

John Fluke Manufacturing, P.O. Box C9090, Everett, Wash. 98206.

HMS COMPUTER SYSTEMS, INC.

AIM/IMS

HMS Computer Systems, Inc. has introduced the AIM/IMS inventory management system designed to provide distributors, assemblers and light manufacturers with inventory planning and control capabilities in either single or multiple locations. The software runs on Hewlett-Packard Co.'s HP 3000 series under HP's MPE operating system.

According to a spokesman, the three AIM/IMS modules — Inventory Control, Customer Order Processing and Purchasing — are compatible with the current AIM/FMS financial system. Features include the ability to move directly from one transaction to another without return to a menu; multilevel user-defined menus; screen print functions; transaction suspend/resume functions; and an end-user report writer. The system will carry along key information allowing users to access new screens without having to reenter item numbers, order numbers or dates.

The total package is priced between $9,000 and $42,000, depending upon the CPU. Each module may also be purchased separately.

HMS Computer Systems, P. O. Box 35505, Tulsa, Okla. 74153.

PDA ENGINEERING

Patran

PDA Engineering has announced that its geometric and analytical modeling package, Patran, is now available for Evans & Sutherland Computer Corp.'s PS 300 family of three-dimensional computer graphics systems. The modeling package operates on Digital Equipment Corp.'s VAX-11 under DEC's VMS operating system and on the Data General Corp. MV series of superminicomputers under DG's AOS/VS interfaced to the PS 300 system.

According to a spokesman, Patran provides solids modeling, color shaded imaging, finite element generation and analysis and results evaluation. In the Patran/PS 300 configuration, modal vibration animation generated within the PS 300 processor frees the host for further analysis, computations and other tasks. Patran uses solid and surface modeling techniques to allow definition of an engineering mode.

Price of the Patran package for the PS 300 system is approximately $10,000.

PDA Engineering, 1560 Brookhollow Drive, Santa Ana, Calif. 92705.

P-STAT, INC.

P-Stat

P-Stat, Inc. has introduced its P-Stat data management and statistical analysis software package, written in Fortran, for the Sun Microsystems, Inc. Sun Workstation running under the AT&T Unix 4.2BSD operating system.

P-Stat reportedly offers data management, data display, statistical analysis and report-writing capabilities. Features include an on-line Help facility, interactive data entry, relational data base capabilities, macros, statistical commands and expandability through a user link facility. P-Stat combines both interactive and batch processing capabilities.

The price of P-Stat for the Sun Workstation is $2,000 for the first year's license and $1,000/year for annual renewal.

P-Stat, P.O. Box AH, Princeton, N.J. 08542.

INTERNATIONAL DIGITAL SYSTEMS CORP.

RAM 12

International Digital Systems Corp. has announced RAM 12, a wholesale distributor package that runs on Digital Equipment Corp.'s Micro PDP-11 and VAX-11 computers under either DEC's VMS or RSTS operating systems.

The product consists of customer order processing, puchase order and receiving, accounts receivable, accounts payable, payroll, general ledger and fixed assets and depreciation modules. It features flexible item pricing, order entry checking, inventory tracking and support for blanket purchase orders.

The general ledger system allows up to 13 accounting periods to be defined and permits transaction detail to be kept on-line for an entire year, the vendor said. The product's cost ranges from $10,000 to $30,000.

International Digital Systems, 669 E. Industrial Park Drive, Manchester, N.H. 03103.

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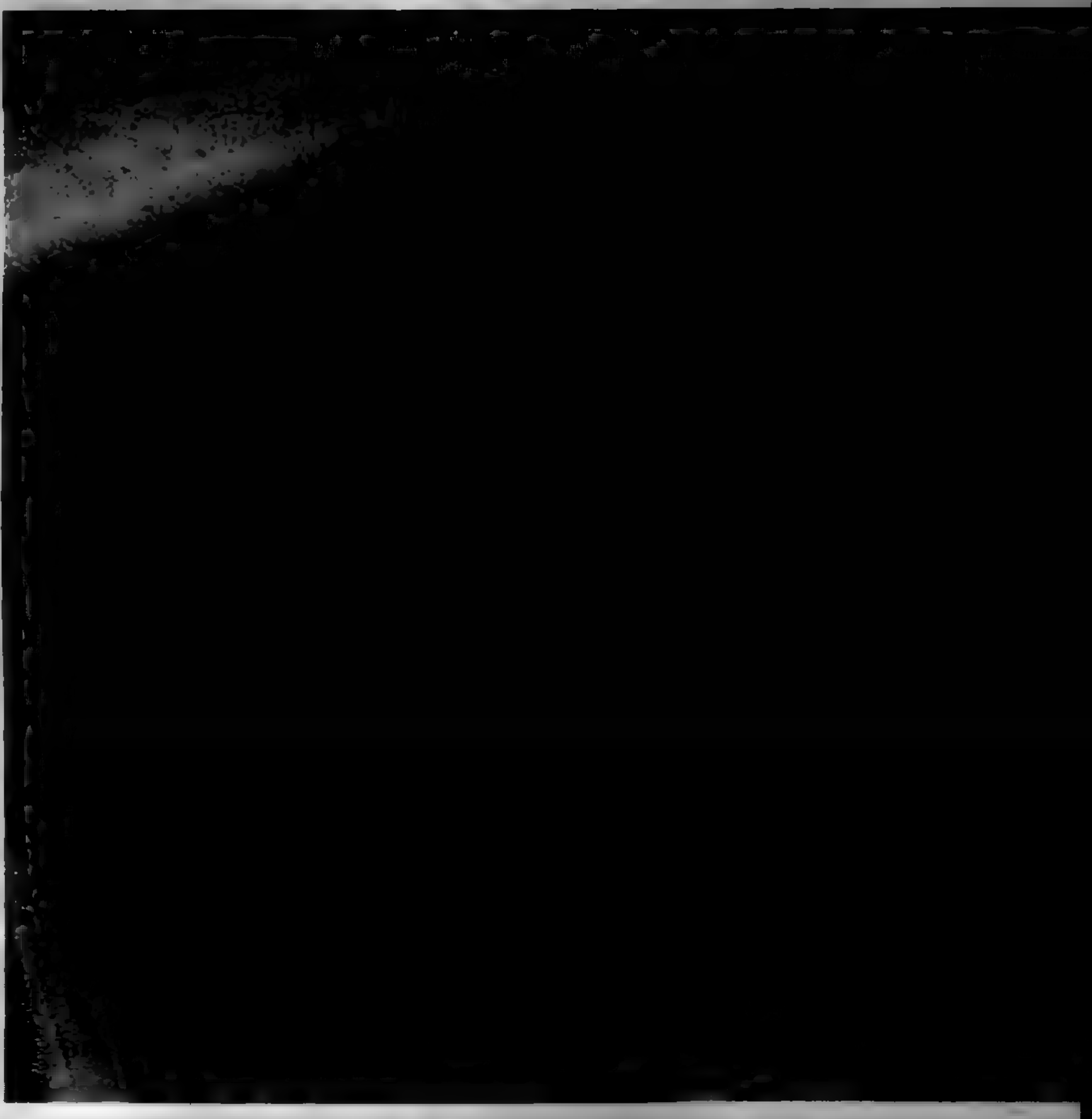

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REMEDY

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tenance transactions for customer data taken.

Paper-intensive routing

All processing activity was paper- and labor-intensive with routing, filing and retrieving information not only a logistical problem but also one resulting in extended delays and noncurrency of data. File updating was cyclical, ranging from one week to one month, with magnetic tape used as an interim storage medium. Verifying "check-in-the-mail" responses involved at least a 24-hour delay, followed by extended searches through transaction lists reflecting interim cycle processing.

Previous efforts over several years had failed to produce a sufficiently static environment from which to begin coding within an IBM PL/I CICS environment. Estimates for developing a Customer Information System (CIS) ranged from 60 to 75 man-years, depending on the complexity desired. Other system conversion estimates reflected the same labor-intensive requirements.

"The selection of [Software AG of North America, Inc.'s] Adabas and Natural was based primarily on their reputations for ease of use given the long training curve required for new personnel in other environments. We needed something that was quick, easy to learn and use and that could incorporate frequent changes without requiring data reorganization or recompilation of previously developed programs. Without this software, CIS alone could not have been completed with even 75 man-years of effort, given the amount of change introduced during the development cycle," Berger said.

After selecting a data base management system (DBMS), system development estimates were reduced to 20 man-years, Berger said. The final product was delivered in 27 man-years, including features not contained in the original system requirements. Overall savings, based on corporate development costs, were nearly $1.5 million.

Using the DBMS concept did not initially meet with universal acceptance. With CIS being a utility's "bread-and-butter" application, some members of management were skeptical of the introduction of so-called new technology. "That's putting it mildly," Berger said. "In some cases, there was outright hostility, and rightly so. It had been in development too long with few tangible results. As an end user, I would have had the same reaction."

With nine analysts assigned during peak development periods, CIS was started in January 1981. Extensive problems during the first several months reinforced the belief that the wrong methodology had been chosen. Working in close association with Software AG representatives and serving as both an alpha and beta test site for the new release, Natural 1.2 was implemented.

The first prototype of CIS was installed in December 1982. "We expected all kinds of problems but had relatively few. Other than streamlining a few programs, it was one of the more successful transitions I've ever encountered," Berger said. The initial portion involved replacement PL/I query programs, interfaces to the autocoder system and included customer contact processing, trouble and service call recording and follow-up, name and address changes and general inquiry capabilities. The complete CIS system was installed Jan. 1, 1984.

Most DP shops introduce new technology by starting with a small, easily managed task. However, CIS represented the largest, most important single application within a utility. Driven by user necessity, not only did Central Hudson take on CIS, but also added the conversions of the financial and plant systems in 1982 with an initial staff of three analysts.

CIS is an interactive on-line system providing prompt responses to customer inquiries; creation, scheduling and dispatching of field service orders to and from remote locations; modification of customer account information from any location with point-of-entry editing and correction; and corporatewide access to current and comprehensive consumer data.

Accounting system

Customer Accounting System is both an on-line and batch support system for CIS and includes meter reading processing, service bill calculation, payment posting, accounting adjustments to customer data, follow-up collection analysis on late and overdue payments and the generation of reports to satisfy internal, state and federal regulatory requirements. The system was designed as a highly modularized application containing more than 850 programs, some 90% of which were written in Natural. The 1982 interim system required only minor modifications to interface to the DBMS rather than autocoder fields.

End-user satisfaction with CIS is reflected by customer services office supervisors who are responsible for handling customer inquiries and complaints. The supervisors find information on customer accounts to be available in greater detail and displayed in more practical formats, permitting faster and better responses for the customer. Besides reducing the delay between the receipt and response to a request, CIS has eliminated the reams of paper that had to be filed and analyzed.

Following on the heels of CIS, the plant and financial systems were installed in April 1984, providing the first interactive on-line access to that data. The flexibility of the Adabas DBMS and Natural made the concurrent conversions possible and made a large dent in the corporate five-year plan.

programming.

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**Diagramming Techniques for Analysts and Programmers* Prentice-Hall, 1984

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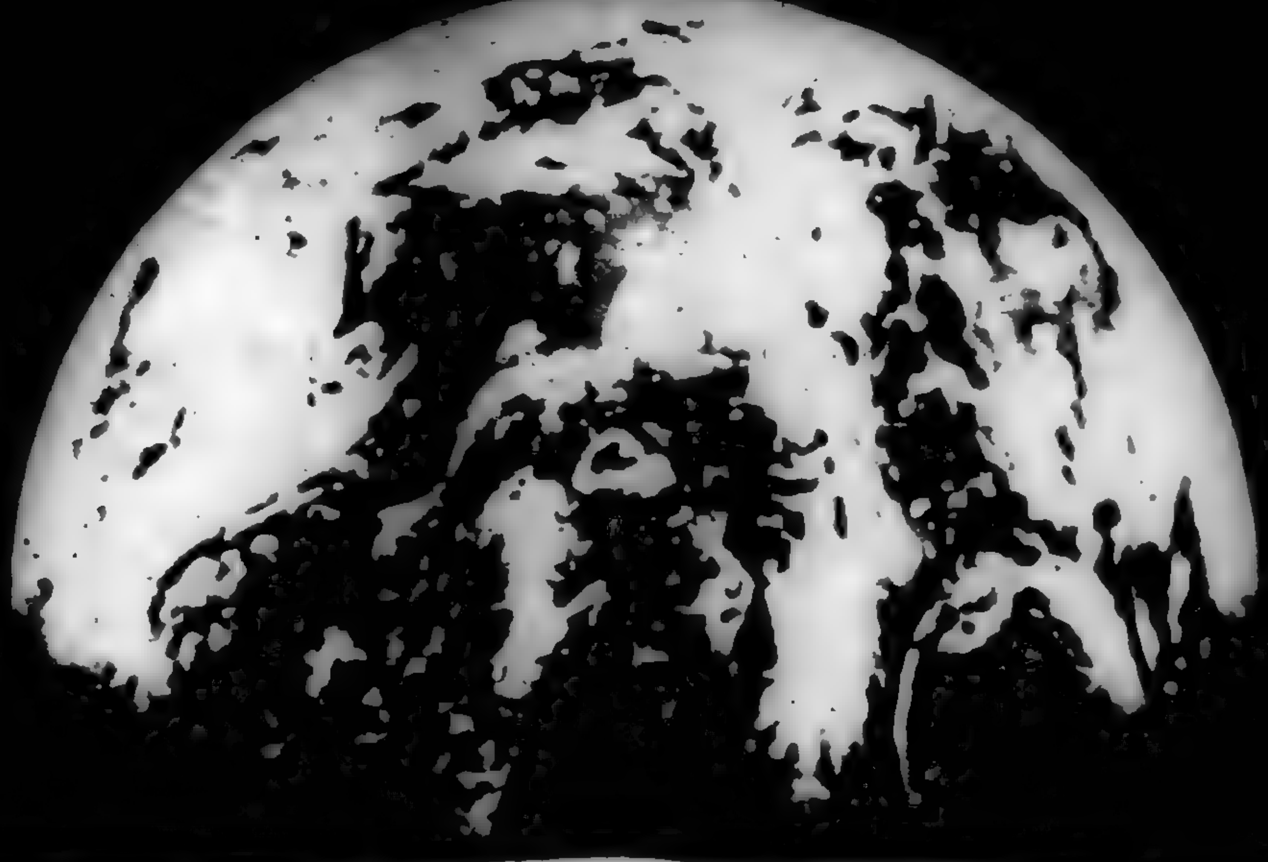

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SI

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umentation. The major new product in this area will be a query system to be released next year. The package, which is based upon Software AG of North America, Inc.'s forthcoming Supernatural language, will eventually offer borderless query across all Software International applications. The query language will first run on general ledger files, but will be added to new releases of all other financial applications.

Smart Link capabilities will be incorporated into all financial products over the next year, Tatum said. Currently, Smart Link only supports Software International's general ledger package. Common screens and transactions are an area of particular emphasis.

"If you look at general ledger and accounts payable now, it's hard to believe they were built by the same company," Tatum said. "In the future, all screen definitions will reside externally to the applications, and we will provide tools to change the definitions to suit your shop without going into the application program."

Help screens

Help screens will be designed so that they can be loaded into customer libraries for access by programmed function keys, Tatum said. Users will be able to access a Help screen and return to the original transaction screen without losing any of the attributes of the transaction screen, a feature called "sticky cursor."

Security, navigator aids and queries will be standardized through a system manager that Software International has been employing to rebuild the on-line portion of its applications for the last 14 months.

The system manager, which includes a fourth-generation language, will make Software International applications virtually independent of a teleprocessing monitor or data base management system (DBMS). All data base interfaces will be accomplished through a set of generic calls that do not require programs to rely upon a specific DBMS, he said.

In addition, all teleprocessing-monitor-dependent calls will be removed from the system manager.

In all, Software International plans "one release next year for each major product," Tatum said. "There will be only one, and it will be thoroughly tested and documented."

Tatum acknowledged the weaknesses of past Software International release policies, which in one instance had two releases sent out less than three months apart.

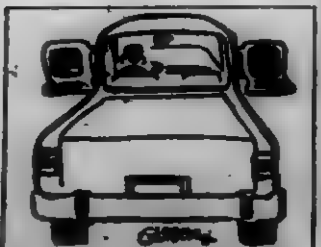
"Software International was doing a very poor job in certain areas," he said. "We were developing systems without a real commitment to education. The documentation was substandard, and we didn't have a commitment to quality assurance. Releases were going out without adequate testing. I don't think management really understood the effects that had on the customer."

Aided in large part by the influx of $33 million in capital since General Electric Co. acquired it in 1982, Software International has entirely reorganized its development and support functions. Previously, Software International "was so bogged down in support activities that we weren't developing new products," Tatum said.

Under the new structure, a staff of 64 will work solely on new development. A separate staff will work entirely on customer support and maintenance. Software International plans to spend $12.2 million on documentation next year, he added.

In addition, the company will attempt to shorten the time required to convert applications from IBM mainframes to the variety of minicomputers the company supports. Previously, such migrations had taken up to one and a half years to complete.

Software International has entered into agreements with a number of smaller vendors that will perform the conversions from the mainframes to systems from Wang Laboratories, Inc., Digital Equipment Corp. and Hewlett-Packard Co.



GROUP

from page 63

much easier and cheaper to manage, but do not offer nearly as much flexibility as those administered by users. If your goal is to learn from the vendor and to talk with other users, this may be an acceptable alternative. If you are more interested in forming a distinct body to air gripes and suggestions, the independent groups have more clout.

If you choose to go the independent path, be aware of the commitment it requires. For large groups in particular, the officers may spend as many as 60 hours in preparation during the month prior to a conference. They should also plan to meet at least two or three other times during the year for a day or more.

■ Should your group structure be centralized or decentralized? Some groups rely on local users groups to hold frequent meetings and then to consolidate concerns and observations at an annual gathering. Others hold large, semiannual, national meetings for all users. If you decide to emphasize regional groups, think about what role they will play in the annual conference. You will want to exchange ideas on running the separate groups as well as technical and management issues.

■ Should you charge dues? This is a good idea if you want to do more than just hold an annual conference. One users group, however, bypasses dues by simply planning for a surplus after its annual meeting. The windfall funds other programs during the year.

■ How do you want to communicate among members and between the users group and the vendor? An important function of a users group is to provide feedback to the vendor. The best way to compile that material is to communicate among users. Do you want to publish a newsletter? Fund an annual survey? Stick to regular telephone contact?

■ Where and when should national conferences be held? This depends largely on where the members are located. Most companies do not have deep pockets when it comes to travel budgets. It makes sense to move conference sites to various locations around the country at different times of the year so that everyone gets a chance to attend at least once every two years.

■ What do users expect from a conference? A young company will probably have many new users who are interested in more basic instructional sessions. A more experienced user base will get more out of "rap" and "helpful hint" sessions. This affects not only the makeup of your agenda but also influences how much representation you want from the vendor. Tips and techniques are better presented by other users.

■ What is the makeup of the user base? Is it mostly DP or mostly nontechnical users? Your conference agenda should reflect your audience. Make sure there is an adequate number of sessions for each group. Do not forget to include the new users.

■ Who should serve on the advisory board? These people are looking at a commitment of 20 to 100 hours each year to attend to administrative tasks. Their companies should be willing to give them the time and travel budgets to perform their duties.

It is also important that the advisory board reflects a mix of DP people, end users and new users with regional considerations also in mind. You do not want the board to be too large, but you want it to represent the concerns of the user base.

■ How should conferences be organized? The most successful meetings seem to be those that plan tracks organized around different product lines. Some attention should also be given to industry groupings — banking, manufacturing and so on. Plan for a good mix of success stories and technical sessions along with product demonstrations, previews of new releases and gripe sessions.

■ Should you invite the media? Some groups feel this is an excellent way to gain visibility for themselves and for the products. Others feel stymied and nervous when members of the media are around. This is an individual decision of your users group.

Try attending a meeting of an established users group for a product that you are considering or already have in-house. There are many excellent users groups out there.

Cityscape in alternative resources: solar, wind and geothermal technologies are applied to maximize energy efficiency. Solar panels form windprops which rotate parallel to desert surface; temperatures of air and water supplies are maintained by flows through buried conduits.

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PHASING

from page 63

evaluated in terms of risk vs. return on investment, both short- and long-term. Typically, information management projects are justified on the basis of a long-term payback. Unfortunately, the critical factors related to assessing the risk of a project are seldom considered. This results in risk never being quantified, causing long-term investments to be made in information management systems without understanding the implications of those investments or the real costs involved. Focus is commonly limited to technological and programming issues without regard for basic business principles.

The first and foremost problem that must be dealt with is how to phase in a system in a manner that will best support the strategic direction of the organization. Since corporate MIS managers are usually not involved in the strategic planning process, they are often unaware of strategic direction. Therefore, these strategic issues cannot be factored into the phasing in of new information management systems. Without this knowledge, the implementation could be doomed from the start. Unfortunately, this failure is sometimes only discovered after the new information management system has been in operation for several months.

The next critical factor relates to the impact of the phasing-in strategy upon the organizational structure. Common sense dictates that monolithic solutions related to the organizational structure are rarely successful. Among the reasons for the failure of such monolithic solutions are the following:

- They require tremendous organizational commitment from the board level down to be successful.
- They demand a higher degree of consensus among all the organizational entities involved.
- They take a long time to effect.
- They challenge the very foundation of the organization itself.

After all, the purpose of these information management systems is to support the business functions — not for the business functions to support the information management systems.

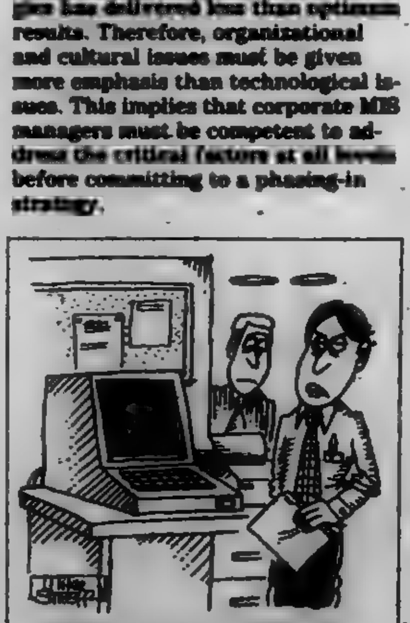
After resolving the strategic and organizational issues, cultural critical factors must be addressed. Given that the phasing-in strategy supports the strategic direction and does not severely impact the structure of the organization, the impact on the functional users of the information management system must be considered. Even the best-built information management system will fail if not embraced by the users. Therefore, the phasing-in strategy must take into consideration how to institutionalize the information management environment among its users.

The final critical factors are technology-oriented. These break down into two major categories: data base issues and equipment and software issues. The data base becomes the foundation for any information management system. It dictates how the data is inherently organized and, therefore, how it can be accessed, manipulated and extracted. Restructuring data bases is not a trivial process. Any successful phasing-in strategy must take into consideration the structural relationships of the entire information management environment.

Equipment and software issues include such things as languages, data base management systems, networking, telecommunications, hardware and so on. Proven technologies are those that have been successfully used and deployed within the public sector. Strategies that incorporate leading-edge technologies that do not fall within the definition of "proven" threaten the feasibility of a phasing-in strategy. Considerations such as industry support and direction, product reliability and vendor stability must be given careful consideration when leading-edge technologies are incorporated into a phasing-in strategy.

> *The first and foremost problem that must be dealt with is how to phase in a system in a manner that will best support the strategic direction of the organization.*

In summary, a good phasing-in strategy should have a self-testing mechanism to monitor its performance against the critical factors. The traditional technological focus for approaching phasing-in strategies has delivered less than optimum results. Therefore, organizational and cultural issues must be given more emphasis than technological issues. This implies that corporate MIS managers must be competent to address the critical factors at all levels before committing to a phasing-in strategy.



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COMMUNICATIONS

New satellites may be fixable

DATA STREAM
[illegible]
CW Senior Editor

The recent rescue of two stray communications satellites by the space shuttle *Discovery* verifies the technical feasibility of recovering communications satellites to retrofit them on Earth and hints at the future capability of repairing satellites in space.

Space-walking astronauts Joseph P. Allen and Cmdr. Dale A. Gardner left the confines of *Discovery* on its latest mission to wrestle two satellites — the 1,200-lb Indonesian *Palapa* satellite and Western Union Corp.'s *Westar 6* satellite — into the shuttle's cargo bay.

Using the craft's mechanical grappling arm and some perseverance, the astronauts bested a design oversight that left useless a mounting bracket manufactured for the rescue of the *Palapa* satellite and manhandled that bird into its nest. The recovery of the *Westar 6* was less problematic.

Both satellites have been floundering at low altitudes since their payload assist modules failed to elevate them to the necessary 22,300-mile orbit after being launched on a previous shuttle mission. In this low altitude, the satellites were impossible to use. At the proper 22,300-mile altitude, satellites obtain what is known as a geosynchronous orbit — synchronized with the Earth and appearing from the ground to be stationary. This makes the satellites available for constant use.

Using the satellites' apogee kick motors and their reaction control systems, both crafts were lowered from the 600-mile orbit they had achieved to within the 300-mile orbital ceiling of the shuttle.

It is this altitude limitation that restricts the shuttle from being used to rescue existing communications satellites that are reaching the end of their roughly eight-year life span.

The shuttle's range of flight is determined by the amount of fuel the craft

See FIXABLE page 80

T1 system controls net parameters

IDNX allocates bandwith, reroutes clogged circuits

By James Connolly
CW Staff

NEW YORK — Network Equipment Technologies, a California-based manufacturer, recently announced its first product, a communications processor meant to be used with wideband T1 carrier facilities that incorporates automated network management.

The Integrated Digital Network Exchange (IDNX), announced here, was designed to manage digital T1 1.54M bit/sec lines carrying voice, data and video transmissions.

A key feature of the system is its ability to allocate bandwidth dynamically to voice, data and video circuits on demand and according to priorities. A company spokesman said that, for example, the system can carry large amounts of voice traffic during the day and automatically reallocate bandwidth to transmit greater amounts of data at night when the voice demand lessens.

Now installed at beta test sites and scheduled for January deliveries, IDNX also features dynamic alternate routing of circuits when an original route becomes congested or fails. Previously, that capability had been available only to public telephone companies, not on private nets.

To improve voice throughput, IDNX is said to use adaptive differential pulse code modulation to compress standard 64K bit/sec voice transmissions to 32K bit/sec and digital speech interpolation to produce an additional 2:1 compression ratio.

Digitized voice input is directly from D3/D4-compatible channel banks or digital private branch exchanges (PBX). The company said it is compatible with all major digital PBXs.

See IDNX page 78

- Datapoint Corp. introduced an Arcnet interface for the IBM Personal Computer AT and terminal emulation capabilities for the IBM Personal Computer and Personal Computer XT/[illegible]
- Dyna Five Corp. has introduced an eight-channel asynchronous communications module designed to be compatible with Digital Equipment Corp.'s Q-bus/[illegible]
- Hayes Microcomputer Products, Inc. unveils a 2,400 bit/sec Smartmodem/[illegible]

INSIDE

Controllers/[illegible]
Multiplexers/Modems/84

Gandalf Data adds PACX 2000

Network switching system links workstations

WHEELING, Ill. — Gandalf Data, Inc. has announced PACX 2000, a distributed networking switching system introduced as part of its Pacxnet family of products.

PACX 2000 is said to be software controlled and designed to handle all of the networking requirements of intelligent devices such as personal computers and word processors. Operating as either a local-area network or wide-area network, it ties together workstations so they can communicate with each other and links groups of workstations in one center to another center or to the corporate mainframe, the company said.

The PACX 2000 is based on 16-bit microprocessors and employs some fiber optics. Reportedly, the device handles a standard data rate of 64K bit/sec, up to 19.2K bit/sec for asynchronous data and is transparent to data speed and code. The switch is said to allocate switching capacity based on demand.

According to Gandalf, the PACX 2000 features a menu-driven console control; network configuration flexibility; messaging to inform users of network changes; a continuous activity log for network usage analysis; and on-line maintenance.

It handles a maximum of 896 lines and costs about $195 per connection, according to the vendor.

Gandalf Data is located at 1019 S. Noel, Wheeling, Ill. 60090.

GTE Telemessage linked to text messaging services

STAMFORD, Conn. — GTE Corp. has announced that it is interconnecting its Telemessage voice messaging service with its Telemail electronic mail service and other text messaging services.

The connection will allow Telemessage users to deliver messages in printed form, as well as by voice, according to the company.

Conversion of voice messages to text will allow the message to be delivered to data terminals, word processors and personal computers. In addition, Telemail subscribers will have the option of having their text messages converted to voice form.

GTE's central Telemessage system will handle the conversion, polling incoming subscriber mail every hour for messages requiring conversion, the GTE spokesman said. The conversion process will be through computerized voice-to-text and text-to-voice processes. The converted message will then be routed to the appropriate electronic mailbox for the recipient to review, redirect or save.

GTE now has Telemessage service centers in Dallas, New York and Los Angeles, and plans to open centers for Boston, Chicago, San Francisco and Washington, D.C., before the end of 1984.

Voice-to-text conversion costs $4 per 400 characters, and text-to-voice conversion costs $2 per 400 characters.

GTE, One Stamford Forum, Stamford, Conn. 06904.

Distributed Logic unveils multiplexing subsystem

ANAHEIM, Calif. — Distributed Logic Corp. has introduced an asynchronous communications subsystem designed to permit Digital Equipment Corp. computer users to multiplex from 16 to 128 local or remote communications devices.

The Optimux/32DMF+ is said to be a self-contained system expansion unit with its own 20A power supply, cooling fan and four printed-circuit card slots. It is intended for use with DEC PDP-11, VAX-11 and Decsystem-10 computers.

The basic configuration includes a single Optimux/16DMF+ asynchronous communications controller and a distribution panel for connection of up to 16 lines.

The subsystem offers a switch-selectable choice of DEC's DMF32 or DH11/DM11 protocols. Throughput is enhanced by the unit's capability for bidirectional flow control and its multiword direct-memory access burst mode, according to the vendor.

It offers software-selectable data transfer rates from a minimum of 50 bit/sec to 38.4K bit/sec.

It may be rack-mounted in 19-in. cabinets or packaged in a 3¼-in.-high enclosure. It is cabled to the DEC Unibus, allowing daisy chaining of multiple controller boards and lines for connection of up to 128 lines.

The rack-mounted version with a single Optimux/16DMF+ controller and distribution panel costs $4,500.

Distributed Logic, 1555 S. Sinclair St., Anaheim, Calif. 92806.

IDNX

from page 77

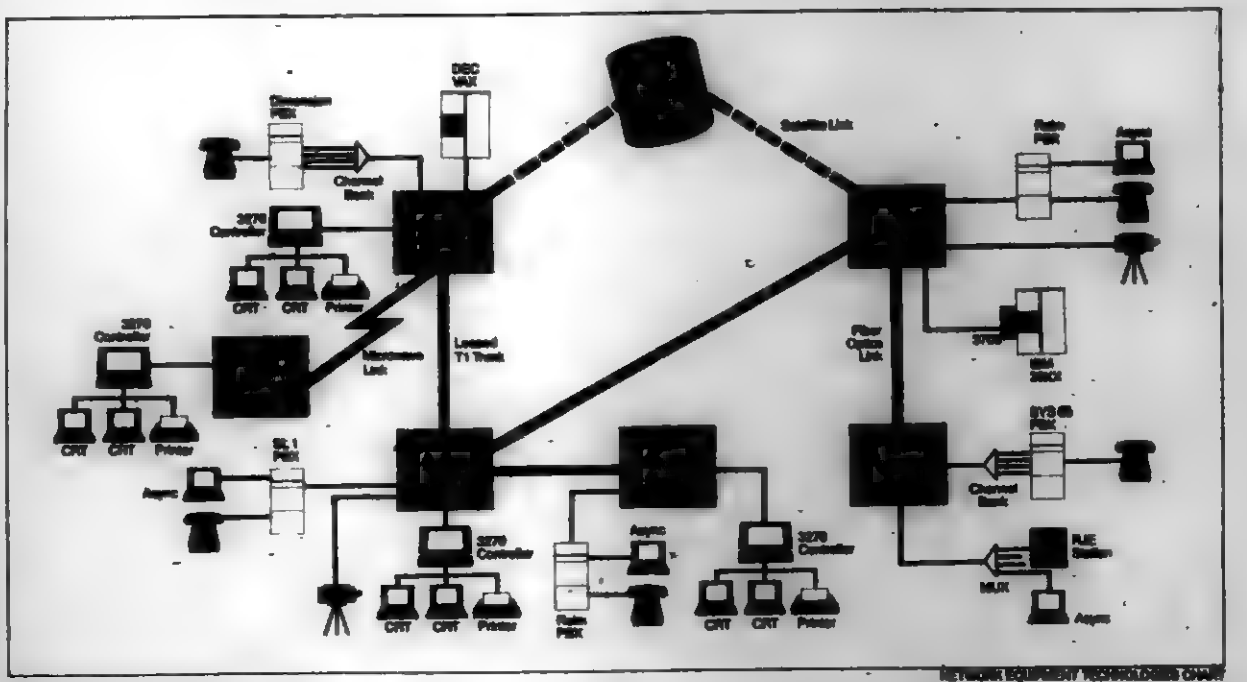
The system, targeted at large corporate T1 networks, can support up to 32 T1 trunks, with 768 addressable ports — 512 of which can be active simultaneously.

The company emphasized IDNX's flexibility, saying that it can be configured in many topologies.

The company emphasized the system's flexibility, saying that it can be configured in many topologies, including point-to-point and fully meshed networks, with each node connected to several other nodes.

Networks reportedly can be designed for the individual customer's needs, and the IDNX can be instructed to manage the network according to the customer's specifications. One such instruction could be analysis of the noise levels on a circuit and the automatic rerouting when the noise becomes excessive, a spokesman said.

The company said the IDNX includes redundant modules for all hardware whose failure could result in a node or trunk outage. Switchover to redundant hardware is said to be automatic, and installation or replacement of circuit boards in the refrigerator-size box reportedly can be done without interrupting service.



NETWORK EQUIPMENT TECHNOLOGIES CHART

Possible IDNX configuration

The IDNX is intended to replace less intelligent T1 multiplexers and is said to be compatible with T1 products and services from AT&T, the regional telephone holding companies and other common carriers. It was designed to interface with private digital microwave radios, fiber-optic and coaxial cables and satellite earth stations.

The data ports are said to support standard interfaces such as RS-232C, V.35 and RS-422/449 at synchronous rates from 1.2K to 1.34K bit/sec.

One beta test site user, Robert Anderson, assistant vice-president for telecommunications at Bankers Trust Co. in New York, said his company is using three IDNX nodes in a 60-day test. He said the test, which was half complete when the product was announced, is still at the evaluation stage and that his technicians have been examining the product's ability to withstand replacement of boards and changes in the network.

A Network Equipment Technologies spokesman said the IDNX operates at the physical link layer of the International Standards Organization Open Systems Interconnect model, transferring bits transparent to protocol between computers.

Pricing is based upon the configuration desired, ranging from $40,000 to $150,000 per node, with a typical customer paying $90,000 to $100,000 per node. Network Equipment Technologies is located at 1060 Marsh Road, Menlo Park, Calif. 94025.

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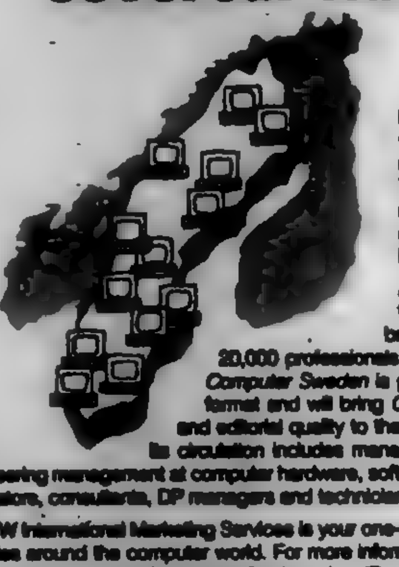

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COMMUNICATIONS

Datapoint offers support for three IBM micros

SAN ANTONIO — Datapoint Corp. has introduced a networking product for the IBM Personal Computer AT and terminal emulation capabilities for the IBM Personal Computer and Personal Computer XT microcomputers.

The Intelligent Network Executive-PC (INX-PC) is an adapter card designed to fit in an expansion slot on the AT, enabling the user to link the micro to the Datapoint Attached Resource Computer local-area network. It reportedly allows the AT to serve as an applications processor.

INX-PC is a user-installable card costing $695 and software costing $75. PC8220 is a software package that enables IBM Personal Computers and Personal Computer XTs to emulate a Datapoint 8220 terminal. It reportedly supports both Datapoint operating systems, RMS and DOS, and gives the IBM user access to Datapoint office automation software, data processing capabilities and communications resources. The cost of PC8220 software is $175.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

CONTROLLERS

DYNA FIVE CORP.
D5-CI100-8

Dyna Five Corp. has introduced an eight-channel asynchronous communications module designed to be compatible with the Digital Equipment Corp. Q-bus.

The D5-CI100-8 serial communications interface module provides 22-bit addressing and is capable of operating at speeds from 50 to 19.2K bit/sec, according to the company.

It reportedly is software- and plug-compatible with DEC's DLJVJ1 interface and allows each channel to be independently configured.

It costs $745 and is available at quantity discounts.

Dyna Five, 12040 Western Ave., Garden Grove, Calif. 92641.

MULTIPLEXERS/ MODEMS

HAYES MICROCOMPUTER PRODUCTS, INC.
Smartmodem 2400

Hayes Microcomputer Products, Inc. has introduced a 2,400 bit/sec modem, the Smartmodem 2400, that reportedly meets the CCITT V.22 international standard for 2,400 full-duplex communications.

The Smartmodem 2400 is also said to meet the CCITT V.22 standard for 1,200 bit/sec communications and to be similar to V.25, the proposed standard for autodial capability.

According to the vendor, the device meets AT&T 212A and 103 requirements and can be switched by the user between CCITT and AT&T-compatible transmissions.

Smartmodem 2400 is said to operate synchronously at 2,400 bit/sec, 1,200 bit/sec and 600 bit/sec and asynchronously at 2,400 bit/sec, 1,200 bit/sec and up to 300 bit/sec.

It features call progress monitoring, voice/data switching and the ability to set communications instructions with keyboard commands instead of with mechanical switches. The Smartmodem 2400 also features a superset of the Hayes AT command, making it downwardly compatible with the Smartmodem 300 and Smartmodem 1200, the vendor said.

Smartmodem 2400 is priced at $899.

Hayes Microcomputer Products, 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

FIXABLE

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carries. A National Aeronautics and Space Administration (Nasa) spokeswoman said that the agency has thought about outfitting the shuttle with additional orbital maneuvering systems to increase its range, but even then, it would only be able to reach an orbit of 600 miles.

While it was possible to pull the *Palapa* and *Westar 6* birds down from their 600-mile orbit under their own power, none of the communications satellites now in use have the necessary fuel supply to bring them down from 22,300 miles. A spokesman for Satellite Business Systems (SBS), a carrier based in McLean, Va., said that a satellite would need as much fuel to get it down from a geosyncrhonous orbit as was required to lodge it there, or the equivalent of two payload assist modules. The extra payload assist module would have to be made at the expense of satellite power and transmission capacity.

To get around this, some scientists are toying with the idea of using a "space tug," a device that would be launched from the shuttle and used to retrieve satellites, an SBS spokesman said. They estimate that such technology is still 10 years away.

By then it is possible that the satellites in orbit will have been manufactured so that they may be repaired in space, instead of having to be brought back to Earth to be retrofitted. The first satellite to be designed with this concept in mind was Nasa's *Solar Maximum*, which is used to study solar flares.

Sometime after the Solar Maximum was launched, its altitude control module failed. In April of this year, the space shuttle *Challenger* caught up with the bird, which maintains a low altitude, and swapped the bad module with a replacement component.

In the future, all domestic communications satellites may be manufactured in a similar modular manner, enabling parts like fuel pods, transponders, solar arrays and guidance components to be changed in space. This would vastly extend the life expectancy of satellites, which cost upward of $40 million or $50 million to build, and would potentially lower the cost of using satellites for long-haul communications.

SYSTEMS & PERIPHERALS

Harris releases 32-bit workstations

FORT LAUDERDALE, Fla. — Harris Corp. has announced the Harris Station 10 and Station 20 Unix-based dual 32-bit workstations, said to deliver 0.575 Whetstone millions of instructions per second processing power and incorporating the Motorola, Inc. 68010 and 68000 microprocessors.

Aimed at engineering, scientific and software development applications, the workstations support the Ethernet local-area network (IEEE 802.3) and the AT&T System V version of Unix. The workstations use multiple 32-bit very large-scale integration (VLSI) microprocessors.

The HS-10 monochrome and HS-20 color workstations operate either as stand-alone computers, graphics systems, Ethernet network nodes or RS-232 terminals for Harris superminicomputers.

Both workstations incorporate the floating-point processor and array processor options for scientific applications. A dual bus architecture reportedly enables workstation system modules to communicate with each other via the 8M byte/sec system bus, while the peripherals connect through an enhanced 6M byte/sec Intel Corp. Multibus.

Harris workstations are reportedly effective for single-user projects in CAE, research and Unix software development.

According to Harris, the single-board floating-point processor is coupled to the CPU via the 8M byte/sec bus for maximum performance. With the Ethernet option, information can be moved between workstations at a 10M bit/sec rate, the company said. Single Harris workstations or a network of workstations can be connected to Harris superminis via Ethernet with the Department of Defense's TCP/IP protocol.

A range of peripheral, memory and performance options are reportedly possible, with the 8- or 15-slot backplanes in the HS-10 and HS-20. An accelerated Intel Multibus interface in the workstations handles mass storage devices and graphics subsystems, the company said. With the multitasking features of Unix, each user can display up to 15 text windows and 16 graphics windows. The monitors feature a noninterlaced 60-Hz refresh rate.

The HS-10 features an independent graphics processor with 256K bytes of display memory on a plane of dual 128K-byte frame buffers. The HS-20 supports up to 1.2M bytes of display memory on 10 planes of dual 64K-byte frame buffers, for 1,024

See HARRIS page 86

■ Genigraphics Corp. has announced three workstations based on Digital Equipment Corp. micros for producing presentation-quality graphics/82

■ Lisp Machine, Inc. has unveiled an artificial intelligence software development system/83

INSIDE

Turnkey Systems/[illegible]

Terminals/86

Data storage: Bubble returning, optic emerging

By John Desmond
CW Staff

LOS ALTOS, Calif. — Magnetic bubble memories and optical disk technologies are capable of serious penetration into the data storage market, according to a recent study of rigid disk drives by Disk/Trend, Inc. based here.

The study, titled "1984 Disk/Trend Report," said bubble memories are now being used in many harsh environments and are being designed into selected DP systems, such as portable computers. And some nonreversible or write-once optical disks have achieved the status of commercial products, the report stated.

Write-once optical systems are capable of higher densities than magnetic recording techniques now in use, and some planned systems could provide access to a large number of optical disks under system control, with several gigabytes on each disk. While not yet demonstrated, "advocates of various types of optical disk media technologies believe that their disks will provide archival lives which equal or exceed those of magnetic media," the report stated.

Two types of optical storage systems are available: document storage and data storage. Systems for storing document images are being offered by Toshiba, Ltd. and Matsushita Electric Industrial Co. in Japan, where the report said the optical emphasis arises from the complex Japanese alphabet. While the report predicted that optical document storage will not be able to compete on a price per image basis with microfilm, it said, "The fast and convenient access to stored images provided by optical disk systems will probably create a major place for them in the emerging OA market."

Optical data storage systems are available from a variety of firms, including Storage Technology Corp. (STC), Control Data Corp., Xerox Corp., Hitachi Ltd., Toshiba and Fujitsu Ltd. The report called STC's 7600, with shipments expected in the first quarter of 1985, the most ambi-

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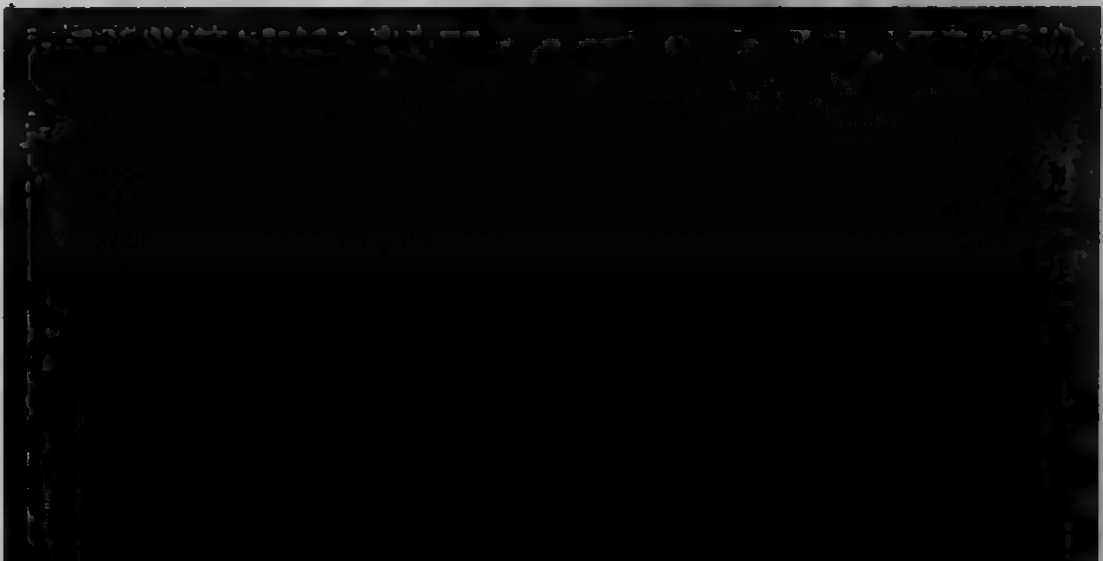

SHOP TALK
Terry Long

Distinctions blurry between system types

The distinctions between types of computer systems is getting more and more blurred. These days, the way a system is marketed can sometimes be the only way to determine into which category it fits. For example, one vendor's supermini may be equivalent to another's low-end mainframe. Supermicros are meshing with the low end of the minicomputer range.

Some vendors, such as many minicomputer vendors, have targeted their products to a particular market niche. But sometimes a market niche can be broadly defined, such as general-purpose systems. This appears to be the target

See TARGET page 84

Long is a project leader at AT&T Information Systems in Altamonte Springs, Fla.

Lab director predicts use of 1M-bit chips by 1987

By Charles Babcock
CW New York Bureau

UNIONDALE, N.Y. — The director of an IBM semiconductor laboratory said integrated circuits will shrink below the one micron level by 1989 or 1990, and 1M-bit memory chips may appear in workstations as early as 1987.

Cmos technology is "clearly going to be the technical choice for the future," ahead of gallium arsenide or other exotic circuits, he added.

Nicholas M. Donofrio, director of the 1,800-employee, Essex Junction, Vt., lab, which is part of IBM's General Technology Division in Burlington, Vt., told 50 members of the American Electronics Association recently that the opinions he expressed were his own, not his company's.

Donofrio was instrumental in developing the fabrication process for IBM's 64K-bit memory chips. IBM is now shipping 256K memory chips and has produced its first experimental 1M-bit chips.

He predicted 1M-bit chips are less than three years away from production, and 4M-bit memory chips will come into use as early as 1992.

When Donofrio joined IBM 17 years ago, main computer memory cost $250,000 per megabyte. Today it costs $5,000 per megabyte, he noted. Computer users have "an insatiable appetite for memory," he added, and the number of bytes per system has gone up an average of 23% a year.

Donofrio predicted that low-power, densely packed Cmos chips will eventually replace the bipolar semiconductors currently in widespread use. Bipolar chips are faster than Cmos chips but cannot be packed with as many components and have heat dissipation problems, he explained. Cmos has already started to displace bipolar technology in logic circuits, he said.

Donofrio said there has been too little investment in developing gallium arsenide for it to come into widespread use as a semiconductor before 1990.

And while some claim Cmos chips operating as superconductors at 4 degrees Kelvin could be the next technological advance, Donofrio said he refused to believe it. "I have never found a cheap refrigerator," he said, noting that the cost of supercooling offsets the gain in speed.

Donofrio also said it was unlikely that wafer-scale technology, such as that attempted by Trilogy Ltd., was a practical alternative. Many interconnect problems exist at the wafer level that "get out of control very quickly." But growing the chip size and putting more components on each chip was a likely alternative, he said. IBM's 256K chip is 50mm compared with 15mm to 20mm for the 64K chip.

Genigraphics terminals aid graphics design

LIVERPOOL, N.Y. — Genigraphics Corp. has announced three terminals, based on Digital Equipment Corp. microcomputers, for use in designing high-quality presentation graphics for 35mm slides, view graphs and transparencies. The terminals are the SG1, 100D-Plus and SG2.

The SG1 is based on the DEC Micro/PDP-11/73 with 512K-byte main memory, the RSX-11M operating system, 31M-byte Winchester disk drive and dual 5¼- and 8-in. floppy disk drives. The SG1 comes with an ergonomically designed display with 576- by 768-line resolution.

The SG1 also comes with a palette of more than 16 million colors, three-page artwork with 256 colors per visual and 12 fonts. A communications feature enables users to transmit graphics to Genigraphics film recorders for production as 2,000- by 2,000-line or 4,000- by 4,000-line slides.

The price for SG1, with 12 fonts, Drawing Tracing Feature software and Extended Artwork software, is $95,000, the vendor said.

Six-font model

The 100D-Plus, also based on the Micro/PDP-11/73, comes with six fonts, and the Drawing Tracing Feature is optional. The product also features 5¼-in. floppy disks. Other features are said to include continuous control of hue, chroma, value, size and position; automatic justification; continuous zoom; automatic data plotting for pie, line, bar and area graphs; and file management for reading, writing, adding, reviewing and copying records. The price for the 100D-Plus is $72,000, vendor said.

The SG2, based on the Micro/PDP-11/23+, is offered with a 512K-byte main memory, 10M-byte Winchester disk drive and dual 5¼-in. floppy disks. An 8-in., single-drive floppy is optional. The price for the SG2 is $35,000, the vendor said.

All of these products are scheduled to be available in December 1984, according to the vendor.

More information is available from Genigraphics, 4806 W. Taft Road, Liverpool, N.Y. 13088.

Lisp compact announced

LOS ANGELES — Lisp Machine, Inc. has announced Lambda/E, a compact Lisp machine designed for expert systems and artifical intelligence software development. Lambda/E is the seventh member of the company's family of Lisp machines.

Lambda/E reportedly features a 32-bit Lisp processor, 128M bytes of virtual address space, a 17-in. 1,024- by 808-pixel monochrome display, 2M bytes of physical memory and 140M bytes of hard disk memory.

Other options include memory boards, a 60M-byte cartridge tape drive and an interface to the Ethernet local-area network.

Lambda/E costs $52,500, the vendor said. Deliveries are scheduled for the second quarter of 1985.

More information is available from Lisp Machine, located at 6033 W. Century Blvd., Los Angeles, Calif. 90045.

TURNKEY SYSTEMS

OPTICAL BUSINESS MACHINES, INC.
Dataflex

Optical Business Machines, Inc. has announced a superminicomputer-based system called Dataflex, built around the Perkin-Elmer Corp. Series 3200 superminicomputer.

Dataflex is intended for sophisticated, time-sensitive applications in commercial and government environments, according to the vendor. Typical Dataflex applications are said to include piecework payroll, time and attendance recording, subscription fulfillment documents, turnaround billing applications, surveys and various typewritten documents.

The 3200 reportedly has the capability to process multimedia data input from optical character readers (OCR), bar-code wands, hand-held OCR wands and direct data capture equipment such as cash registers, electronic [illegible] and instrumentation devices under applications software control. Another feature in-

Continued on page 89

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General DataComm

TARGET

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market for IBM's Series 1 and Digital Equipment Corp.'s VAX-11/780.

Machines may be targeted for scientific or commercial applications, as are the Hewlett-Packard Co. HP 1000 and HP 3000, respectively. Some minis are positioned for specific applications like laboratory instrument data collection, manufacturing, robotics, medicine or office automation.

Matching the application

While a general-purpose machine is generally a safe choice, it may not be the one most suited to a particular application, nor the most cost-effective. Scientific machines are classified as such for their number-crunching ability and support for laboratory devices. They are appropriate for applications that have a tendency to become CPU-bound, such as statistical modeling, simulation and research applications.

Commercial machines are noted for their capacity to handle transaction processing or I/O-bound operations and perform well for such applications as billing and inventory. Machines targeted for business applications may come bundled with application-specific software or equipped with specialized hardware interfaces. Third-party vendors offer minicomputers packaged as turnkey systems that they will maintain and update.

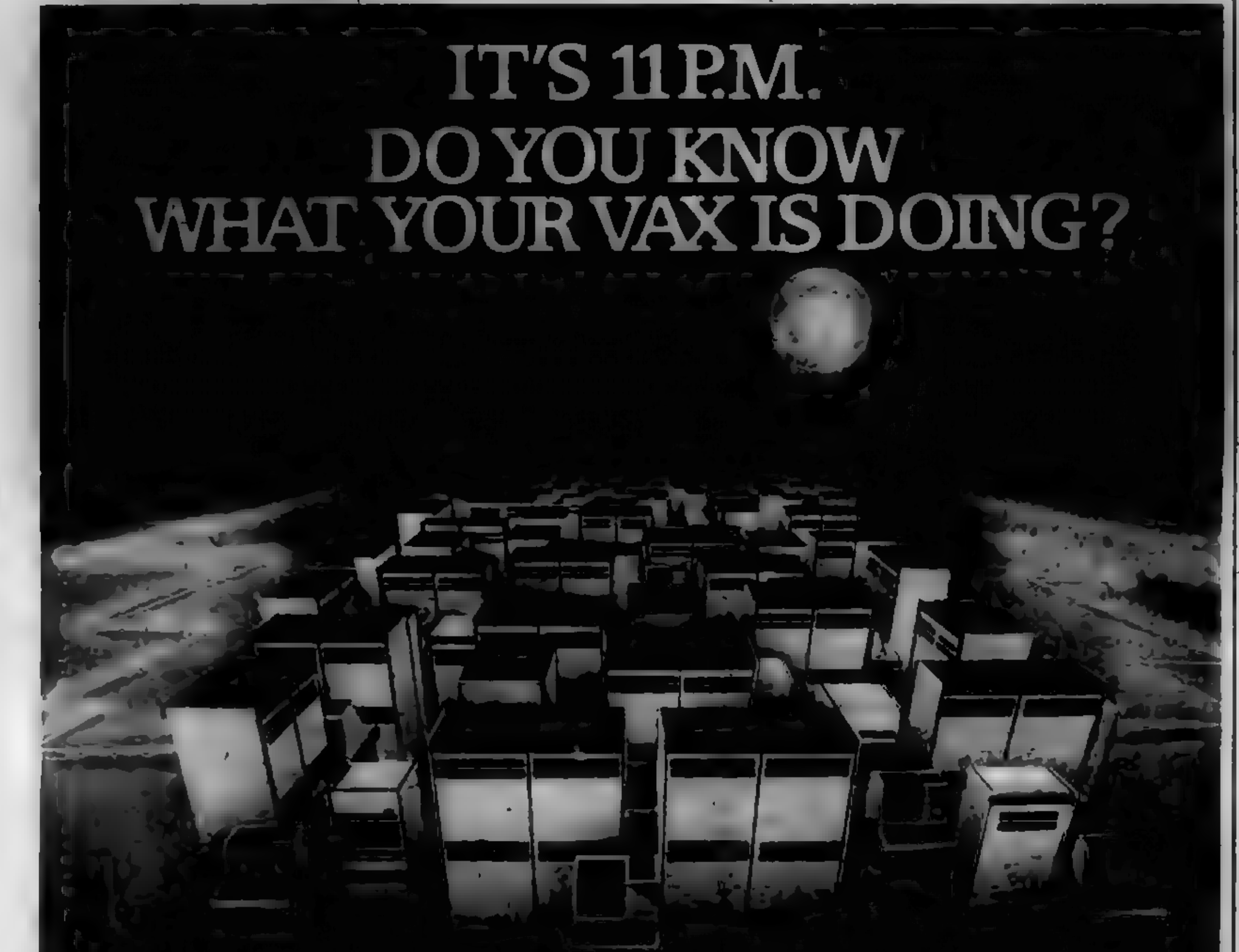
The goal of any data processing application is to meet users' needs. This is only possible when the hardware and software used for the system are equal to the job. Hardware and software that fit the applications for which they were intended are also a real morale boost for system programmers and analysts. The only way to prevent such a catastrophe is to know the application and the hardware well.

The following are some suggestions that will help to determine whether a particular machine meets particular requirements.

- Identify current application requirements in terms of the maximum number of concurrent users, required response times, size of the largest data base, size of the largest disk file, size of the largest program, interface requirements to other hardware and required software such as compilers, utilities and vendor-supported application packages. Be sure that the application planned for the minicomputer is not really a job for a mainframe.
- Project the growth of the application. Does the vendor offer upward compatibility or will the choice to be made now imply a costly conversion in the future?
- Compare the functionality with cost. Know what is available on the market that meets the requirements.
- Know the training requirements for users and DP personnel. Calculate the costs in terms of time and money. If possible, match the machine software to the skills of existing personnel. Users generally are more satisfied if they can solve some of their own DP problems rather than contribute to the existing application backlog.
- Consider the level of vendor support required and whether the vendor will be able to provide it. A vendor's reputation for support is not always consistent across all geographic locations. If you are running a 24-hour-a-day operation and production is dependent upon the uptime of the machine, be sure that you can depend on the vendor for parts and service 24 hours per day.
- When you have narrowed your choice to several pieces of hardware, request a benchmark. Benchmarks do not necessarily have to be difficult to construct. In lieu of a benchmark, ask the vendor for references of companies that are using his equipment in a way similar to the one in which you plan to use it.
- Does the system meet all or most of the requirements? Are the needs that it does not satisfy noncritical to the applications? One way to decide this is to prioritize the requirements in categories.
- Can the vendor meet the delivery date? Will the machine be installed soon enough to meet the company's business needs? The second or third best machine in terms of meeting the requirements may turn out to be the optimal choice if the vendor of first choice cannot respond to needs quickly enough.
- Do not choose a computer system because of a positive bias for a favorite vendor. Blindly purchasing from a familiar vendor may not always result in the effective solution of a business problem.
- Do not take sales brochures at face value. A system that is advertised to support 30 users may support only 15 under certain types of applications.
- Do not use a vendor demonstration of a machine as a benchmark. Demos are designed to show only machine strengths. The best benchmarks are those that most closely approximate the job mix that will be running once the machine is installed in house.

The best overall view of machine performance will come if the benchmark is run in four phases. First, run all the jobs single-threaded on an unloaded machine. Second, run a mix of the jobs that represents the average machine load. Third, run a mix of jobs that would represent an extremely heavy load. Fourth, run as many jobs as are required to bring the machine to full-load capacity. Then compare the results of step four with figures for projected growth to estimate the lifetime of the machine.

Vendors generally have software to simulate any number of users and can help in constructing a script that will represent a particular machine load. They may be able to provide performance statistics as jobs run.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COMPUTERWORLD

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DISKS

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tious of these. The 7600 subsystem has a transfer rate of 3M byte/sec, the same as IBM's 3380 magnetic disk drive, the report said. STC has identified an optical storage market in data bases that are infrequently or never updated, such as stock market history and legal files, as well as a market for replacing magnetic tape for archival storage, according to the report.

Delivery of 7600

Despite the recent announcement that STC has filed for a reorganization under Chapter 11 of the Federal Bankruptcy Act, the company still plans to release the 7600 on schedule, according to an STC spokesman.

Technology for the erasable optical disk is making progress, the report stated. Most development programs involve either use of a low-power laser to change the state of an amorphous gadolinium coating on a disk or use of a polarized light to change a different type of amorphous coating from a crystalline state to a noncrystalline state.

But the first volume shipments of erasable optical disk drive systems may take another three to five years, because no firms have yet committed the heavy investment required, the report said.

Despite the loss of credibility after the 1981 departure of National Semiconductor Corp., Texas Instruments, Inc. and Rockwell International Corp. from the magnetic bubble memory market, the bubbles "now look like a product with a future," the report stated. Portable computers offer the largest potential market because the bubbles have the advantages of physical size and durability while being transported, the report suggested.

Bubble memories are also attractive in applications such as industrial control systems, robots, point-of-sale terminals, medical instrumentation, avionic systems and militarized systems, according to the report.

Other highlights

Other highlights of the report were the following:

- The most likely product to replace certain rigid disk drives is the high-capacity flexible disk drive, the report stated. The 3.3M-byte, 5¼-in. floppy media being shipped by Drivetec, Inc. and Eastman Kodak Co. are developing markets with specialized systems and as personal computer add-ons, according to the report. And such media may double its capacity to 6.6M bytes next year, with the potential for even more expansion.
- Perpendicular recording for flexible disks has the potential to increase the capacity of a 5¼-in drive to 5M to 10M bytes, the report said. Linear densities of up to 50,000 bit/in. are predicted, but media availability will be a limitation on the market.
- The use of very small magnetic particles could result in isotropic magnetic recording, in which more flux changes per inch can be obtained. Eastman Kodak's Spin Physics subsidiary is advocating this technology, the report stated.
- The potential is great for track/in. improvements. "The industry still has plenty of room for innovation in this area," the report said, since most disk drives operate below 500 track/in., and the highest performers operate at approximately 960 track/in. The report predicted that IBM will release a double-density version of the 3380 in the first half of 1985, with at least 1,400 track/in.
- Perpendicular recording, as opposed to longitudinal recording used by all disk drives today, has untapped potential. If magnetization were oriented in a plane perpendicular to the recording surface, the potential would be at least 100,000 bit/in., the report said. The Japanese are developing perpendicular recording, and CDC in the U.S. has a license for the technology.

The report on rigid disk drives, which is designated Volume I, is available for $1,015, and a report on flexible disk drives, Volume II, is available for $775. The price for both reports is $1,530. More information is available from Disk/Trend, Suite B-20, 5150 El Camino Real, Los Altos, Calif. 94022.

HARRIS

from page 81

color combinations, the company said. Six planes of display memory for 64 color combinations are standard in the HS-20.

The independent graphics processor is a Motorola 68000 microprocessor with 128K bytes of random-access memory. Each one uses high-speed direct memory access transfer to obtain graphics commands from any area within the system's memory.

Computer-aided engineering applications include two-dimensional drafting and three-dimensional design, printed-circuit board layout and routing, VLSI circuit and gate-array design, civil engineering architecture and mapping, the company said.

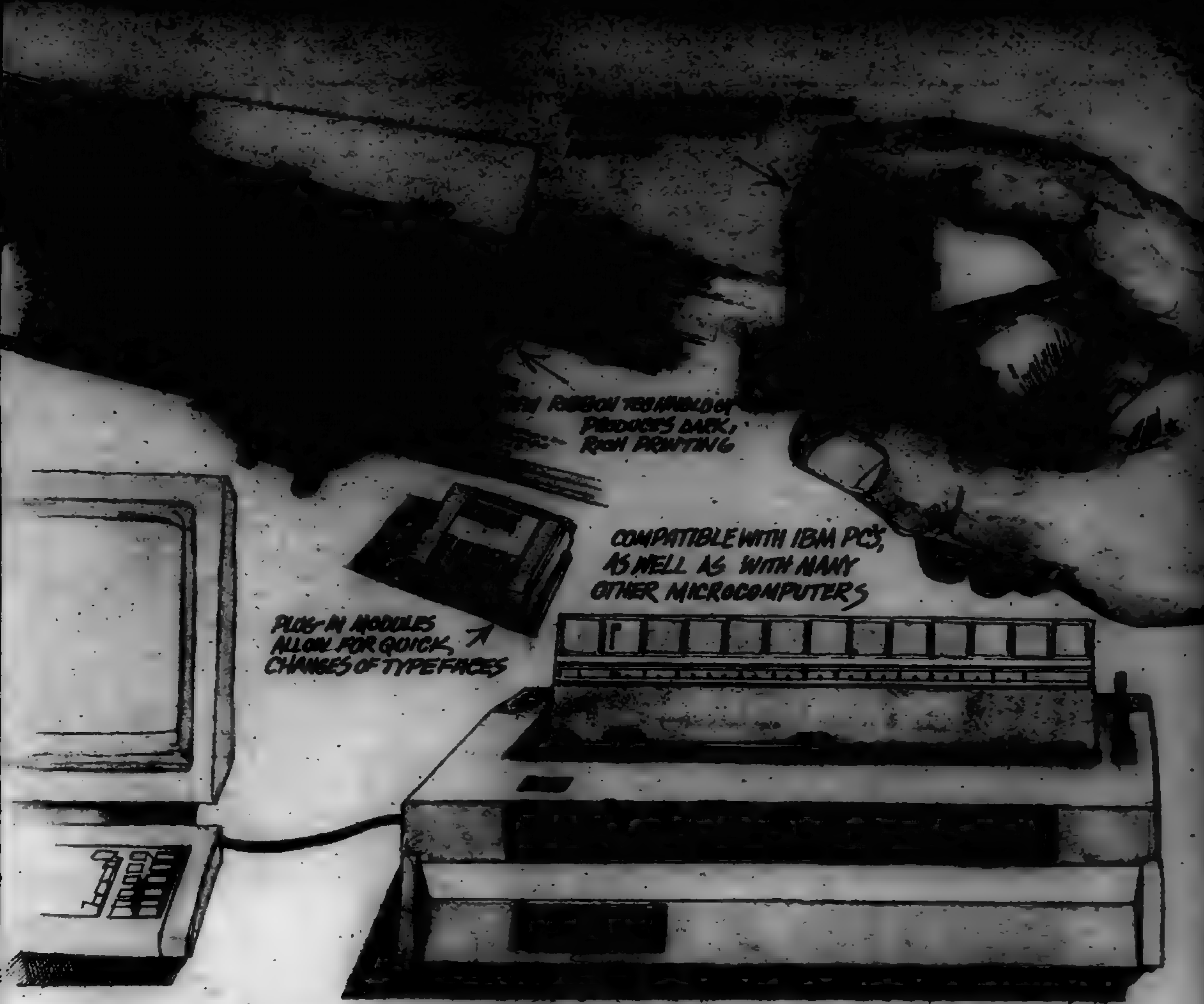
A stand-alone unit includes the 32-bit CPU with three RS-232 lines, 1M-byte of memory, independent graphics processor, a 50M-byte disk drive and 45M-byte cartridge tape, AT&T's Unix with Fortran 77 and C languages, 19-in. monitor and an 8-slot chassis.

The standard HS-10 includes a monochrome graphics subsystem with a 19-in., 1,024-pixel by 800-pixel monitor. The HS-20 features color graphics with a 19-in., 832-pixel by 600-pixel monitor, the company said.

Prices for the HS-10 start at $32,500, and prices for the HS-20 start at $39,000.

More information is available from Harris, Computer Systems Division, 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Tasty forays into the [illegible] of microcomputing, [illegible] video cassettes.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IBM PRINTERS

The Finishing Touch

Continued from page 83

cludes input through manual key-entry terminals, the vendor said.

The price of the system is dependent on the hardware and software configuration needed by the customer, but it starts at approximately $100,000, the vendor said.

Optical Business Machines, 804 W. New Haven Ave., Melbourne, Fla. 32901.

TERMINALS

LIBERTY ELECTRONICS U.S.A.
Freedom terminal enhancements

Liberty Electronics U.S.A. has enhanced three of its terminals and cut the price of another terminal.

Liberty is now offering 14-in., 132-col. display options for its Ascii terminals Freedom 110 and Freedom 200 and for its Digital Equipment Corp. VT220-compatible Freedom 220 terminal, the vendor said.

Prices for the enhanced terminal options are $595 for the Freedom 110, $745 for the Freedom 200 and $845 for the Freedom 220.

The price for a Freedom 110 has been reduced from $595 to $545, the vendor said.

Liberty Electronics, 625 Third St., San Francisco, Calif. 94107.

DIPIX, INC.
Aries II

Dipix, Inc. has announced the Aries II mapping workstation for use with Intergraph Corp.'s Intergraph Computer-Aided Mapping System, said to allow users to integrate information from raster images with Intergraph graphics files.

The Aries II mapping workstation operates in three modes: tape-to-tape transfer of a graphics file in Intergraph's Standard Interchange Format from the Intergraph system to a stand-alone Aries workstation; Aries peripheral workstation interfaced to the Intergraph host Digital Equipment Corp. VAX-11 as a peripheral with direct transfer between the vector and raster data bases; and as a stand-alone Aries workstation networked to the Intergraph host allowing direct transfer of data and a distributed processing environment.

Aries II ranges in price from $35,000 in workstation mode to $100,000 as a stand-alone unit.

Dipix, Rivers Center, 10220 Old Columbia Road, Columbia, Md. 21046.

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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Comdex/Fall shows all

Like a national political convention, Comdex/Fall '84 dominated the local landscape, generated tremendous hoopla with a working minimum of true excitement and ended up by promising something for everyone.

Some highlights:

- This year's hottest desktop micros, the IBM Personal Computer AT and the Apple Computer, Inc. Macintosh, both received generous gifts of software and hardware add-ons from third-party suppliers.
- Lotus Development Corp.'s Jazz integrated package for the Macintosh, in beta form, looked impressive during brief semipublic showings. One potential drawback is the $4,000-plus price tag for Jazz and the required 512K-byte Macintosh with external disk drive.
- Lightyear, the decision-modeling package for the IBM Personal Computer introduced by Lightyear, Inc., also sparked a great deal of interest.

See COMDEX page 96

Traveling professionals to drive up portable use

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — By 1990, portable computers will play a more significant role in office automation functions as increased emphasis is placed on meeting the needs of the professional audience and automating the work of people who travel.

That was the assessment of Thomas Kinch, president of Micro Office Systems Technology, Inc., a Connecticut-based portable computer firm, who addressed a seminar on trends in the portable computer industry at Comdex/Fall '84, held here recently.

To date, the portable computer industry has focused on designing Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M-based systems. But Kinch said that with developments in 32-bit Cmos microprocessor technology, the industry is "not far away from introducing [an AT&T] Unix-based portable computer."

By the late 1980s, Kinch said, briefcase-size portable computers will be able to support a Unix file server.

Stymied by design shortcomings

Gene R. Talsky, president of Professional Marketing Management, Inc., a Connecticut-based consulting firm, said the market acceptance of these hand-held machines has been stymied by a number of design shortcomings.

The screen technology used in hand-held systems, which relies on the use of LCDs, presents problems for users, Talsky said.

"If you use a portable with an LCD display for more than an hour to run a word processing or spreadsheet program, it gets very tiring," he said. Problems with glare and contrast on LCDs remain to be addressed, he said.

Weaknesses to disappear

But, according to Talsky, the weaknesses of briefcase-size portables will disappear next year.

In 1985, he said, these hand-held computer systems will be designed with advanced microprocessors, will feature better displays — including flat panels — and will provide increased memory and storage.

Lisa Williams, president of STM Electronic Corp., a California-based computer firm that sells transportable computers, said that AT&T's entry into the computer market had introduced a new factor in the industry, one that could signal a change in direction for other computer firms.

Williams said AT&T has the ability to become another industry standard setter. "Cloning IBM is not the only strategy," she concluded.

- Digital Equipment Corp. cut prices for its Rainbow microcomputer/90
- NCR Corp. announced a local-area network/91
- Alpha Software Corp. enhanced its four-function Electric Desk package/92

INSIDE

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True Basic — from original Basic authors — gets graphics

HANOVER, N.H. — John G. Kemeny and Thomas E. Kurtz, creators of Basic in 1964, are gambling that graphics capabilities will lure current Basic users to True Basic, Inc.'s True Basic.

Last year, the authors of Basic formed True Basic, Inc. and announced plans to create a superior version of Basic. "We want to eliminate the babble of Basic," Kemeny stated.

The linchpin of their offering is its ability to support graphics. True Basic conforms to the proposed American National Standards Institute (Ansi) Basic and supports Ansi's Graphic Kernal System, a proposed graphics standard recently incorporated in a number of IBM graphics products [CW, Sept. 24].

Principal benefits that True Basic is said to provide include the ability to draw pictures without counting pixels and to recall pictures previously drawn, Kemeny said. Users reportedly can design graphs, charts, picture programs and animated displays that can be used in programs or stored in external libraries. Pictures can be changed, rotated and moved from one window to another.

The product, which combines an editor, compiler and interpreter, features English language syntax, sophisticated error-handling, on-line Help facilities, a full screen editor, windows, mouse support and programmed function keys, True Basic said.

Initially, the company is targeting educational institutes for the program. Kemeny claimed that True Basic, which requires 128K bytes of random-access memory, will be offered on a number of microcomputers, and programs written on one microcomputer can be easily moved to a second microcomputer.

The company has announced an IBM Personal Computer version with a shipping date of January 1985 and an Apple Computer, Inc. Macintosh version due in the second quarter of 1985.

True Basic costs $149.90. Addison-Wesley Publishing Co. will act as publisher, handling the two versions and related materials.

Addison-Wesley is located in Reading, Mass. 01807.

Spelling checker, text outliner introduced for Lotus Symphony

NEW YORK — For Lotus Development Corp., Nov. 12 was a day of product introductions, led by its debut of Jazz but also featuring the announcement of two software products for use with the firm's Symphony integrated package and a book.

The software products that bowed, a spelling checker and a text outliner, will each reportedly be priced at $139 and will be available in early 1985. The spelling checker, Lotus said, will allow users to compare words in a document against those in a master dictionary and will manually correct the word or choose from a list of alternative words. The text outliner, Lotus added, will allow users to switch from writing a text outline to editing the text itself. It reportedly will also create a table of contents automatically.

Also introduced was the "Lotus Guide to Learning Symphony," the first in what Lotus said will be a series of learning and application guides jointly produced by the Cambridge, Mass., software firm and the Addison-Wesley Publishing Co. The guide is priced at $22.95 and reportedly features 400 illustrations.

Lotus is located at 161 First St., Cambridge, Mass. 02142.

Corona unwraps desktop series said to be compatible with IBM

LAS VEGAS — Corona Data Systems, Inc. has announced an enhanced series of IBM-compatible desktop personal computers.

Corona's PC400 series features 640- by 400-pixel resolution, along with a 14-in. monitor. The systems reportedly provide users with the ability to run in IBM's medium and high 200-line-resolution mode or in Corona's 400-line mode, without an adapter card. Graphics adapters for the PC400 series are built into the motherboard, leaving an extra expansion slot free, Corona said.

Based on the Intel Corp. 8088 microprocessor, the PC400 series includes 256K bytes of random-access memory (expandable to 512K bytes); Microsoft Corp.'s MS-DOS and GW-Basic; Multimate International Corp.'s Multimate word processing package, and Comprehensive Software Support's PC-Tutor.

The series ranges from the Model 12, with one floppy disk drive, to the Model HD2, which includes one floppy disk drive and a 10M-byte hard disk drive. The Model 12 is priced at $2,650, and the Model HD2 costs $4,395.

Corona is headquartered at 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

Spreadsheets cited most used micro software

NEW YORK — Spreadsheets are the most widely used software packages among companies using microcomputers, a national survey has found. According to the National Association of Accountants (NAA), which sponsored the survey, more than 90% of the companies purchasing micros use spreadsheet software packages.

Most companies initially bought micros hoping to use them for budget and financial analysis applications, the survey said, but it noted that 64% of the respondents used word processing software; 37% had general accounting packages; and 36% used graphics packages.

The survey found that 47% of the respondents using spreadsheets used Lotus Development Corp.'s 1-2-3; 22% chose Software Arts, Inc.'s Visicalc; and 12% used Sorcim Corp.'s Supercalc.

Word processing packages

Of those companies that use word processing packages, Micropro International Corp.'s Wordstar is used by 33% of the respondents. Service industry firms use word processing packages most frequently, the survey said.

"Respondents ... were not as pleased with their word processing software selection as they were with their spreadsheet selection," according to the survey.

This may be because "most of the respondents held management accounting positions and ... do not have hands-on experience working with their word processing package."

Manual systems replaced

BPI Systems, Inc.'s General Accounting was the accounting package employed by most of the respondents, the survey said. General accounting software packages were purchased primarily to replace manual systems, according to the NAA survey. The financial sector (including banks, insurance companies, real estate firms and security brokerage firms) had the biggest users of graphics software packages, the survey said.

More than 80% reportedly used their graphics package for preparing illustrations in reports and documents, and 74% used it to prepare graphs and charts for company presentations.

IBM Personal Computers reportedly were the most used micros among those surveyed. Another system mentioned frequently was IBM's Personal Computer XT.

Majority have one micro

According to the survey, the majority of the participants had one micro and used it between 20 and 40 hours a week. Most said that both management staff and between one and three clerical personnel are trained to use a microcomputer.

Conducted in cooperation with Auerbach Publishers, Inc. of Pennsauken, N.J., the survey questioned about 500 manufacturing firms and financial service organizations employing more than 500 people and reporting annual revenue in excess of $100 million.

Answers were also received from service industry firms reporting annual revenues between $1 million and $9.9 million and with fewer than 100 employees.

Results of the survey are published in this month's edition of *Management Accounting*.

DEC reduces micro, memory, software prices

LITTLETON, Mass. — Digital Equipment Corp. has reduced prices on its Rainbow 100 and Rainbow 100+ personal computers, memory options and operating system software.

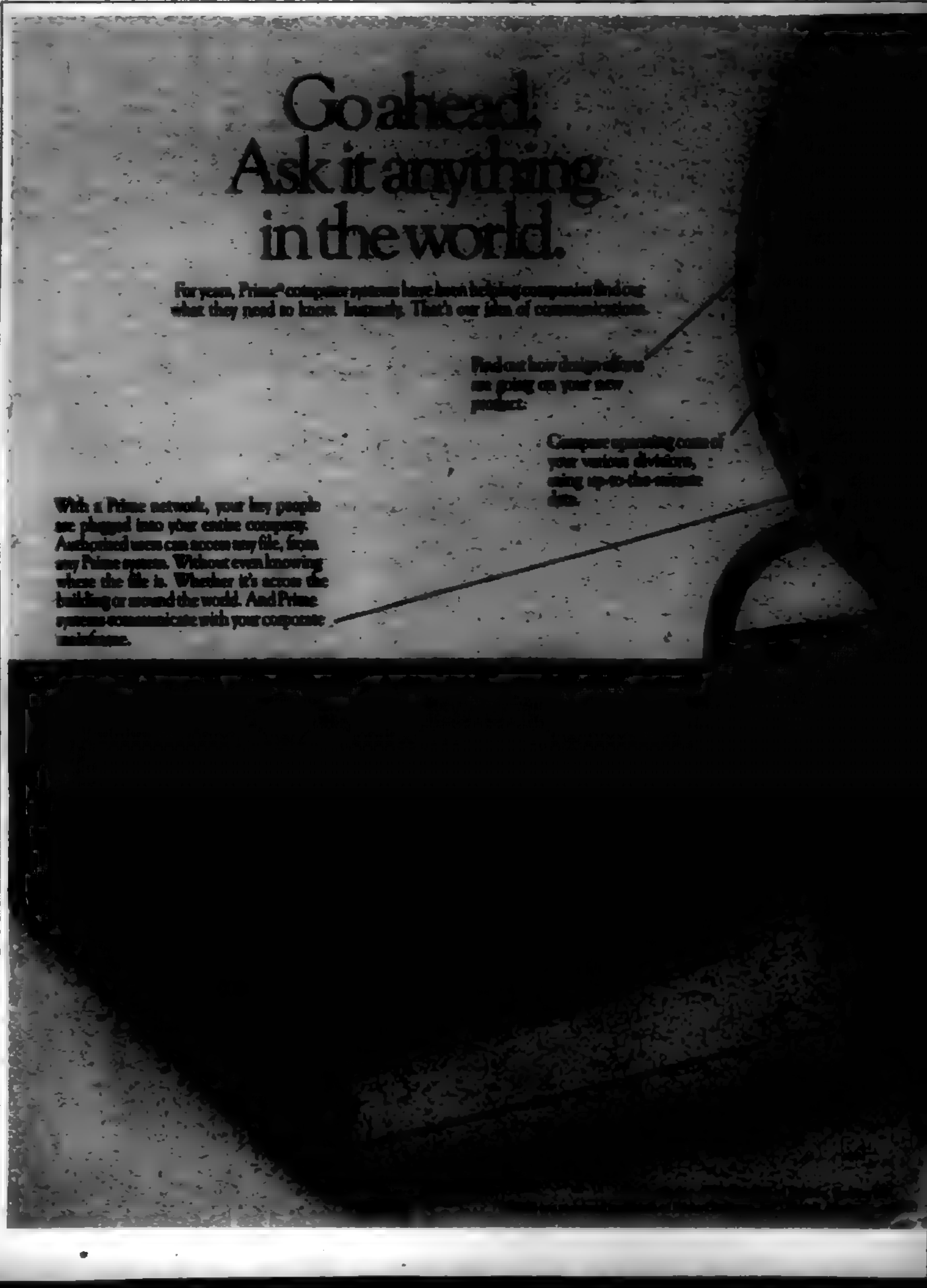
The system unit price of the floppy-disk-based Rainbow 100 with 128K bytes of main memory is now $2,415 — reduced from $2,750 — and the Rainbow 100+ with a 10M-byte hard disk is now $4,315 — reduced from $5,075, the firm said.

The price of the 128K-byte option has been reduced from $449 to $300, and the 256K-byte option has been cut from $[illegible] to $[illegible].

Prices for Digital Research Inc.'s CP/M 86/80 or Microsoft Corp.'s MS-DOS operating systems have been reduced from $275 to $95 each. The two systems can be purchased together for $175, the company said.

Keyboard and monitor prices remain unchanged, however. A typical configuration of the Rainbow 100 system with 256K bytes of memory, keyboard, monitor and choice of operating systems is now $3,380, compared with $4,044, while a similarly equipped Rainbow 100+ is about $5,289 — reduced from $6,369, the company said.

DEC is located at 146 Main St., Maynard, Mass. 01754.



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Phone management available

Packages to autodial, autoanswer, provide security and remote access

PALO ALTO, Calif. — Digital Pathways, Inc., has introduced a line of communications software that is said to allow an IBM Personal Computer XT to perform telephone answering functions.

The Soundware series of products include: Communicard, a voice communications card, telephone management software called Voicemate and programming software [redacted]

Communicard permits high-quality voice to be recorded on a hard disk, the vendor said. The card is said to require a half slot in the IBM PC XT or compatible card cage and to provide automatic Touch-Tone recognition.

Used in conjunction with Communicard, Voicemate reportedly provides an individual telephone management system with message greeting, message playback, phone directory with automatic dialing capability, password recognition, remote owner access for message playback and audit train, voice file transmission, Touch-Tone dialing and Touch-Tone decoding.

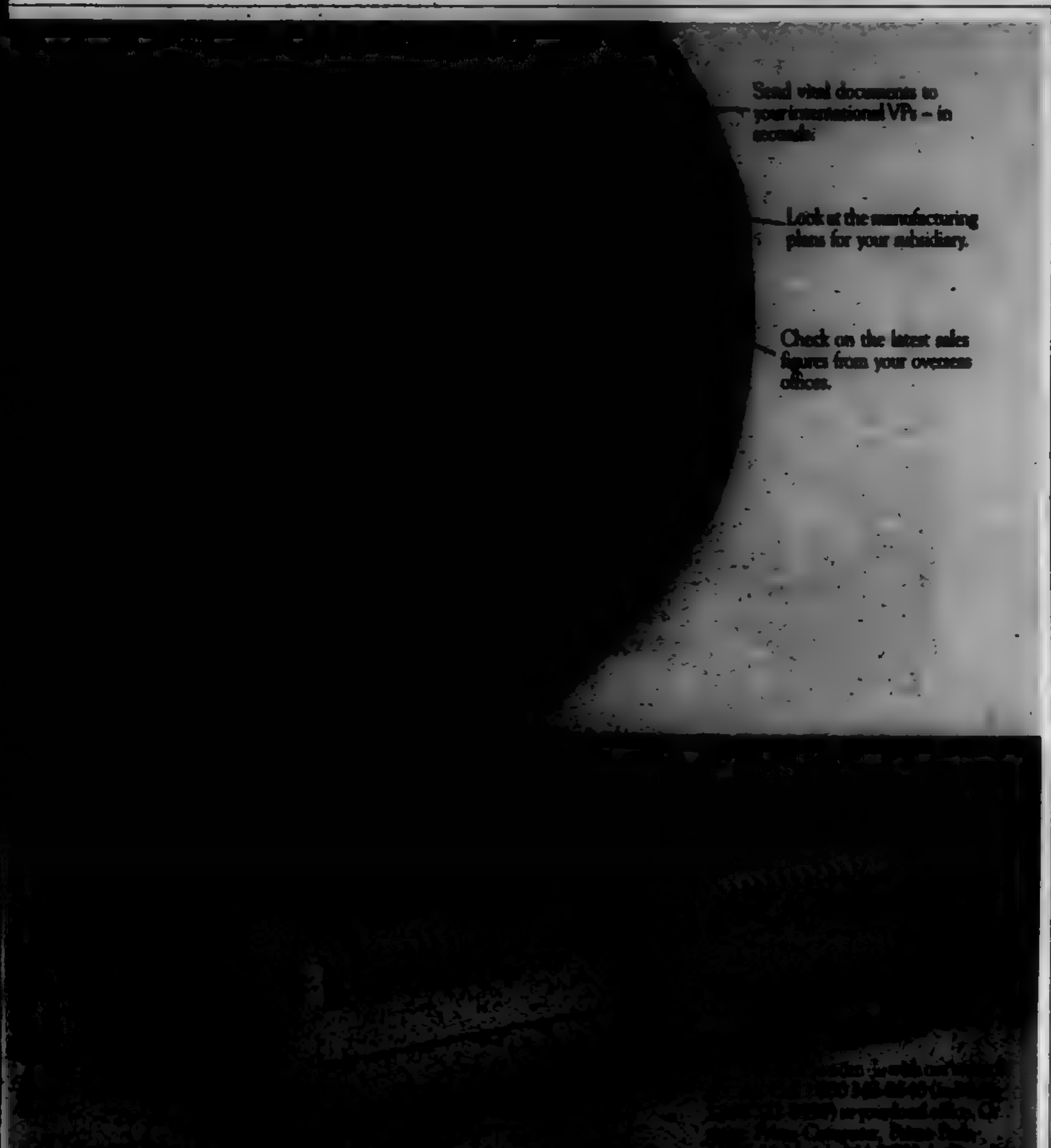
Voicemate includes a remote-access feature that allows the owner to call the personal computer and play back messages, the vendor said.

Soundtools reportedly allows users to develop their own software applications, including voice recording capabilities.

Price of the Soundware package, including Communicard, a diskette with Voicemate and Soundtools software, is $449.

The Communicard and Soundtools modules together [redacted]

Digital Pathways is headquartered at 1060 E. Meadow Circle, Palo Alto, Calif. 94303.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Macintosh Think Tank announced

LAS VEGAS — Living Videotex in- [redacted] outline processor for the 512K-byte model of the Apple Computer, Inc. [redacted] Comdex/Fall '84 show.

Peter Winer, director of new product development for the Mountain View, Calif.-based software firm, said Think Tank for the large-memory Macintosh offers the capacity to store windows of text or graphics within a Think Tank outline, something not possible on earlier versions.

Think Tank lacks built-in graphics-generation capability, Winer said, but it allows graphics to be imported from any graphics program that runs [redacted]

Like the other versions of Think Tank (for the Apple IIe, the 128K-byte Macintosh and the IBM Personal Computer) the new version of the software allows users to create an [redacted] in any order.

Winer pointed out that larger concepts are stored under main headlines and more specific concepts under smaller subheadlines, both created by the user.

A special feature of the 512K-byte Macintosh version, Winer noted, is its "slide show" function, under which users can place a series of graphics elements — including digitized pictures — back-to-back in a series and then run through them as if they were doing a slide show, with the machine's mouse acting as the remote control.

Think Tank for the 512K-byte Macintosh is priced at $245. An upgrade for users of Think Tank on the 128K-byte Macintosh is priced at [redacted]

Living Videotex is located at 2432 Charleston Road, Mountain View, [redacted]

PC2PC links compatibles

DAYTON, Ohio — NCR Corp. has introduced PC2PC, a local-area network that links IBM Personal Computers and compatible computers.

The product transforms any micro on the network into a file server and allows up to 64 machines to be connected, NCR said. It is said to operate at a transmission speed of 1M bit/sec and to allow users to share printers, hard disks and communication lines.

"This product is user-installable and the entire network can be fully operational in less than two hours," Vernon W. Yates, NCR division vice-president and general manager, said. "It uses a small number of easy-to-use commands to allow the novice and experienced user to explore the capabilities of the network."

The cost of the network is $495 per connection.

NCR is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

SOFTWARE

APPLIED DATA RESEARCH, INC.
ADR/PC Adroit enhancements

Applied Data Research, Inc. has enhanced ADR/PC Adroit, its training system software that runs on the IBM Personal Computer with IBM's PC-DOS operating system.

The product now is able to capture mainframe screens and create corresponding Adroit text screens, according to the vendor. To complete this task, a user requires a Digital Communications Associates, Inc. Irma board that is activated by the control key, Applied Data Research said. The enhancement reportedly expedites tutorial creation when combined with Adroit's software simulation capability.

Adroit costs $4,500.

Applied Data Research, Rt. 206 & Orchard Road, CN-8, Princeton, N.J. 08540.

PRECISION SOFTWARE PRODUCTS
Keys Please!

Precision Software Products has developed a product said to increase the speed of Micropro International Corp.'s Wordstar word processing package by 20% to 40%.

According to the company, Keys Please! puts all Wordstar commands onto function keys, and all printer capabilities are automatically activated. The product comes with an on-screen reference line and a chart of commands, eliminating the need to memorize Wordstar letter codes, the company said.

An Instant Install process enables Wordstar users to change peripherals to their computer systems without having to go through a Wordstar installation process.

Keys Please! with Instant Install is available with several operating systems, including Microsoft Corp.'s MS-DOS, IBM's PC-DOS, Digital Research, Inc.'s CP/M 80 and CP/M 3.0 and Musys Corp.'s Turbodos.

The cost of the product is $69.95

Precision Software Products, Suite 204, 360 17th St., Oakland, Calif. 94612.

STRATEGIC SOFTWARE PLANNING CORP.
Promis for the Personal Computer AT

Strategic Software Planning Corp. has announced that its project management software system is now available for the IBM Personal Computer AT.

Project Management Integrated System (Promis) can reportedly handle project planning, tracking, resource management and cost control functions. The product utilizes a data base architecture and report writing and graphics capabilities.

The cost of Promis is $2,995.

Strategic Software Planning, 222 Third St., Cambridge, Mass. 02142.

MANAGEMENT CONTROL SYSTEMS, INC.
Quick-Look Version 84.01; Financial Reporting System Version 2.01

Calculations for computing income tax averaging, 10-year averaging and marriage penalty deductions are among the enhancements included in Version 84.01 of Management Control Systems' (MCS) Quick-Look tax planner package.

The software reportedly runs on IBM's System/34 and 36, Personal Computer XT and AT and System/23.

Quick-Look Version 84.01 costs $535 for the IBM System/34 and System/36 computers. The cost of the software on the Personal Computer XT and AT is $350, and for the System/23, it costs $495.

The company also announced the MCS Financial Reporting System Version 2.01 for the IBM Personal Computer XT and AT.

The product increases processing time by eliminating the need for loading a key diskette in the disk drive, according to the company. Keyboard handling has also been modified to speed up data entry, the company said.

The package requires 256K bytes of memory and a 10M-byte hard disk, according to the vendor. It costs [illegible]

Management Control Systems, 2400 Lake Park Drive, Smyrna, Ga. 30080.

See TOOLS page 94

Electric Desk gets upgrade

BURLINGTON, Mass. — Alpha Software Corp. has released an upgraded version of its Electric Desk, a four-function integrated package that runs on the IBM Personal Computer with IBM's PC-DOS operating system.

The new version reportedly supports spreadsheets up to 200K bytes in size, with improved speed in displaying spreadsheets. The upgrade also is said to add the ability to dial a phone number in the communications function without first creating a log-in script.

In addition, the enhanced Electric Desk can display foreign characters on-screen in the word processing mode, Alpha said.

Electric Desk runs with 256K bytes of random-access memory and provides word processing, data base management, spreadsheet and communications functions.

The upgrade will be provided free to current owners of the package. Electric Desk costs [illegible]

Alpha Software is located at 30 B St., Burlington, Mass. 01803.

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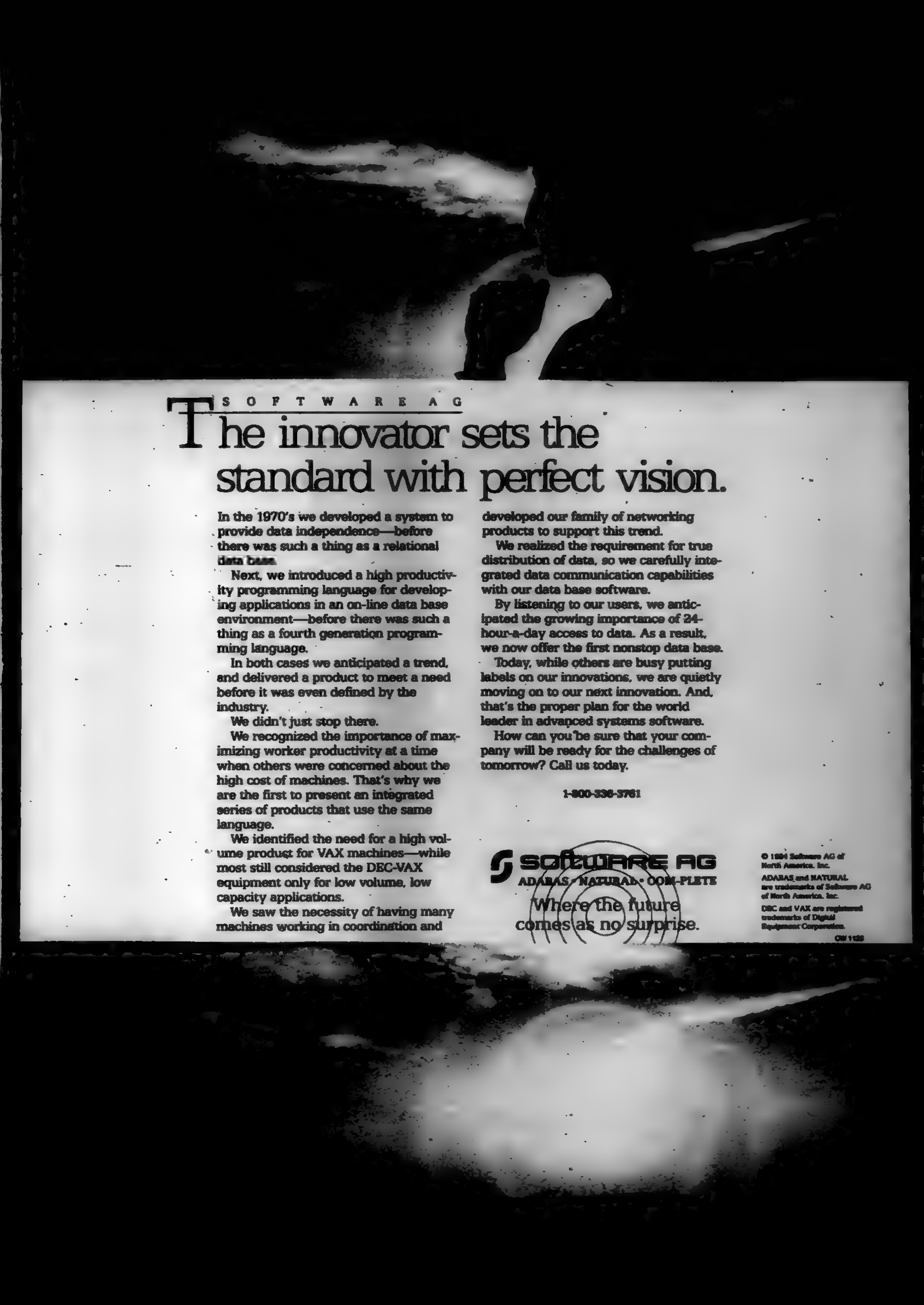

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TOOLS

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ANALYTICA CORP.
Reflex

Analytica Corp. has introduced Reflex, a data base management package for the IBM Personal Computer.

Reflex reportedly combines information management and analysis features and is designed for data collection and interpretation. It is said to perform traditional collection and retrieval functions. In addition, it facilitates analysis by allowing users to review information in a variety of formats and to group it to reveal interrelationships, trends and deviations, the company said.

Data reportedly can be organized in lists and tables, extracted and displayed in charts and graphs and summarized or combined using a number of built-in functions.

Reflex is said to require graphics capabilities and 384K bytes of random-access memory. It sells for $495.

Analytica, 3155 Kearney St., Fremont, Calif. 94538.

STERLING-CASTLE
The Decision Analyzer

Sterling-Castle has announced The Decision Analyzer, a decision-making software package for the IBM Personal Computer XT and compatibles.

The company said that up to five people can use the package, which reportedly makes judgments based on paired comparisons. The preferences of the decision maker on one or more criteria are combined into scores for each problem alternative or subject such as product preferences, plant sites, warehouse locations and personnel evaluations. Customers can then use the scores to determine the best course of action.

The package costs $199. Demonstration packages are being offered for $10.

Sterling-Castle, Suite 174, 702 Washington St., Marina del Rey, Calif. 90291.

LAYERED, INC.
Front Desk

Layered, Inc. has introduced a business calendar with a time accounting function for Apple Computer, Inc.'s Macintosh personal computer.

Front Desk integrates schedules in up to 15 categories, then reports or projects productivity and revenue per person or for an entire business, according to the vendor.

Front Desk can maintain employee schedules for up to 12 months and can provide time accounting information, the company said. Users can define standard hourly billing rates for each resource being scheduled. It reportedly uses the rates to calculate total revenue generated for each source.

Front Desk is priced at $149.95

Layered, 85 Merrimac St., Boston, Mass. 02114.

DURANGO SYSTEMS, INC.
RM/Cobol for Xenix 3.0

Durango Systems, Inc. has announced that Ryan-McFarland Corp.'s RM/Cobol compiler now runs on Durango's Poppy microcomputer series using Microsoft Corp.'s Xenix 3.0 operating system.

The company claimed that more than 1,500 application programs are available for RM/Cobol. RM/Cobol is now available on all Durango systems, which feature Intel Corp. 80186 and 80286 microprocessors and run Microsoft's MS-DOS and Digital Research, Inc.'s Concurrent CP/M 86 operating systems. The RM/Cobol compiler with runtime costs $1,250.

Durango Systems, 3003 N. First St., San Jose, Calif. 95134.

SYSTEMS

COMPUTER CONSOLES, INC.
CCI Personal Computer

Computer Consoles, Inc. (CCI) has introduced a desktop personal computer that is compatible with the IBM Personal Computer.

The CCI Personal Computer comes with Microsoft Corp.'s MS-DOS 2.11, Basic programming language and CCI's Officepower office automation terminal emulation package.

Hardware consists of a table-top terminal, tilt-swivel monochrome or color monitor, an Intel Corp. 8088 microprocessor, 256K bytes of of random-access memory (RAM) expandable to 640K bytes, two serial ports and a parallel port.

The desktop computer can operate as a fully supported Officepower terminal and can perform all of the OA system's functions, including integrated record and word processing capabilities, the company said.

Base price of the product is $2,500 for a single floppy disk drive, monochrome display, 256K bytes of RAM and Powerterminal emulation software. Prices range up to $5,800, depending on configuration.

Computer Consoles, 97 Humboldt St., Rochester, N.Y., 14609.

COMMUNICATIONS

AVATAR TECHNOLOGIES, INC.
PA-Plus

Avatar Technologies, Inc. has introduced a package for the IBM Personal Computer and Personal Computer XT that provides IBM 3270 terminal emulation capabilities.

PA-Plus is said to offer IBM 3278-2 terminal emulation for users requiring dial-in access to IBM mainframes.

The software is designed to be used in conjunction with the vendor's

Continued on page 96

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Continued from page 94

PA1000 or PA1000E protocol converters. These stand-alone units are said to allow dial-in access to both the 3270 network and a local or remote asynchronous host computer. PA-Plus provides keyboard and data management features included in the PA100 board-level emulation product, the vendor said. The product reportedly lets IBM Personal Computer users run 3270 asynchronous communications and IBM PC-DOS application sessions concurrently.

When used with PA1000 or PA1000E, PA-Plus is said to provide programmable keyboards with Help screen support, screen capture to disk or memory, multilevel password security and automatic logon.

PA-Plus costs $100.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

DATAPOINT CORP.
Intelligent Network Executive; PC8220

Datapoint Corp. has announced an adaptor card for the IBM Personal Computer AT that is said to enable the AT to function as an applications processor on a Datapoint Attached Resource Computer (ARC) local-area network.

The company also announced the PC8220, a software package that reportedly provides emulation of a Datapoint 8220 terminal.

The adaptor card, called the Intelligent Network Executive, is designed to fit in an expansion slot of the Personal Computer AT and is said to enable users to link their microcomputers via the Datapoint ARC intelligent network. The card is priced at $695.

The PC8220 emulation package reportedly enables an IBM Personal Computer to emulate a Datapoint terminal. Software support includes Datapoint's Resource Management System operating system. The product is priced at $175.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

PRINTERS/PLOTTERS/ PERIPHERALS

TOSHIBA AMERICA, INC.
P1351 printer enhancements

Toshiba America, Inc.'s Information Systems Division has introduced an automatic sheet feeder and bidirectional tractor feed for its P1351 dot matrix printer.

The sheet feeder is capable of handling letter- and legal-size paper and can accommodate up to 170 sheets, including letterhead, the company said.

Using the bidirectional tractor, the printer reportedly can handle superscript and subscript for scientific notion with one and multipart forms.

The printer can accommodate bidirectional printing with both scripts without speed degradation, Toshiba said.

The sheet feeder retails for $995; the tractor feed is priced at $195, the vendor said.

Toshiba America, Information Systems Division, 2441 Michelle Drive, Tustin, Calif. 92680.

BOARD-LEVEL DEVICES

STRUCTURED SOFTWARE SYSTEMS, INC.
Mass-Storage ROM for HP 9825T

Structured Software Systems, Inc. has offered Mass-Storage Read-Only Memory (ROM) for the Hewlett-Packard Co. HP 9825T desktop computer.

The product reportedly replaces the HP 98228A Flexible Disk Drive ROM and 9895 8-in. double-sided drive. It is said to plug into one of the HP micro's four expansion slots in the same manner as the HP option ROMs.

The Mass-Storage ROM also interfaces to all Hewlett-Packard disks, including the 9221 and 9122 3½-in. microdiskette drives, according to the vendor.

The Mass-Storage ROM is priced at $990.

Structured Software Systems, Box 1072, Irick Road, Mount Holly, N.J. 08060.

COMDEX from page 89

■ Simple "pop-up" packages such as Borland International's Sidekick, offering handy and easily accessible features within other applications, were the programs that came up most frequently in casual conversation. "At last I really have a reason to use [a personal computer] every day!" one user remarked.

■ With IBM compatibility a standard for most serious personal computer manufacturers, vendors increasingly are attempting to differentiate themselves once again by adding communications or graphics features or by using value-added reselling strategies. In one example, ITT launched a personal computer, called the Voice Communications PC, which was aimed at integrating voice recognition, management and synthesis features into the company's Xtra.

■ Dozens of local-area network-related announcements were scattered throughout Comdex. Speaking almost as one, network suppliers insisted that IBM's PC Network and Microsoft, Inc.'s Networks/MS-DOS 3.1 have broken the ice on software application standardization. Copy protection and licensing for network-delivered software remain major stumbling blocks, however.

Quite likely, Comdex unleashed a thousand products on a grateful world, and every last one of them was described a thousand times in exactly the same way — as a customer solution.

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COMPUTER INDUSTRY

STC credit plan canceled; 1,200 layoffs announced

By David Gimes
CW Staff

LOUISVILLE, Colo. — Storage Technology Corp.'s (STC) efforts to steady its tottering business were dealt a serious blow when Chemical Bank of New York recently decided to terminate a previously announced loan commitment.

The cash infusion was badly needed by STC, which last month filed for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act.

STC, a maker of data storage devices, said Nov. 16 that Chemical Bank had terminated the loan agreement in which it would have provided STC with a $150 million credit line. The loan had been subject to a definitive agreement between the companies and approval from the bankruptcy court.

In the wake of that development, STC said last week that it was further reducing its work force by 1,200, with 1,100 of those positions being taken from its Colorado facilities and 100 at its Documation subsidiary in Palm Bay, Fla.

STC's board of directors also named one of its members, Thomas F. Wands, as interim president and chief executive officer (CEO). Jesse Aweida stepped down as CEO but remained as chairman of the board.

STC said it was negotiating with other financial institutions to obtain the cash it needs to operate while it reorganizes under Chapter 11. "The company believes that it can obtain sufficient short-term financing to operate its business until its longer term financing issues are resolved," STC said in a statement.

STC gave no explanation for why the loan was terminated. Ken Herz, a spokesman for Chemical Bank, said the company would not comment on the matter. Erica Rosenfeld, a spokeswoman for Touche

'[STC] can obtain sufficient short-term financing to operate its business until longer term financing issues are resolved.'
— STC statement

See STC page 109

Peachtree sale, demise refuted; retail sale eyed

Manager cites rebound, predicts profitable '85

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — When Larry Smart, general manager of Peachtree Software, Inc., took the podium at a Comdex/Fall '84 press conference here recently, he did not waste any time getting to the heart of the matter.

"It has been widely rumored that the purpose of this press conference was to announce the sale or shutdown of Peachtree Software," he said. [Management Science America, Inc. (MSA) had recently announced that Peachtree, its microcomputer software subsidiary, was up for sale.] "But the discussion of our death has been widely exaggerated," said Smart, who also serves as senior vice-president of MSA.

MSA, in conjunction with Alex Brown, a Baltimore-based investment banking firm, recently issued an "offering memoran-

See MSA page 109

■ The proposed merger with Visicorp solves funding problems for Paladin Software Corp. but also saddles it with restoring credibility to a tarnished product line, the president of Paladin acknowledged recently / 148

■ Speaking of mergers, the recently announced absorption of Visual Technology, Inc. by Lee Data Corp. had been under discussion for two years, executives of both companies said recently / 109

■ Financially ailing Eagle Computer, Inc. posted a loss for the most recent quarter but managed to sound cheerful anyway / 155

IBM seeks mart leverage via customer revenue

By John Desmond
CW Staff

NEW YORK — Despite dramatic drops in hardware prices in the last 20 years, IBM's marketing strategy is to continue to increase its revenues from existing customers by selling them increasingly more powerful CPUs with more demanding software.

So said noted IBM consultant and author Fred Lamond, who spoke at a recent seminar here.

Lamond said the cost of main memory has dropped 600:1 in the last 20 years, based on the price for 1M byte of main memory on an IBM 2365 Model 2 in 1964 and on the same capacity for an IBM Personal Computer AT today.

To maintain revenues, IBM has had to sell its oldest customers on using 600 times the processing power, 200 times the main memory and 50 times the disk backup of 20 years ago, he said.

Lamond, who conducted a three-day seminar on alternative growth strategies for IBM users, addressed the issue of how the increased power is being used and whether users are really locked into the directions that IBM has mapped out for them.

Lamond

As IBM main memory has increased, operating systems have occupied greater capacities of main memory, Lamond noted. For example, the IBM OS/360 MFT operating system running on the IBM 360/75 occupied 80K bytes in main memory. The MVS/XA operating system running on the 3081 Model KX mainframe requires 4M to 8M bytes of main memory — an increase of 50 to 100 times, he said.

"That growth has not been done by simply adding lots of loops that don't do any work. IBM has added more functions," Lamond said. The functions added have allowed users to begin programming on-line instead of off-line and to execute instructions on-line instead of in batch mode.

Competition in the 1970s from minicomputer vendors such as Digital Equipment Corp. helped motivate IBM to aid program development, Lamond said. A 1975 survey that IBM commissioned showed that appli-

See IBM page 108

ACRS cuts, changes seen key to tax simplification

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

Generally believed to be supportive of President Ronald Reagan in the recent election, computer users and vendors may find the November ballot shockingly counterproductive to their own interests if recent reports out of Washington, D.C., are accurate.

In the traditional Washingtonian style of anonymous spokesmen and sources floating trial balloons to see how well they fly, recent press reports indicated that a key measure to any tax simplification proposal from the U.S. Department of the Treasury will be the modification or elimination of the Accelerated Cost Recovery System (ACRS).

ACRS is the bonanza tax write-down program instituted just a few years ago to substitute for the actual life depreciation method of writing off expenditures on tangible equipment and property.

Aside from election campaign rhetoric, just about anybody with a head on his shoulders must by now realize that the U.S. government needs some mechanism to relieve the astounding federal budget deficits being run up by the administration that came to town with the stated goal of shrinking the federal government.

With Reagan committed to defense spending, senators and representatives unwilling to touch popular entitlement programs and the growing federal debt taking an increasing bite just for interest payments, the moderate viewpoint is that some type of enhancements to the federal government's revenue collection are mandatory.

Because cutting ACRS is the first substantive trial balloon to be floated, it seems reasonable to conclude that flat-tax simplification is going to involve an attempt to remove what is probably the most admired, and arguably the most effective, business stimulation program in recent history.

It will affect computer industry vendors who need large amounts of capital in order to make rapid and expensive development plans to stay abreast of America's fastest moving industry. It will impact users who are now encouraged to replace older generation equipment because they can effectively recover the costs of purchase in five years. And it will impact the leasing indus-

See ACRS page 107

Lack of changes in 1984 tax act leaves credit status

OUTSIDE LINES
Alonzo D. Saunders

Perhaps the biggest nonevent of the Tax Reform Act of 1984 was that no changes were made to the rules regarding software development credits. The Internal Revenue Service code says that the costs of developing computer software do not automatically qualify as a research and experimentation credit. What qualifies is "new or significantly improved" software.

Consider the quandry of Lotus Development Corp. Its Symphony product, as currently envisioned under the law, is eligible for the credit. But what about a product like [Lotus] 1-2-3? Does "significantly improved" hinder taking the credit if 1-2-3 were to become [Lotus] 1-2-3-4? A software product line extension or a product that is compatible with another is likewise on uncertain ground.

Taking the credit has a direct impact on the balance sheet, because a credit is a deduction from taxes. As Robert Langer, treasurer of Lotus, put the problem, if the credit reduces the company's tax rate from 50% to 48%, then the company's earnings are correspondingly increased. So are earnings per share and the interests of financiers and capital markets in the company.

The downside is that if an IRS audit disallows the credit, the company may find itself restating earnings. Shareholders tend not to be pleased by a downward restatement. The Securities and Exchange Commission (SEC) position on this is well taken. Investors do not know at any given moment how hard a software development company's financials are unless the company voluntarily discloses whether its accounting treatment of the credit is aggressive or conservative. Ironically, there is not a specific accounting rule applicable under these circumstances to outline management discretion or circumscribe management greed.

The Department of the Treasury has offered some guidelines. Treasury distinguishes between software developed for in-house or "management" use and in-house, "innovative" software. The former would not qualify for the credit; the latter would. Treasury also disallows credit for "customized" software but not for software sold to the public without customization. These distinctions do not seem to have been made with marketing realities in mind, so they do not clarify matters. George Yost of Coopers & Lybrand has characterized

Saunders is a Boston-based attorney with a practice that includes international marketing, antitrust issues and corporate finance.

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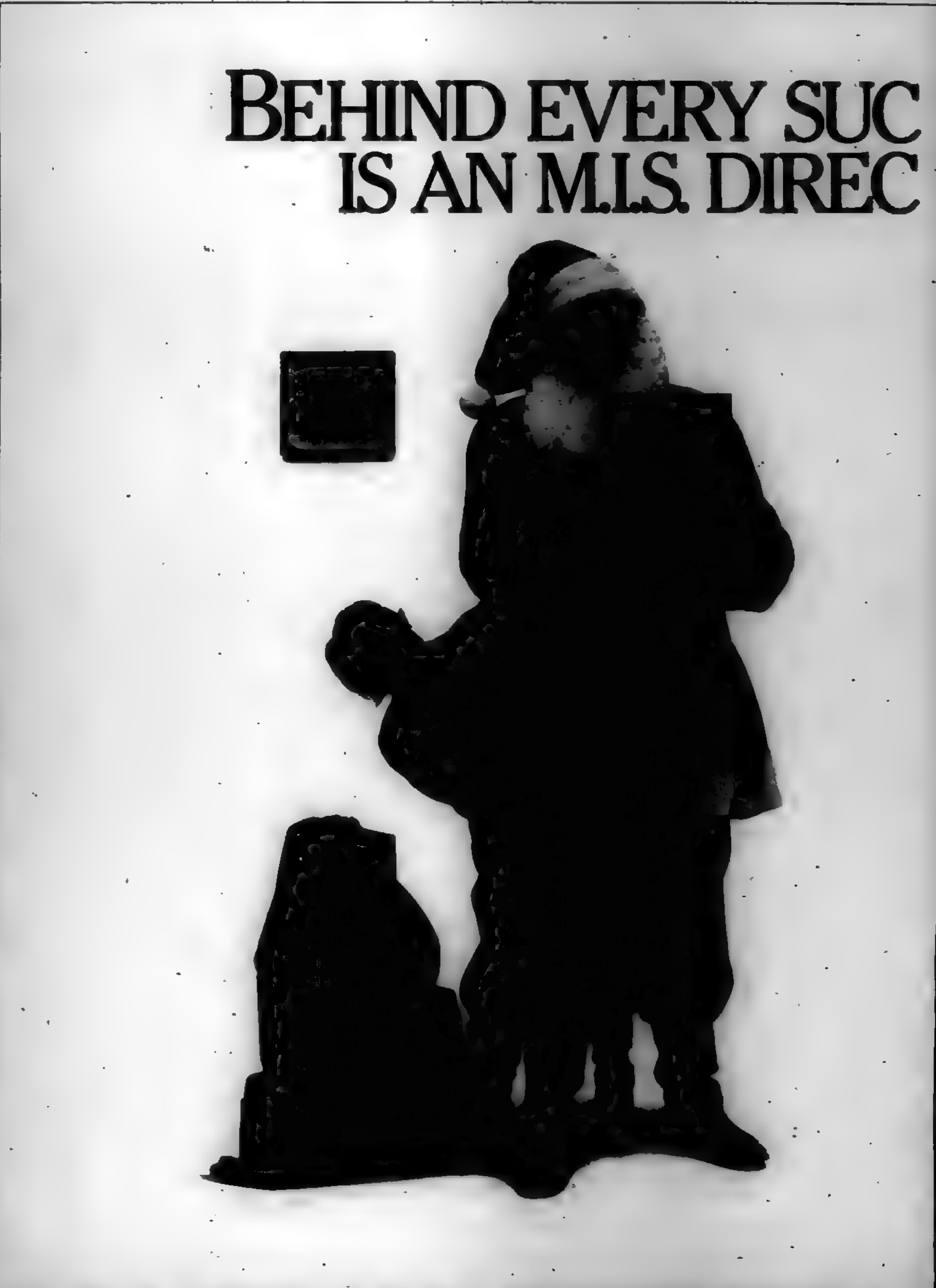

# of software development in state of confusion

Treasury's policy in January 1984's *The Tax Executive* as a "disincentive" to software development.

The Financial Accounting Standards Board (FASB) — the major rule-making body for accountants — has recently proposed a rule that would allow certain software development costs to be treated as assets. The SEC opposes this approach on the grounds that it creates instant profits and, as discussed above, does not address uniformity in software accounting. Nevertheless, the SEC will defer to FASB, and if the FASB rule is adopted, it would become effective in December.

Congress deliberated this law for over a year, coming up with an act in two parts: the Spending Reduction Act, designed to decrease federal spending by some $13 billion; and the Tax Reform Act, designed to raise some $50 billion.

Unlike previous revenue-raising acts, this tax act was not intended to change income tax rates either for companies or for individuals. Its objective was to increase revenue by closing loopholes. The act, therefore, made significant technical changes, changes that are more subtle and less likely to have their impact felt immediately. The act also promised additional regulations in many areas, so there are auditors, lawyers, treasurers and others who are waiting for additional shoes to drop.

As we have seen, however, Congress may have been myopic by not putting these loopholes in perspective and balancing them against other, nontax policies. The result — a continuing lack of a coherent federal tax policy for the high-tech industry.

If it is said that Congress is the culprit, then it must also be said in all fairness that Congress may have done its duty as it saw fit, if not very well. Yet in the final analysis, not Congress but the industry itself must take responsibility for laws that nurtured its fragile beginnings, compensated its people, protected it (and its customers) from theft, kept its finances honest and provided incentives to be competitive worldwide.

If change or prevention of laws, which some call penalties and others call disincentives, are to be made, then the high-tech industry should read the Tax Reform Act of 1984 as a call to arms: The industry must dramatically step up its relations with the public and its liaisons with Congress. It should devise a strategy to lobby at the federal level as never before.

First, the industry should attack the serious problem posed by the lack of clarity of the software development accounting rules. Second, the industry should develop a position that will counteract the inevitable and possibly onerous coming of future IRS regulations. Allies such as FASB, the Big Eight, legal counsel and public relations counsel should be involved.

In short, the Tax Act's errors and omissions demonstrated Congress' ignorance of the realities of the high-tech industry and, sadly, also demonstrated the industry's lack of clout in the corridors of Congress. Now that the industry has seen what can occur without political diligence, perhaps it will be motivated to get organized and step up the fight for its objectives.

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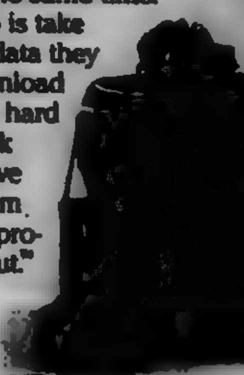

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COMPUTER INDUSTRY

IBM users question future

Integration, ambiguous solutions raise concern

CW AT ENTERPRISE INFO SYSTEMS

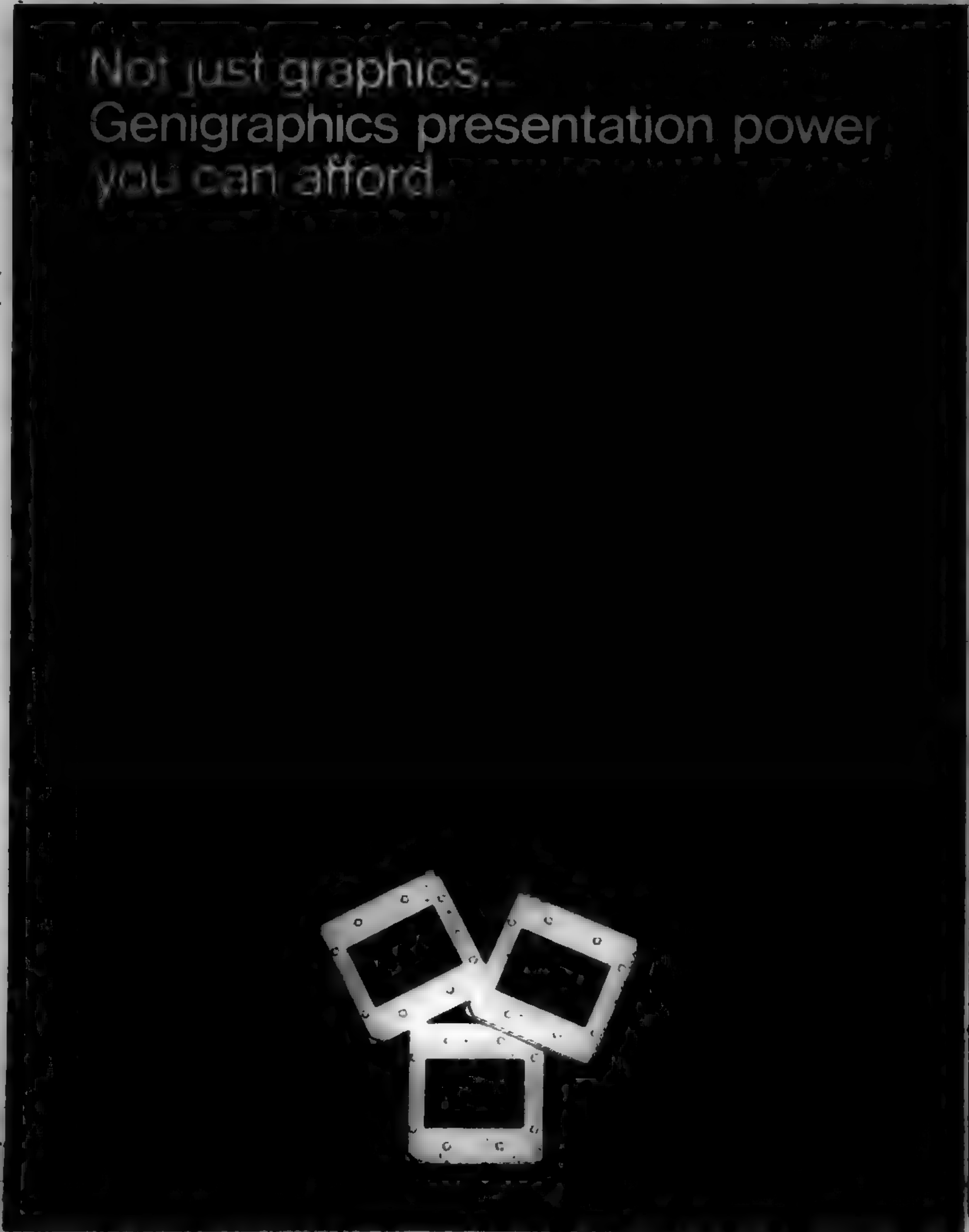
By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — Concerned IBM users, trying to plot their future strategies, are questioning the company about a number of wide-ranging issues, encompassing everything from ambiguous IBM solutions to a perceived lack of integration among IBM product families.

So claimed Robert T. Fertig, president of Enterprise Information Systems, Inc. at a seminar held at the sixth annual Enterprise Information Systems forum in San Diego recently. Using results from his annual survey of more than 200 IBM users, Fertig said other user concerns centered on IBM's nebulous operating system strategy, plans for the VM/CMS environment, questions about the direction of distributed data processing and dismay over IBM's rapidly skyrocketing support costs.

Based on the survey, Fertig predicted several IBM product and strategy scenarios through 1987.

- Unlike Digital Equipment Corp., IBM will avoid providing a total integrated office automation solution. DEC's OA solution lets users move from a Microvax I and II to clustered DEC 8600s using a single operating system. This strategy makes DEC's products an obvious target for plug-compatibles, and any price/performance improvements to low-end products must also be implemented at the high end.
- IBM's popular Professional Office Systems Software (Profs) will merge with the poorly performing Distributed Office System Support (Disoss) host-based business system by the second quarter.
- IBM will develop multiple solutions and overlapping products to answer mainframe server needs. The 8100 will be enhanced to act as a file and print server in a local-area network. The 8100, 4300, System/36 and System/38 will all serve distributed processing needs. This strategy will prove expensive and confusing for users but will let IBM offer a moving target to competitors.
- IBM will announce initial models of its next mainframe family, the Sierra series, with capacities of 7.5 to 30 millions of instructions per second perhaps as early as third-quarter 1985. Offering bulk main storage, the Sierra will adversely impact IBM's existing 3080Q and KX series, offering twice as much performance for the price. The Summit series, a sucessor to the Sierra, may be announced by the second quarter of 1987.
- IBM's mid-range System/38 will merge with the 4300 line by 1986 and serve as a key departmental and host system in IBM's OA strategy.
- An 80386-based update to the Personal Computer AT will be released in 1986. The AT will continue to run both MS-DOS and Xenix, underscoring IBM's strategy of offering several solutions and letting the market decide.
- Aimed squarely at the business/professional market, IBM will announce the Crackerjack portable computer, Fertig said, by this Christmas. The 80186-based, stripped-down model will run MS-DOS, retail for $1,500, weigh less than 15 lb, have a built-in 3½-in. disk drive and an attached plasma display.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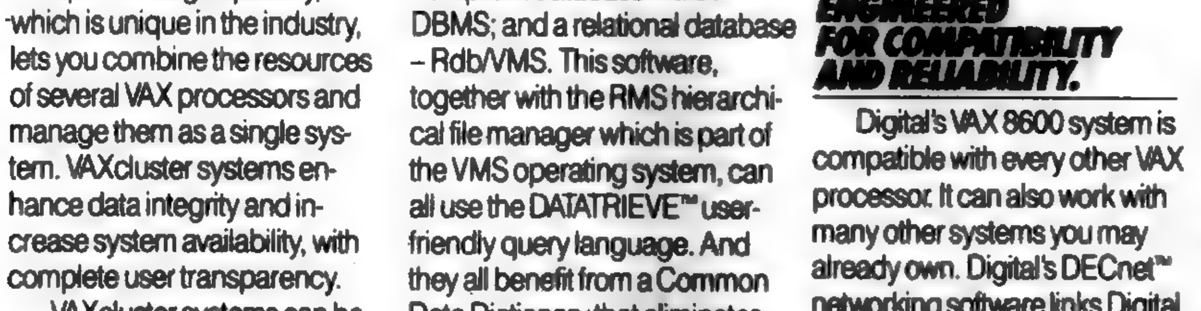

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Rolm acquisition girds IBM for telecom, PBX mart push

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — IBM's acquisition of Rolm Corp. will yield several new private branch exchange (PBX) voice and data products and represents the importance the company places on providing telecommunications products and services, an IBM marketing executive said recently.

At the Enterprise Information Systems Forum here, Kenneth B. Simon, IBM manager of product marketing, stressed the importance of IBM's recent acquisition of Rolm — the Santa Clara, Calif.-based telecommunications firm — and its 60% ownership of Satellite Business Systems, a satellite communications firm.

IBM plans to emphasize its thrust into the telecommunications arena in several ways, said Simon, by sponsoring business shows to announce and display new telecommunications products (IBM sponsored six such shows in 1984), by emphasizing issues and product-oriented advertising and by developing specialized telecommunications product marketing groups.

Expand telecom experts

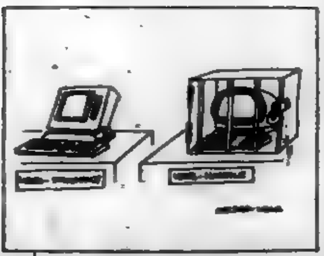
IBM will also expand its cadre of telecommunications specialists from current bases in nine U.S. cities, and they will work closely with IBM account teams, he said. To support its customers directly, IBM also will develop executive briefings, hold seminars and offer network modeling to measure and predict a customer's future networking needs with a 99% accuracy rate, Simon said.

IBM's Fortune 1,000 accounts, according to Simon, are now demanding telecommunications products in several areas where IBM is not yet strong. Customer requests include voice terminals, digital workstations, remote high-speed digital links, digital multiplexers and networking capability to non-IBM hosts, he said.

Future products will focus on extending network connectivity, providing network management capability, expanding services and optimizing existing network configurations with enhancements to IBM's 3710 network controller and 7426 terminal interface, both introduced last year.

"Within the next year and a half, IBM will develop products that will connect a customer's manufacturing plant directly to his office," Simon said. The products will be extensions of IBM's token-bus protocols and broadband local-area network products, Simon said.

Customers will be able to customize the design by specifying whether they want independent local-area nets, networked IBM Personal Computers or structured intraoffice wiring. "IBM will also make an increasing thrust into the message marketplace," Simon said. IBM recently introduced its first messaging products: an audio distribution system, a telephone message management system and a voice/text messaging system, Simon said.



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Paladin out to restore credibility to Visicorp name

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — Paladin Software Corp. was a fledgling start-up in search of a second round of venture capital financing when it decided to merge with troubled, but cash rich, Visicorp.

The proposed merger of the two firms will solve Paladin's need for funds to continue working on its own product line, said Roy Folk, founder and president of Santa Clara, Calif.- based Paladin.

On the other hand, he acknowledged, the firm now shoulders a formidable task: restoring credibility to the Visicorp name and reclaiming confidence in its product line.

In an interview at the recent Comdex/Fall '84 held here, Folk, who worked at Visicorp for 2½ years before starting at Paladin, said he was confident the new firm "will be able to resurrect the good memories" that Visicorp was once able to evoke.

The new company, which will be known as Paladin Software Corp., will be headquartered in San Jose, Calif.

Visicorp, which gained early prominence in the personal computer industry as the distributor of Visicalc, has been beset with problems during the past year and a half.

When it was unable to provide enhancements to Visicalc, the firm lost market share and revenues to new competitors such as Lotus Development Corp. After an extended legal battle with Visicalc's creators, Software Arts, Inc., Visicorp lost the right to market its flagship product.

Problems with Visi On

In addition, Visicorp faced product delays and technical problems when it tried to design its next generation of software, an operating environment known as Visi On, Folk said.

But Folk said Paladin is prepared to restore the health and viability of Visicorp's product line, which includes Visi Series programs such as Visi Word and Visi Schedule, Flash Calc, PC Paint and Visi On.

As evidence of Paladin's commitment, Folk pointed to several product introductions made recently at Comdex. Included among them was a new version of Visi On, designed for the IBM Personal Computer AT. The new version, which takes advantage of the AT's 286 microprocessor, runs 3½ times faster than the original Visi On, Folk said.

More applications

When the original Visi On was unveiled, only one applications program was available, Folk noted. But now, all the applications programs for Visi On are ready, including spreadsheet, word processing, business graphics and presentation graphics programs, Folk said.

Paladin has also answered critics that said Visi On was overpriced. At $495, Visi On is aggressively priced to go up against industry leaders such as Lotus' 1-2-3 and Symphony and Ashton-Tate's Framework, Folk claimed.

"If we have the quality product that I believe we have, we now face the grueling task of turning dealers around," he said.

Folk declined to describe the products that Paladin has been working on. "We want to maintain a low profile until we are prepared to announce and ship the product," he said.

He said the products, which are being developed for the business market, will be introduced next year.

Long talks led to Visual Technology buy-out

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — The proposed acquisition by Lee Data Corp., the Flying Cloud, Minn.-based vendor of IBM-compatible terminals and workstations, of Visual Technology, Inc., a Tewksbury, Mass., firm [CW, Nov. 19], had been under discussion for about two years, according to the presidents of both companies.

In a deal worth about $17 million, Visual Technology would become a wholly owned subsidiary of Lee Data, according to a preliminary merger agreement. Visual Technology would retain its current management, and its president, Tom Foley, would join Lee Data's board of directors.

Visual Technology, which sells Digital Equipment Corp.-compatible terminals, a Televideo Systems, Inc. emulator terminal and a 16-lb IBM-compatible portable, last week introduced the Visual 2000, a Microsoft Corp. Xenix-based multiuser system.

In an interview at the recent Comdex/Fall '84 here, John M. Lee, president of Lee Data, and Visual Technology's Foley said the proposed merger would serve to round out each other's product lines and strengthen each company's competitive position.

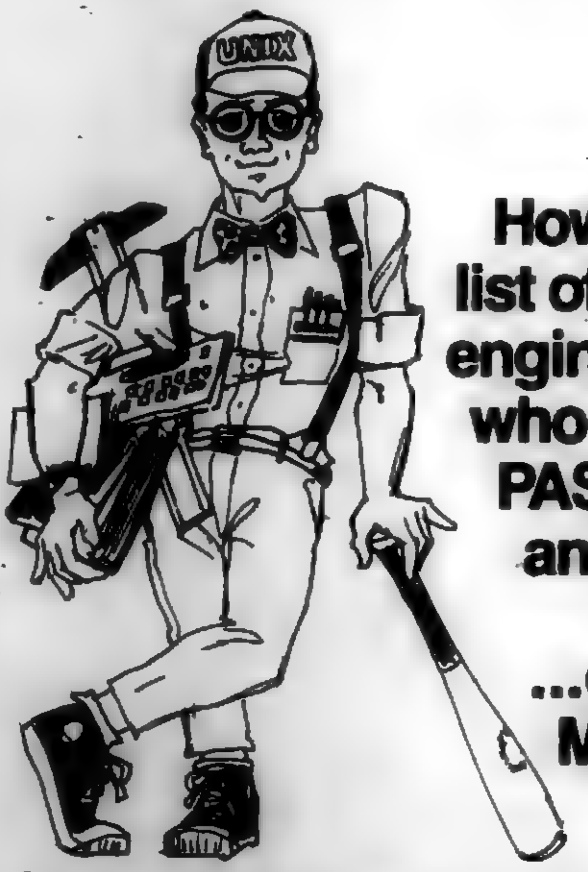
"Every one of our customers has IBM and non-IBM systems," Lee said. "With the merger, we will be able to sell IBM as well as non-IBM systems."

Foley said he expected "substantial incremental sales" when Lee Data's national sales force begins selling his firm's products. He said the two firms are currently discussing the sale of Lee Data's products through Visual Technology's third-party distribution network.

Foley said the proposed merger will fortify Visual Technology's financial base. The planned merger will also serve to strengthen each firm's market position, he said.

Lee said Visual Technology's portable, known as the Commuter, would serve as a "nice entry-level product," in the Lee Data product line. He added that the company planned to integrate Visual's new 2000 system into Lee Data's next generation of 3270 products.

The planned merger calls for the exchange of a half share of Lee Data stock for each share of Visual Technology's 4.9 million shares of outstanding common stock. At Lee Data's closing price on Nov. 9 of $6.85 a share, the transaction is reportedly valued at approximately $16.8 million. The merger is subject to the approval of each company's board of directors as well as each firm's shareholders.



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Profits up at Cullinet

WESTWOOD, Mass. — Cullinet Software, Inc. last week reported second-quarter profits of $5.9 million, or 39 cents per share, up 57% from year-earlier profits of $3.8 million, or 25 cents per share.

For the quarter ended Oct. 31, the company reported revenues of $43.5 million, a 58% increase over the second quarter a year ago when revenues were $27.7 million.

Robert N. Goldman, president and chief operating officer of the company, noted the report represented the 27th consecutive period of increases in both revenues and profits.

Cullinet continues to experience rapid growth in sales of mainframe data base management and applications products and also began shipping its Goldengate microcomputer integrated software package during the quarter, Goldman said.

MAI set to sell Basic Four unit

NEW YORK — Management Assistance, Inc. (MAI) said recently that it has signed an agreement for the sale of its Basic Four Information Systems unit to a company formed by Bennett S. LeBow, a private investor.

The company said the final sale is still contingent upon approval of the purchaser's financing arrangements. "The financing arrangements have progressed sufficiently for us to sign the definitive agreement," the company said in a statement.

LeBow reportedly will pay $30 million in cash and $75 million of debt and preferred stock for the Basic Four unit.

MAI is also in the process of selling its other major segment, the Sorbus Service division, to Bell Atlantic Corp. for $175 million. That sale must be approved by a federal court.

MAI said it has filed a preliminary proxy statement with the Securities and Exchange Commission for the complete liquidation of assets and dissolution of the company following the sale of its two divisions.

HP reports $665 million tax-benefited profit

PALO ALTO, Calif. — Aided by a $118 million tax-change windfall, Hewlett-Packard Co. last week reported fiscal year 1984 profits of $665 million or $2.59 per share, compared with year-earlier profits of $432 million or $1.69 per share.

HP reported an extraordinary tax benefit of $118 million resulting from federal tax law changes earlier this year, which forgave accrued tax liabilities owed by domestic international sales corporations. Discounting the tax benefit, HP said its profits for the year would have increased by 27% to about $654 million or $2.55 per share.

Revenues for the year were $6 billion, a 28% increase over year-earlier revenues of $4.7 billion. For the fourth quarter, the company reported profits of $167 million, or 65 cents per share, up 14% compared with year-earlier profits of $147 million, or 57 cents per share. Revenues for the quarter were $1.6 billion, up 27% from the fourth quarter of 1983 when revenues were $1.3 billion.

The fourth-quarter profits were not particularly strong and HP President and Chief Executive Officer John A. Young said that reflected a competitive environment and discounts and aggressive foreign pricing to help offset the effects of the strong U.S. dollar overseas.

Young also said that while orders in the quarter remained strong, there was a softening of orders in the U.S., which climbed only 13% over year-earlier figures, while international orders rose 39% in the same period.

Datapoint profits plunge

SAN ANTONIO — Datapoint Corp. reported a more than threefold decline in profits for the first quarter, with revenues just barely ahead of year-earlier results.

Profits for the period ended Oct. 27 were $1.5 million, or 7 cents a share, compared with $5.4 million, or 27 cents a share, in the same period a year earlier.

First-quarter revenues were $140.1 million, compared with $139.7 million a year ago.

"Although revenue in the quarter was virtually the same as a year ago, sales revenue in our domestic markets was down substantially. from the first quarter last year, reflecting the depressed order rate and lower backlog experienced in the fourth quarter," said Harold E. O'Kelley, board chairman and chief executive officer, in remarks at the company's Nov. 15 annual meeting here.

O'Kelley attributed the lower profits to "slightly lower" gross profit margins, increased engineering and product development costs related to new product introductions and increased marketing costs for international subsidiaries.

O'Kelley said that the continued strengthening of the U.S. dollar overseas had an adverse effect on the company's international business. He said the company plans to expand its product line and to extend its position in local-area network products.

ACRS from page 97

try, which has honed the entrepreneurial spirit to a fine edge by using ACRS and other tax loopholes to finance leases through outside investors who reap the benefits of ACRS and investment tax credits.

While ACRS is sometimes criticized for favoring older, smokestack industries over high-tech industries, various elements in the computer industry have been arguing that depreciation should be accelerated for computer equipment.

R&D tax credits unlikely

In the current climate, that seems unlikely; what seems even more unlikely is expansion of R&D tax credits.

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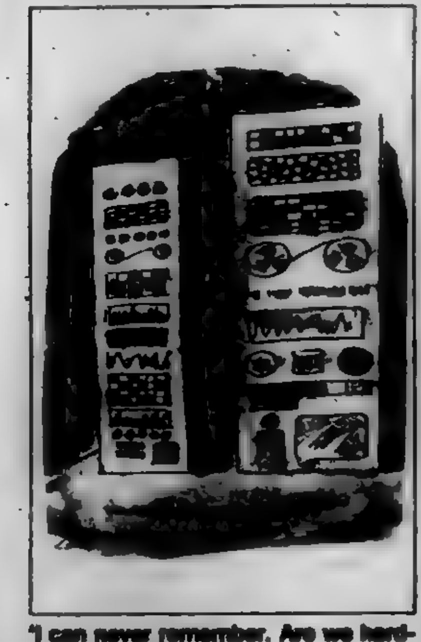

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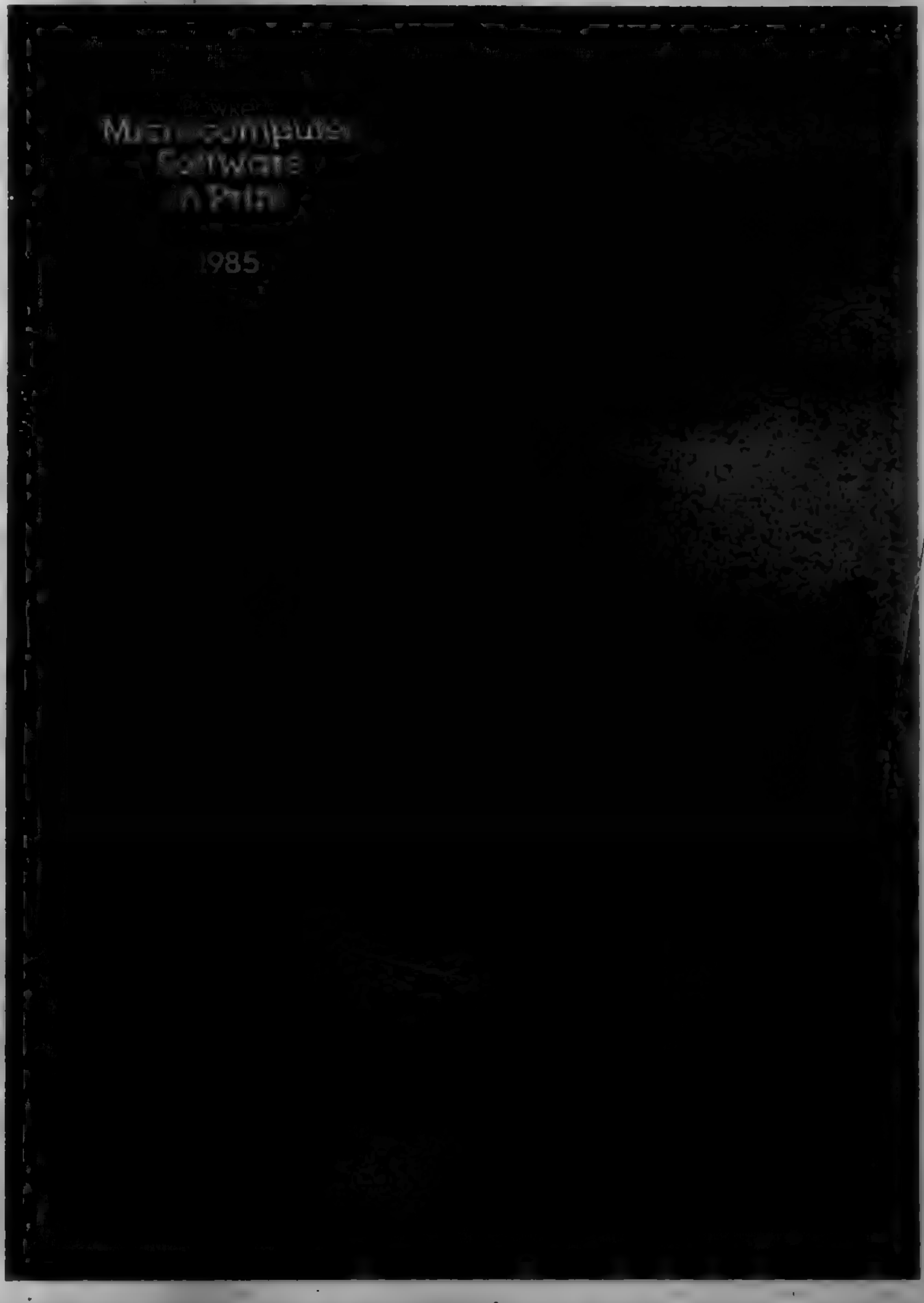

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Eagle revenues fall sharply

GARDEN GROVE, Calif. — Eagle Computer, Inc. reported a $2.3 million loss, or 16 cents per share, on sharply lower revenues for the first quarter ended Sept. 29.

In the year-earlier period, Eagle, a maker of IBM-compatible microcomputers, had a profit of $81,000, or one cent per share. Revenues for the latest quarter were $4 million, compared with revenues of $14.2 million a year ago.

Ronald N. Mickwee, Eagle chairman, said the first-quarter results were "as we predicted." He noted that the results showed improvement over the prior two dismal quarters, attributing that to cost-cutting measures taken during the past several months.

The company recently laid off 55 employees, closed its headquarters in Los Gatos, Calif., and moved its operations to its manufacturing plant here.

In the fourth quarter ended June 30, the company reported a staggering loss of $17 million, nearly four times the $4.9 million in revenues it took in during that period.

Although the company's latest revenue figures were still lower than the earlier quarter, Mickwee, referring to the reduction in losses, said, "Our plan continues to work; we've apparently turned the corner."

On a brighter note, the company announced it had received government approval for more than $4 million in desktop microcomputer orders [redacted]

Eagle said it anticipates approval of additional orders in the near future.

IBM

from page 97

cations backlogs of two years in DP departments were slowing growth. Another survey of Fortune 500 companies in 1978 showed the backlog to be four years. IBM was losing revenue because of the bottlenecks, and minicomputer vendors were providing frustrated users with solutions.

The bottlenecks were partly IBM's fault, he added, because the 1978 survey showed that programmers were spending 80% of their time maintaining applications and only 20% of their time developing new applications. "By too frequent operating system releases, IBM was shooting itself in the foot and creating a maintenance problem on its user sites," Lamond said. With on-line programming replacing off-line batch programming and users having access to a data base to run their own applications, the productivity figures have been reversed, Lamond said.

Minicomputer vendors

While DP departments were struggling with two- to four-year bottlenecks, the minicomputer vendors were able to deliver dedicated minicomputers to end users within six months.

This was due in part to DP departments programming on mainframes in Cobol while minicomputer vendors provided customized standard application packages. To help meet the competition, IBM announced programmable small-business minicomputers such as System/36, in addition to the productivity aids, according to Lamond.

"That is the IBM strategy to help you all be more productive, so that you more quickly need more IBM processing power," Lamond said. The productivity aids are in the best interest of users "if your DP programmers cannot keep up with end-user requests for new applications" and if the application backlog is growing, he said.

Alternatives do exist to implementing the productivity aids on a central mainframe, including desktop personal computers or time-sharing with the mainframe, and to implementing on-line, real-time transaction processing, Lamond advised.

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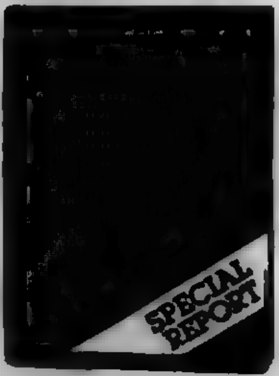

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U.S. chip billings declining

SAN JOSE, Calif. — Semiconductor bookings and billings in the U.S. continued their downward trend in October, according to Semiconductor Industry Association statistics.

The association's yardstick of its member companies' health, the book-to-bill ratio, measuring new orders against completed orders, fell to 0.67:1 in October.

A figure of 1.1:1 or 1.2:1 is generally considered good.

The figure includes bookings and billings for semiconductor manufacturers based in the U.S., Europe and Japan.

In October, the association said, semiconductor users continued to reduce inventories accumulated during late 1983 and early 1984, a period of exceptionally high orders.

"While the short-term situation is of great concern to the industry, we believe that the underlying fundamentals of the economy will support continued long-term growth," said association President Thomas D. Hinkelman.

Hinkelman said that the U.S. Department of Commerce has estimated that the electronics industry — the largest consumer of semiconductors — will experience an 18% growth this year and 15% growth in 1985. He said the association believes that purchasing agents for those manufacturers overbought during the first nine months of 1984.

STC

from page 97

Ross & Co. in New York, the accounting firm that reportedly helped put the agreement together, said the firm had no comment.

Richard Hastings, an analyst with Merrill Lynch & Co. in New York, said he was not surprised that the loan fell through. "When they first announced [the loan], I thought it definitely wasn't a done deal," he said, adding, "The company is operating under Chapter 11, with numerous creditors having a stake in what's going on. It was a tentative thing from the start."

Even if the $150 million loan had gone through, Hastings said, it would only have bought some time for STC. "I think the problems there are very deep," he added. "I don't expect the company to come out [of Chapter 11] as an independent entity in any shape or form."

Under the agreement with Chemical Bank, the bank would have been given "superpriority" over the company's other unsecured creditors, the largest of which is New York-based Citibank, which is owed $38 million. STC would have paid interest on the funds at 1.5% above the prime interest rate.

Analysts have said STC is likely to be liquidated or acquired if it does not receive significant funds to operate soon.

Pressured by its creditors and in default on most of its bank loans, STC filed for Chapter 11 on Oct. 31. As of Sept. 28, the company owed about $450 million in long- and short-term debt, about $15.7 million of which was secured, according to company financial data.

MSA

from page 97

dum," which was sent to 50 interested individuals, Smart said. The memorandum broke the firm down into four separate groups — business software, international sales, educational software and microcomputer distribution — that could be bought separately.

Why did MSA decide to sell Peachtree, which is known for its accounting software designed for the IBM Personal Computer? When MSA purchased Peachtree 3½ years ago, the mainframe software firm hoped to find some "synergism or economies of scale" through the acquisition, Smart said.

But instead, MSA and Peachtree discovered very little overlap between selling mainframe software to executives and selling microcomputer software through retail channels, Smart said.

And Peachtree stopped "acting like a microcomputer software company." The operations of the subsidiary moved into MSA's building in Atlanta and, in the process, were transformed from a low- to a high-overhead firm, Smart said. "Our overhead must have quadrupled since we became an MSA company," he said.

The metamorphosis of Peachtree will include a new emphasis on retail sales. In the past, Smart said, more than 50% of Peachtree's revenues came from sales to hardware companies. While selling software to manufacturers maximized revenues in the short term, it proved to be a poor strategy in the long term: When the personal computer industry stumbled, Peachtree suffered.

But Smart was optimistic about the firm's future. Peachtree has already started to act on plans to revamp the company's strategies, he said. He predicted the company's revenues would reach between $15 and $20 million in 1985 and said the firm, which was not profitable this year, will be profitable next year.

It will not be an easy task though, because in addition to its traditional competitors, Peachtree has a new foe. In September IBM joined the field, announcing its Business Management series of accounting software.

Once a buyer is found, the actual sale could take up to nine months to finalize, Smart said. In the meantime, MSA has not curbed Peachtree's spending or development work, he said.

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We are an international CPA firm. Our client, a successful wholesaler and retailer located in Southern California is seeking a Manager of Information Systems.

The successful candidate will have a B.S. or B.A. Degree, PICK operating system experience and six to eight years D.P. experience including two years in management. The candidate must have good project management, administrative, communication and personnel skills and be capable of working with creative rather than pre-programmed approaches. The candidate will also have a business orientation as well as strong technical skills.

The organization offers excellent benefits and the salary ranges from $35,000 to $40,000 per year commensurate with experience.

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Requires a BS in Computer Science or Engineering, and 6+ years systems analysis experience in the field of office automation, using minicomputers and microprocessors. Also required is the ability to perform system engineering, problem analysis, office automation evaluation; make recommendations; and handle project management. Wang and IBM OA experience preferred.

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Requires Bachelor's degree, preferably in Computer Science or Math, a minimum of 7 years experience with IBM 3081, MVS/XA; and at least 1 year in capacity planning activities including workload forecasting, impact analysis, hardware planning/usage and service reporting. Experience with MICS, BEST 1, and SAS is desirable.

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Requires a BS in Computer Science and 3-7 years in an IBM-MVS environment with knowledge of IBM 370 Assembler. Problem determination and resolution skills are required in any of the following areas: IMS DB/DC, CICS, IBM Program Products, TMS, SAS and PGF-CDDM. Past experience supporting MICS is a definite advantage for qualified candidates.

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The position will involve a 40-hour work week programming on-line applications using TIP or DPS-1100, UNIVAC, EXEL 8, ECL, CTS or Test Editor. Also requires the knowledge of DML-1100 Data Base programming, COBOL programming and extensive use of data processing concepts. A minimum of a high school education with 2 years college (Associate degree or equivalent in computer science, mathematics, or related field) and 4 years of related working experience using the above programming applications in an industry manufacturing large capital goods, with knowledge of inventory methods and cost accounting. Salary will range from $25,000 to $40,000 based on related work experience and related education.

Interested candidates should immediately direct their resumes to: **Larry M. Holbrook, Sr. Specialist, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189.** We are an equal opportunity employer, *m/f/h.*

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SYSTEMS TECHNICIAN

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DIRECTOR, INFORMATION SYSTEMS AND ADMINISTRATIVE COMPUTING
The University of Maryland University College
European Division   Heidelberg, F.R. Germany

University College, the worldwide continuing education campus of The University of Maryland, conducts undergraduate and graduate programs in Europe, Asia, and Maryland/Washington, DC. The European Division, established in 1949, serves approximately 40,000 students a year in U.S. military communities in thirteen countries. The administrative headquarters of the European Division are at Heidelberg, F.R. Germany with a staff of 135. Administrative computing at the Heidelberg office is provided by a HP 3000 series 68 mini and HP 150 micros.

Responsibilities: The Director oversees all administrative computing operations of the European Division and is responsible for strategic planning to ensure that the European Division continues to provide advanced, high quality administrative computing and office automation; leads the development and implementation of a data network involving distributed computing, micro and minicomputer workstations; develops applications and coordinates with users of administrative applications including financial, payroll, student records, management information systems; coordinates the overall operation of the administrative computing services, and other duties as assigned by the Director, European Division. Supervises a staff of ten.

Qualifications: Master's degree; extensive background in computer operating systems and hardware including microcomputing; a thorough understanding of data communications networking; excellent interpersonal communication skills; a record of managerial accomplishment in a full-service computing environment; familiarity with HP hardware. Specific knowledge of 3000 series 68 mini and HP micros is preferred.

Salary: Commensurate with qualifications

Expected Starting Date: February 1, 1985

Application Deadline and Procedure: The deadline is December 17, 1984. Submit a letter of application, professional resume, and the names of three references. Applications received after the deadline will be considered at the discretion of the Search Committee.

Search Committee, DISAC, c/o Chancellor's Office, The University of Maryland University College, University Boulevard at Adelphi Road, College Park, MD 20742
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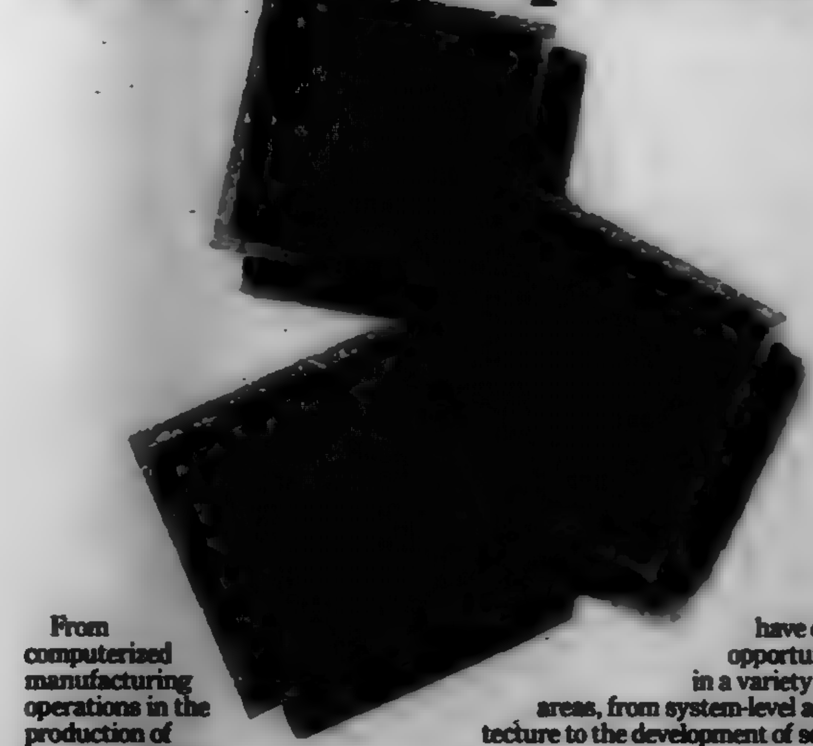

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HARDWARE - IBM 3081, NAS 9070, 3725, 3274, 3705
SOFTWARE - MVS/SP1, ACF/NCP, ACF/VTAM, MSNF

IBM IMS/VS SYSTEMS AND DATA BASE SPECIALIST - Positions require minimum of three (3) years experience in installation and maintenance of IMS DB/DC products and technical support. Data Base design, control, and problem resolution are desired capabilities.

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Write hardware/software manuals describing operating characteristics and theory of FPS products for use by customers and company personnel. Requires experience in relevant technical writing and a degree or equivalent experience in electrical engineering or computer science.

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- Two or more years experience in a systems programming role on Sperry 1100 equipment.
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IMS-IDMS-ADABASE-[illegible]

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[illegible]

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Software Eng [illegible], ADA, Assem	to [illegible]	TP Network Mgr	to [illegible]
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Sr P/A IMS-PL1	to [illegible]	P/A 3000/4700, EFT	to [illegible]
OPS Anal UCC-1, ACF2	to [illegible]	Sr P/A Tandem, TAL	to [illegible]
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(Hewlett Packard)

You'll be responsible for the supervision and control of the teams involved in the development, implementation and maintenance of the HP 3000 equipment. You will need in-depth knowledge of IMAGE, VPLUS, COBOL and preferably SPL, and experience with fourth generation tools such as QUICK, QTP and QUIZ would be a great advantage, as would experience of on-line hospital patient care systems.

For this post we seek someone with at least eight years experience including three in systems analysis/design, and two in project management and you'll need to show that you have developed and successfully implemented at least two major systems in the past.

This is a married status post.
Ref: P/RKH/3033/CW.

Programmer/Analyst

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AMG

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Several opportunities exist within our Technology Group for individuals to provide system software support, assist in planning, coordinating and implementing software.

The persons we seek should possess 2+ years experience in large scale IBM systems software in the following disciplines:

- MVS/SP (XA preferred), JES 2, SMP-E, VM/CMS, RSCS, RACF/ACF 2, etc.
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The MIS Department of GOULD INC., Computer Systems Division is expanding its Data Center at Divisional Headquarters in Florida. We operate dual IBM 4341's in a VM/DOS/VSE environment, with a large VTAM/CICS network. The following key positions are immediately available.

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Project Leaders

MANUFACTURING SYSTEMS FINANCIAL SYSTEMS

We are also staffing two key supervisory positions in the above areas. Candidates for both positions should have proven supervisory experience, excellent user interface skills and a strong background in an IBM, DOS, COBOL and CICS environment.

Candidates for Manufacturing Systems should have significant manufacturing systems experience. APICS certification and/or knowledge of MRP II/closed loop philosophy is a plus.

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We're Hiring Data Processing Professionals

Central and South West is a two plus billion dollar electric utility holding company offering competitive salaries, excellent benefits and stable working conditions. Our Information Services Department, as host center, provides services in a multi-company environment.

Our primary system software is MVS/SPI with JES2. Additionally we use TSO/SPF, COBOL, ROSCOE, and Command Level CICS. Our data base is IDMS. We were recently chosen to be one of Cullinet's beta sites for their new development software! We use Cullinet's 4th generation languages—ADS/O, OLQ, CULPRIT, etc.

Each of our current openings needs people with proven analytical skills and user interface experience in addition to technical knowledge and abilities.

If we're the type of company you are seeking, and your experience is from a similar environment, please send your resume and salary requirements to the Employee Relations Department. Principals only.

Programmer/Analyst
(Business Applications)
Typical project assignments include construction project management, land management system, corporate shareholder system, etc.
Will provide technical expertise in system design, problem determination and system maintenance efforts. Should have JCL skills and online experience (CICS, VSAM) plus exposure to data base concepts.

Sr. Programmer/Analyst
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Multi-project assignments offering multi-company exposure will include CAD/CAM, VM/CMS, transmission design, etc.
Will provide scientific/engineering expertise in system design and implementation efforts. Should have prior scientific/engineering application experience plus IDMS experience.

Programmer/Analyst
(Engineering Applications)
Initial assignment to the mining information management project will result in the development of a total, stand-alone system using state-of-the-art technology.
Will provide online and data base technical expertise in system design and problem determination efforts. Should have related technical skills developed from manufacturing related assignments. IDMS, ADS/O experience important.

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To apply for any of these positions, please refer to the code letters in parenthesis at the end of each position description. Send detailed resume, including salary requirements, to: **EASTERN AIRLINES, Management Recruiting, Department VO, International Airport, Miami, FL 33148.**

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Battelle
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COMPUTER OPPORTUNITIES

Salt Lake City, Utah

Hercules Aerospace Company, a leader in the areas of solid fuel propulsion systems, development and production of graphite fiber and composite structures, presently has career opportunities for experienced computer professionals.

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Business Programmer/Analysts

Candidates should have a BS in a computer related field and a minimum of 2 years experience on large IBM mainframes with emphasis on COBOL, IMS and TSO. Excellent communication skills and the ability to interface with user departments are a must.

Systems Programmers

Requires basic knowledge of assembler language and 2 plus years in one or more of the following: MVS/XA, MVS/370, TSO, JES 2 and/or IMS. Currently operating MVS/XA on a 3084Q with expansion program to include additional IBM computers.

Systems Programming Supervisor

Requires BS in a computer related field and 5 plus years with large IBM systems (MVS/XA, MVS/370 and/or IMS/VS). Ideal candidate will have management/supervisory experience and a technical degree.

SCIENTIFIC

Electronic Engineers

BSEE or EET and 2 to 5 years of experience working with control systems to solve automation problems using 68000 or 8080 technology. Experience with assembler and "C" language for mini/micro computers is desirable.

Math Modeling Specialist

MS or Phd Physics, Math or Computer Science with knowledge in all three areas. Individual will analyze and develop large scale computer simulation systems. Must be skilled in differential equations, 3-D geometry and FORTRAN programming. Mathematical models will be used for filament winding of asymmetric3-D surfaces with multi-axis winding machines.

Programmer / Analysts

BS ME, CE, ChemE with capabilities in numerical methods and computer graphics technology. IBM mainframe and FORTRAN experience with graphic language skills desirable. Interactive techniques are used to support engineering design and analysis systems. Familiarity with Apollo work stations would be a plus.

Software Engineers

BS in a technical field with a minimum of 2 years experience in real time applications, data acquisition, laboratory automation or robotic control systems. Individuals should be experienced with DEC PDP-11 RT/RSX operating systems and 68000 technology or have FORTRAN experience on IBM or Honeywell (CP-6) mainframes.

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Position requires a BS in electrical engineering and a minimum of 2 years programming experience in ALGOL and FORTRAN languages on a mainframe computer. Experience in power system design is preferred. Individual will participate in the conversion of an electrical system from Burroughs to IBM 3081.

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Dartmouth College

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Please mail resume and salary requirements to the Employee Relations Department. Principals only.

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DATA PROCESSING OPPORTUNITIES

Juneau and Anchorage, AK

DATA BASE ADMINISTRATOR
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The State of Alaska has a current vacancy located in Juneau. This is a supervisory position with responsibility for the development, analysis, design control and management of the State of Alaska data base systems.

Minimum qualifications are: three years of data base management systems experience on a system equivalent in size and complexity to IBM, IMS, Total Systems 2000, RAMIS, IDMS, or ADABAS, including one year of experience equivalent in kind and level to Data Base Specialist with the State of Alaska. PLUS three additional years of computer programming and/or systems analysis experience.

Note: The State's DBMS is ADABAS and preference is given to applicants with ADABAS experience.

DATA BASE SPECIALIST
Salary: $43,500 to $47,500/year plus benefits

Open recruitment is underway in order to find additional qualified candidates in the event of future openings. Positions are located in Juneau and Anchorage, and perform the full range of data base requirements in support of user activities. These include DBMS design, definition, organization, security, efficiency, documentation, generation, long term requirements, and operational guidelines.

Minimum qualifications are: two years of data base management system experience at a level equivalent to Systems Analyst II, EDP Programmer IV, or Systems Programmer II with the State of Alaska on a system equivalent in size and complexity to IBM, IMS, Total Systems 2000, RAMIS, IDMS, or ADABAS.

One year of experience listed above must have been in the analysis and design of data base applications and/or data base administration. PLUS at least three additional years of computer programming and/or systems analysis experience.

Send official State application or resumes to: Recruitment Coordinator, Pouch C-0201, Juneau, AK 99811.

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State of Alaska

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ANALYST/PROGRAMMER (SCIENTIFIC) Requires previous experience in scientific applications with a sound knowledge of PL-1 or Fortran, Computer applications development with exposure to a VM operating system would be helpful.

ENGINEERING SYSTEMS ANALYSTS As a member of the power systems planning team you will be directly involved in program development and ongoing support to the Power System Planning Group. Programs used by this group are for planning future transmission and generation. Requires BSEE degree and minimum 2 years experience in application and program development.

ANALYST/PROGRAMMERS Position involves the development of various Business applications using COBOL or PL/1. Knowledge of IMS DB/DC and ADF is considered a plus. Large IBM OS/MVS experience required.

IMS SYSTEMS ANALYST Position involves systems analysis in a large scale multi-user IMS DB/DC environment, logical Data Base Design, utilization of TRANSFORM applications generator, testing and debugging on-line IMS programs, and development of reusable field update logic in data management transactions.

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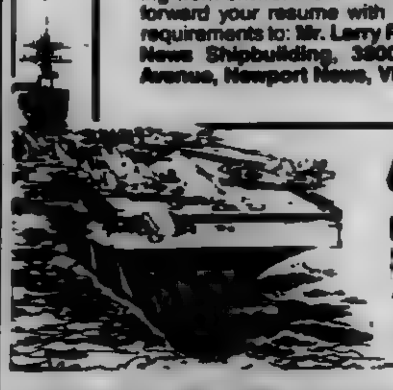

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The Associate Director of University Computing for Administrative Systems, reporting to the Director of University Computing, is broadly responsible for the development and oversight of university-wide administrative and management information system plans, policies, and priorities. Specific responsibilities include: administrative & management information system planning, policy, and priority development; administration and management of major university data bases; oversight and review of administrative and management information system hardware and software acquisitions, and various administrative and management information system consultative services to administrative units at all levels within the University.

Minimum requirements are a Masters degree in management information systems and data base administration and management, and a minimum of six years experience in progressively responsible planning, policy making, and administrative and management information system positions or the equivalent combination of education and experience. Experience in higher education, experience in dealing with the problems and opportunities inherent in the administration and management of a complex University, familiarity with data processing and office automation equipment and commercially available administrative software, and the capability of communicating effectively and providing leadership in a comprehensive, decentralized educational environment preferred. Qualified applicants may be considered for academic tenure.

Deadline for receipt of letter of application, including minimum acceptable salary, and resume is December 14, 1984, but may be extended if additional applicants are necessary. Send to: Lou Proctor, Campus Employment Office, East Maxwell Street, University of Kentucky, Lexington, Kentucky [illegible]-0014.

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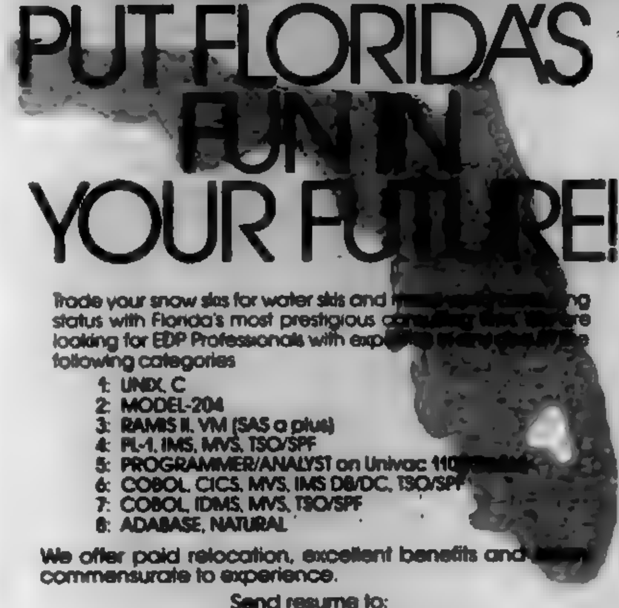

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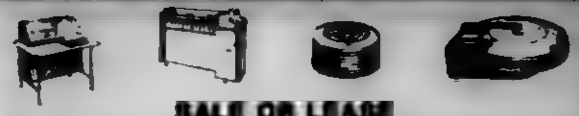

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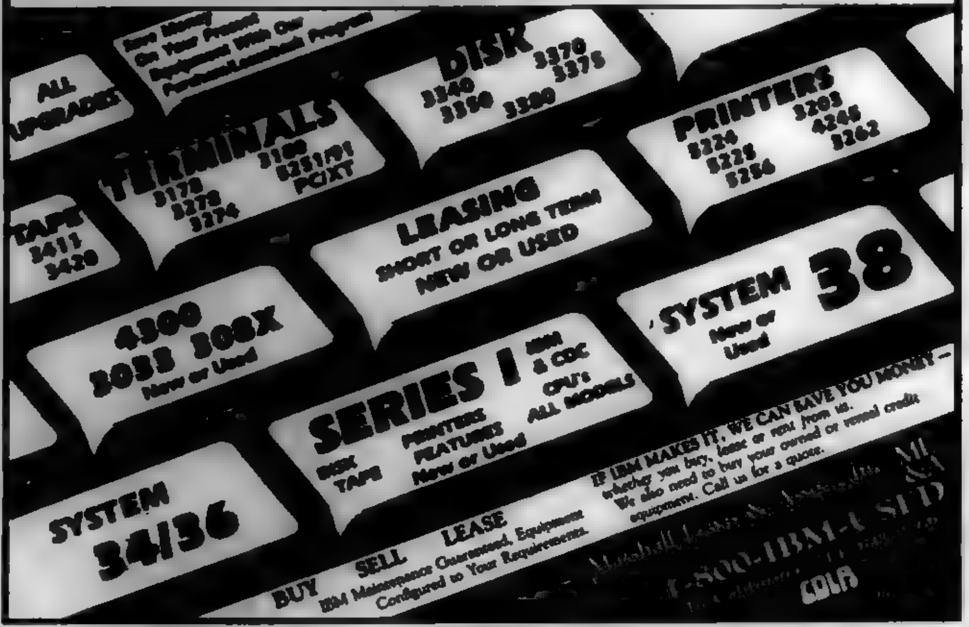
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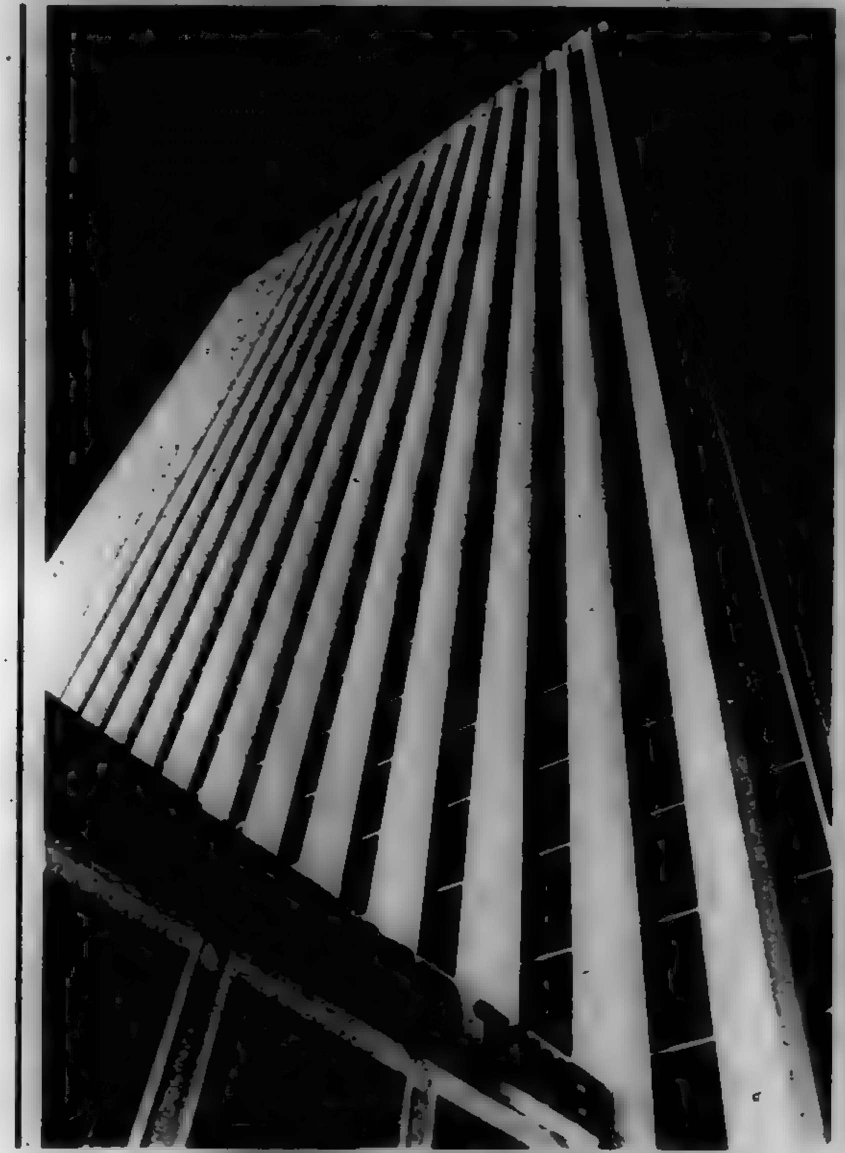

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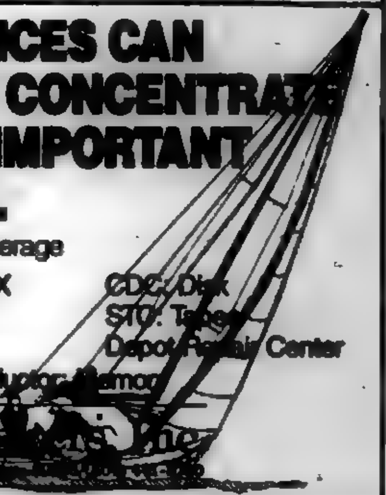

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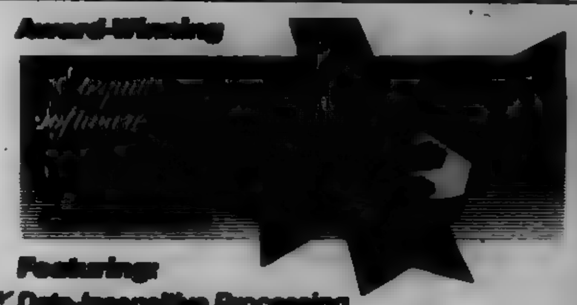

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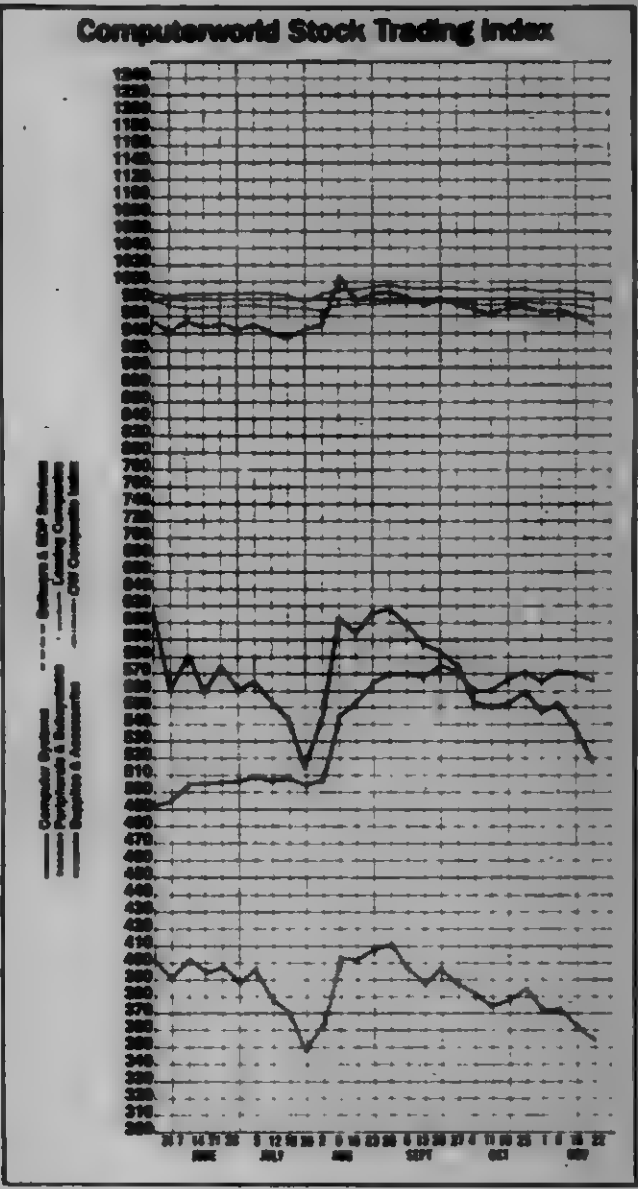
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

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CLOSING PRICES FRIDAY, NOVEMBER 16, 1984

E X C H		PRICE 1983-84 RANGE (1)	CLOSE NOV 16 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	5- 24	7 1/8	0	0.0
P	ALTOS COMPUTER SYST	6- 21	8 1/2	- 5/8	-6.8
A	AMDAHL CORP	16- 30	18 7/8	- 1/2	-4.3
O	APPLE COMPUTER INC	19- 63	21 7/8	-1 7/8	-7.8
N	AT&T	15- 21	18 3/8	- 3/8	-2.0
N	BURROUGHS CORP	44- 59	53 1/2	-1	-1.8
O	COMPAQ COMPUTER CP	4- 15	4 3/4	- 1/4	-5.0
O	COMPUTER AUTOMATION	4- 17	4 1/8	- 3/4	-15.3
A	COMPUTER CONSOLES	8- 28	8 1/8	- 3/4	-8.4
N	CONTROL DATA CORP	25- 62	34 7/8	+2	-5.4
O	CONVERGENT TECHNOL	6- 46	6 1/8	- 7/8	-12.5
N	CRAY RESEARCH INC	38- 58	50 1/2	-1 1/2	-3.0
O	[illegible] SYSTEMS CORP	14- 28	24 1/2	+ 1/2	+2.0
N	DATA GENERAL CORP	27- 59	53 1/4	-1 3/8	-2.5
N	DATAPOINT CORP	14- 33	14 3/8	- 3/8	-2.5
N	DIGITAL EQUIPMENT	84-175	101 1/4	-3 1/2	-3.3
A	ECCO INC	12- 16	13 1/2	+ 1/8	+0.9
N	ELECTRONIC ASSOC.	2- 15	2 1/2	0	0.0
N	FLOATING POINT SYST	13- 44	14 7/8	- 1/8	-0.7
N	FOXBORO	28- 47	30 1/2	- 1/2	-1.6
O	GENERAL AUTOMATION	6- 16	9 1/8	- 5/8	-6.3
N	GOULD INC	21- 44	21 1/2	- 1/8	-2.2
N	HARRIS CORP	23- 40	28 1/2	+1 5/8	+6.0
N	HEWLETT-PACKARD CO	33- 48	33 1/8	-1 7/8	-5.5
N	HONEYWELL INC	46- 69	58 1/2	-1 1/2	-2.5
N	IBM	103-134	120	-3 1/8	-2.5
O	IPL SYSTEMS INC	2- 14	1 3/4	0	0.0
N	ITT CORP	21- 47	26	-1	-3.7
N	M/A-COM INC	13- 38	17 3/8	- 3/8	-2.1
N	MANAGEMENT ASSIST	8- 29	27	- 1/4	-0.9
N	MATSUSHITA ELEC(ADR)	58- 80	57 1/2	+4	+7.4
N	MODULAR COMPUTER SYS	6- 16	6 5/8	- 3/8	-5.3
N	MOHAWK DATA SCI	9- 17	10 1/4	+ 1/4	+2.5
N	MOTOROLA INC	29- 48	34 1/8	- 1/2	-1.4
N	NAT'L SEMICONDUCTOR	11- 28	11 1/4	-1	-8.1
N	NBI INC	14- 35	14 1/8	- 7/8	-5.8
N	NCR	21- 34	25 5/8	- 5/8	-2.3
N	PERKIN-ELMER	18- 37	29 1/4	- 7/8	-2.8
N	PRIME COMPUTER INC	11- 26	16 1/4	- 1/8	-1.5
N	SPERRY CORP	30- 50	37 1/4	- 5/8	-1.6
O	STRATUS COMPUTER INC	8- 17	9 1/4	0	0.0
O	TANDEM COMPUTERS INC	15- 48	17 1/8	+ 3/4	-4.1
N	TANDY CORP	24- 48	24 3/8	0	0.0
O	TELEVIDEO SYSTEMS	2- 41	3	- 1/4	-7.6
O	TELXON CORP	8- 17	16	0	0.0
N	TEXAS INSTRUMENTS	101-160	121 3/8	- 1/2	-0.4
A	ULTIMATE CORP	15- 24	14 3/4	-2 1/8	-12.9
O	VECTOR GRAPHICS INC	0- 9	3/8	-	-44.8
A	WANG LABS "B"	24- 42	26 7/8	- 1/4	-0.9
A	WANG LABS "C"	24- 42	27 1/4	- 1/8	-0.4
N	XEROX CORP	35- 52	36 3/8	-1	-2.6
	LEASING COMPANIES				
O	[illegible] FINANCIAL CP	10- 22	20 3/4	- 1/4	-1.1
A	CMI CORP	4- 10	6	- 3/8	-5.9
N	COMDISCO INC	10- 42	11 1/4	- 3/4	-6.2
O	CONTINENTAL INFO SYS	5- 16	7	- 1/2	-6.6
N	DPF INC	10- 16	15 1/2	- 1/2	-3.1
O	FINALCO GROUP INC	4- 12	4 1/2	-1 1/2	-25.0
O	PHOENIX AMERICAN INC	4- 17	4	-1	-20.0
O	SELECTERM INC	10- 22	9 1/2	-1	-9.5
N	U.S. LEASING	20- 44	26 3/8	- 3/8	-1.6
	COMPONENTS				
N	ADVANCED MICRO DEV	25- 49	28	-1	-3.3
O	ADV'D SEMICONDUCTOR	14- 30	14	- 1/2	-3.4
N	ANALOG DEVICES INC	20- 32	22 7/8	+ 1/4	+1.1
O	ANALOGIC CORP	10- 31	11 3/4	+ 1/2	+4.4
N	APPLIED MAGNETICS CP	9- 37	9 1/8	- 1/2	-5.1
O	[illegible] CORP	6- 12	6 3/4	- 1/8	-1.8
O	MICRO MASK INC	10- 19	10 3/8	0	0.0
N	TERADYNE	23- 39	23 1/8	-1 5/8	-6.5

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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E X C H		PRICE 1983-84 RANGE (1)	CLOSE NOV 16 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 8	3 1/8	+ 1/8	+4.2
O	ADVANCED SYSTEMS INC	10- 22	12	-1 3/4	-9.7
O	AGS COMPUTERS INC	10- 30	10	-1	-9.0
O	AMERICAN SOFTWARE	13- 30	13	- 1/4	-1.8
N	ANACOMP INC	2- 10	3	0	0.0
O	ANALYSTS INTL CORP	9- 17	4 3/8	- 1/2	-9.5
A	APPLIED DATA RES	16- 37	27 1/2	+ 1/2	+1.8
O	ASHTON TATE	6- 15	6 1/2	- 1/2	-7.1
O	ASK COMPUTER SYSTEMS	13- 41	14	0	0.0
O	ASTRADYNE COMP IND	1- 7	1 1/2	0	0.0
N	AUTOMATIC DATA PROC	30- 44	38 5/8	- 3/8	-1.0
O	COMPUTER ASSOC INT'L	15- 28	17	- 3/8	-2.2
O	COMPUTER HORIZONS	8- 20	6 1/4	- 3/8	-5.6
O	COMPUTER NETWORK	5- 11	6 5/8	- 1/8	-1.8
N	COMPUTER SCIENCES	12- 20	13 7/8	0	0.0
O	COMPUTER TASK GROUP	12- 19	13	0	0.0
O	COMPUTER USAGE	5- 10	6 3/4	- 5/8	-7.3
O	COMPUTONE SYSTEMS	4- 20	7 1/4	-1 1/8	-13.4
O	COMSERV CORP	1- 16	3 3/8	+ 1/8	+3.8
O	COMSHARE	7- 14	8 3/4	- 3/8	-4.2
A	CULLINET SOFTWARE	20- 50	40 7/8	+ 3/8	+0.9
O	CYCARE SYSTEMS INC	16- 30	20	+ 1/2	+2.5
O	[illegible] SYSTEM INC	9- 27	9 1/4	0	0.0
N	GENERAL ELECTRIC CO	48- 59	56 1/4	- 7/8	-1.5
N	[illegible] CORP	36- 40	38 3/8	-1 1/2	-3.7
N	INFORMATICS GENERAL	18- 32	23 5/8	- 1/2	-2.1
O	INFORMATION SCIENCE	5- 17	9 1/4	0	0.0
O	INFOTRON SYSTEMS CP	20- 40	23 1/4	-1	-4.1
O	KEANE ASSOCIATES	6- 13	15	-3	-16.6
A	LOGICON	16- 32	28	-2 1/4	-7.9
O	LOTUS DEVELOPMENT CP	15- 40	22	-1 1/2	-6.6
O	MCI COMMUNICATIONS	6- 20	7 3/8	- 5/8	-7.8
O	MGMT SCI AMER INC	5- 33	10 1/4	0	0.0
O	MATHEMATICAL APP GRP	4- 18	8 1/2	0	0.0
A	MICOM SYSTEMS INC	11- 30	20 1/4	- 3/4	-3.2
O	MICROPRO INT'L CP	3- 10	3 3/8	0	0.0
O	NATIONAL DATA CORP	6- 26	7 3/8	- 1/4	-3.1
O	ON-LINE SOFTWARE INT	6- 20	9 1/2	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	13	+1 1/8	+9.4
N	PLANNING RESEARCH	10- 31	9 3/4	- 3/8	-3.7
O	POLICY MGMT SYSTS CP	22- 50	24 5/8	+ 5/8	+2.5
O	PROGRAMMING & SYS	4- 9	4 1/2	0	0.0
O	REYNOLDS & REYNOLD	20- 30	21 1/4	-2 3/4	-11.4
O	SEI CORP	11- 34	13 1/2	+ 1/4	+1.8
O	SHARED MEDICAL SYST	23- 43	23 1/2	- 5/8	-2.5
O	SCIENTIFIC COMPUTERS	5- 14	5 1/4	+ 1/4	+4.5
O	SOFTWARE AG	8- 18	14 5/8	- 5/8	-4.1
N	URS CORP	10- 18	12 3/8	- 3/8	-2.9
N	UCCEL	7- 27	11 1/8	-1 1/8	-9.1
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	2 3/4	- 1/8	-4.3
A	ANDERSON JACOBSON	4- 26	4	- 1/4	-5.8
O	AUTO-TROL TECHNOLOGY	8- 29	8 1/2	+ 1/4	+3.0
O	[illegible] COMPUTING	15- 30	20	0	0.0
O	BANCTEC INC	5- 22	6 3/4	+ 1/2	+8.0
A	[illegible] INT'L	1- 15	3/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	30	0	0.0
O	CAMBEX CORP	1- 8	1 7/8	- 1/8	-6.2
N	CENTRONICS DATA COMP	5- 20	3	- 5/8	-8.4
A	CETEC CORP	7- 12	7 1/4	+ 5/8	-7.9
A	COMPUTRONICS	6- 20	4 1/8	0	0.0

E X C H		PRICE 1983-84 RANGE (1)	CLOSE NOV 16 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUGRAPHIC CORP	26- 48	27 5/8	- 3/8	-1.3
O	COMPUTER TRANSCEIVER	1- 10	5/8	-	-8.2
N	COMPUTERVISION CORP	29- 53	39 3/4	0	0.0
N	CONRAC CORP	11- 24	14 3/8	+ 1/2	+3.6
N	DATAPRODUCTS CORP	10- 32	16 1/4	- 1/2	-8.9
A	DATARAM CORP	4- 12	4 1/4	- 1/8	-2.9
O	DATA SWITCH CORP	4- 41	9 3/4	-1	-10.0
O	DATUM INC	5- 17	9 1/8	+ 3/8	+4.3
O	DECISION DATA COMPUT	9- 16	10 5/8	- 1/8	-1.1
O	DOCUTEL-OLIVETTI	5- 20	5	- 1/8	-2.4
N	ELECTRONIC M & M	5- 11	6	+ 1/8	+2.1
O	EMDATA, INC	4- 16	7	- 3/4	-9.6
O	EVANS & SUTHERLAND	12- 50	12 3/8	0	0.0
O	GANDALF TECHNOLOGIES	8- 14	13 1/8	- 1/8	-0.9
N	GEN'L DATA COMM IND	10- 26	17 5/8	- 1/2	-2.7
N	HAZELTINE CORP	18- 33	28 3/4	- 3/8	-1.4
O	ICOT CORP	3- 8	3 3/4	+ 1/4	+6.2
O	INFORMATION INT'L INC	10- 19	11 1/4	0	0.0
O	INTECOM INC	7- 21	9 1/4	- 3/8	-3.8
O	INTEL CORP	27- 48	27 3/4	-1 1/4	-4.3
A	LUNDY ELECTRONICS	7- 19	9	+ 1/8	+1.3
O	[illegible] CORP	8- 19	10 1/2	- 3/8	-3.4
A	MSI DATA CORP	9- 23	9 1/8	- 3/8	-3.9
N	NASHUA CORP	18- 29	23 3/8	0	0.0
O	NETWORK SYSTEMS CORP	14- 34	20 7/8	+ 1/8	+0.5
N	NO AMERICAN PHILIPS	30- 40	35 1/8	+ 7/8	+2.5
N	NORTHERN TELECOM LTD	28- 48	30	- 7/8	-2.8
O	OMEX	1- 6	3/8	0	0.0
N	PARADYNE CORP	11- 26	14 3/8	- 1/8	-0.8
A	PENRIL CORP	5- 14	14 3/8	+ 7/8	+7.8
N	PLESSEY CO (ADR)	25- 41	26 3/8	-2 1/2	-8.6
O	PRINTRONIX INC	15- 34	18 1/2	- 1/2	-2.6
O	[illegible] CORP	5- 23	5	-1	-16.6
N	RECOGNITION EQUIP	10- 17	12 3/8	- 3/8	-3.0
N	ROLM CORP	30- 60	60 3/8	+ 1/2	+0.7
N	SANDERS ASSOCIATES	30-120	30	-1 3/4	-4.4
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	9- 13	11 5/8	- 1/8	-1.0
N	SCIENTIFIC ATLANTA	8- 28	9 1/8	+ 1/8	+1.3
O	SEAGATE TECHNOLOGY	5- 20	4 5/8	0	0.0
N	STORAGE TECHNOLOGY	2- 23	2 7/8	- 3/8	-11.5
O	SYKES DATATRONICS	1- 13	1 3/4	+ 5/8	[illegible]
O	SYSTEMS & COMP TECH	20- 39	24 1/4	-1 1/4	-4.9
A	T BAR INC	7- 17	7 1/8	- 3/8	-5.0
A	TAB PRODUCTS CO	13- 20	14 1/4	- 1/4	-1.3
O	TANDON CORP	7- 38	6 3/4	- 1/8	-1.8
A	TEC INC	8- 12	8 7/8	- 1/4	-2.7
N	TEKTRONIX INC	50- 67	57 1/8	- 3/8	-1.0
N	TELEX	15- 38	31 1/4	- 3/4	-2.3
O	[illegible] SYSTEMS CP	2- 17	2	- 1/4	-11.1
N	TIMEPLEX INC	13- 23	18 3/4	+1	+5.6
A	VISUAL TECHNOLOGY	3- 20	2 3/4	+ 1/8	+4.7
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 23	21 1/8	+ 1/8	+0.5
N	BARRY WRIGHT	22- 30	27	- 1/4	-0.9
A	DUPLEX PRODUCTS INC	22- 27	26 1/4	- 1/8	-0.5
N	ENNIS BUS. FORMS	16- 28	20 3/4	0	0.0
N	3M COMPANY	69- 90	79 7/8	-2 1/8	-2.5
N	MOORE CORP LTD	30- 35	34 1/2	- 3/8	-0.9
O	STANDARD REGISTER	27- 41	41 1/2	0	0.0
N	WALLACE COMP SERVICE	20- 30	29 3/4	0	0.0

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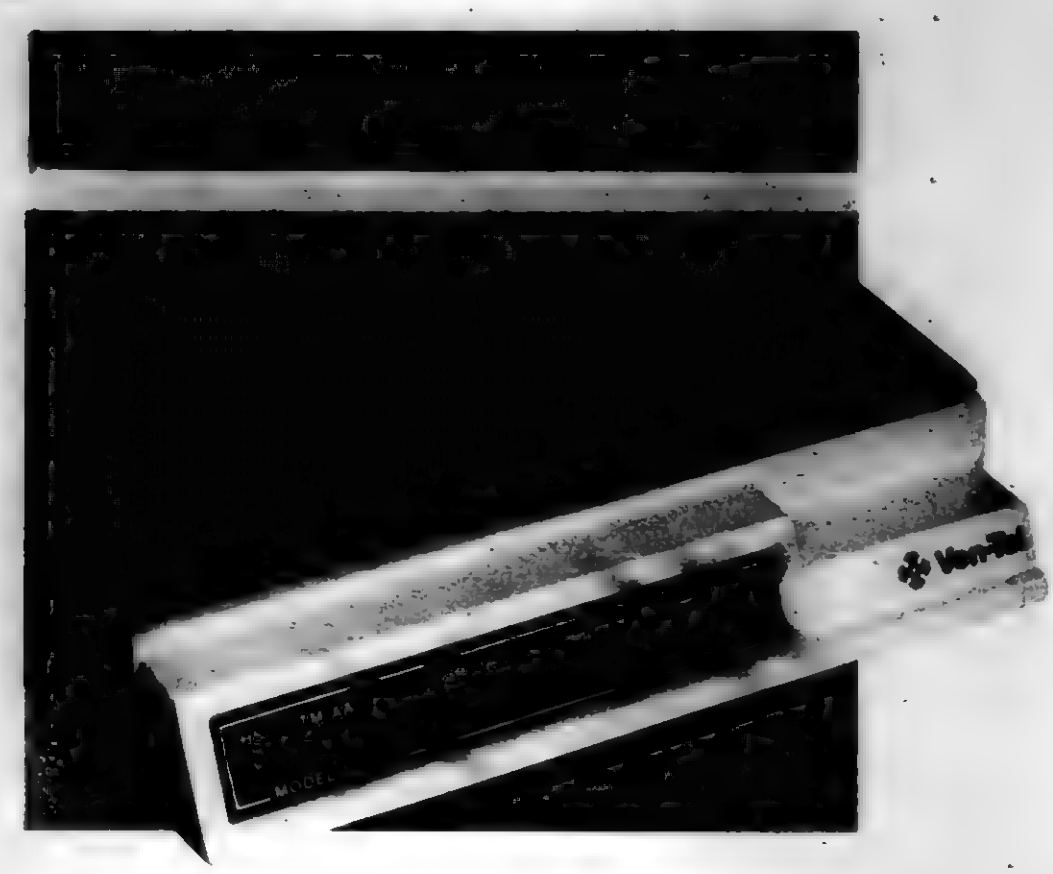

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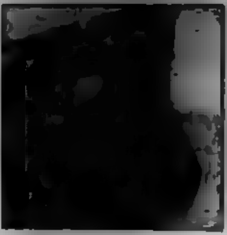

In Depth
A strategy for success with office systems software **ID/11**

In Depth
The ups and downs of bubble memory **ID/25**

Amdahl announces dual operating system option

Multiple Domain Feature for 580 series reportedly cuts hardware needs, saves on software licensing

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Amdahl Corp. last week enhanced its 580 series mainframes with a hardware option that reportedly allows either identical or dissimilar operating systems to coexist in a CPU.

For users of the 580 series' three uniprocessors and two multiprocessors, Amdahl's Multiple Domain Feature reportedly cuts hardware requirements and eliminates redundant software licenses by consolidating control programs that previously resided on separate mainframes.

According to Henry Cassel, manager of Amdahl's 580 product program, the ability of two operating environments to occupy the same processor simultaneously can also benefit MIS organizations in the following ways:

- Spares them the trouble and expense of maintaining dedicated CPUs for production and testing.
- Simplifies upgrades to IBM's Extended Architecture or other major conversions involving control programs or application subsystems.
- Aids in creating backup systems.

Cassel described the 580/MDF as a set of microcoded logic boards that fit inside a 580 series processor's chassis. The boards replace some of an Amdahl processor's existing hardware, can be installed in the field in about eight hours and require no programming changes or software additions, he said.

Although the MDF boards contain no additional main memory, channels or other system resources, they do reportedly enable a uniprocessor to support dual copies of IBM's MVS/370, MVS/XA or VM/SP HPO

See AMDAHL page 7

Users find new solution to old problem

Migration packages let users slide into DBMS conversions

By Charles Babcock
CW New York Bureau

NEW YORK — Companies that want to buy a data base management system, but cannot afford the cost of conversion, are finding a new way to get from point A to point B — migration software.

Migration packages allow a company to put a hierarchical or relational DBMS into use while continuing to run a standing library of Cobol programs for IBM's Vsam.

Users said the migration software intercepts a Cobol call to the Vsam files and converts it into a call that taps the new data base. The Vsam files often no longer

See MIGRATE page 6

TOP OF THE NEWS

For every code, there's a code breaker. Once he figured out the algorithm, it took just one hour for a scientist at Sandia National Laboratories to break a public key encryption code previously considered a top security choice. **Page 2.**

■

Take away the local net capability, and Ztel, Inc.'s Private Network Exchange is no more than a "plain-wrapper PBX," according to the product's first user. **Page 5.**

■

The business world is taking notice of a new algorithm from Bell Laboratories that may significantly cut runtime for linear programs. **Page 8.**

■

A "get-tough" policy will be backed up by increased data sharing and computerized cross-matching in a bid to reclaim billions of dollars from delinquent California taxpayers. **Page 13.**

■

CW photo by P. Gillin

An expert on expert systems, Dr. Randall Davis, offers an insider's view of current work at MIT's Artificial Intelligence Laboratory. **Page 16.**

■

Which software security package is best? Cambridge Systems, Inc. landed on top, and IBM was next to last in a recent user survey of seven packages. **Page 57.**

■

They switched to System/36

By Donna Raimondi
CW Staff

"Two people on a job queue and everyone's sitting there dead in the water — and it's not cheap, either." This price/performance critique was the rationale from one of several companies that recently decided to convert from an IBM System/38 to an IBM System/36 minicomputer.

The Globe Amerada Glass Co. of Elks Village, Ill., a privately owned, $20 million-a-year business, upgraded from an IBM System/3 to an IBM System/38 Model 5 two years ago, said Charles Chewning, DP manager. Since then, Chewning has been unhappy with the System/38's response time and the difficulty of obtaining software for his company's special purposes.

Chewning and the financial vice-president of the company laid out on paper what the System/38 was costing, how expensive it would be to upgrade it and what it would cost to custom-design production control software that was already available for the System/36 but not for the larger machine, Chewning said. They compared these figures with the expense of converting to a

See CONVERT page 6

FYI

MGM wraps up epic DP revamp

By Paul Gillin
CW Staff

CULVER CITY, Calif. — The talk of Metro-Goldwyn-Mayer/United Artists Entertainment Co. recently has been *2010*, the studio's upcoming film about contact with alien life. Meanwhile, the MIS staff has been occupied with a technological transformation that is perhaps less colorful but no less important to MGM/UA.

Since April, the department has almost entirely restructured its hardware and software operations. From an environment that was based on an IBM DOS-like

See MGM page 4

CW photo by P. Gillin

Gerrie Caruso, Larry Histon and Brad Heap of Metro-Goldwyn-Mayer/United Artists' MIS staff in MGM's film vault.

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NEWSPAPER

Scientist cracks knapsack public key code

By John Desmond
CW Staff

ALBUQUERQUE, N.M. — A scientist at Sandia National Laboratories here has broken a knapsack public key encryption code thought to have been the security equal of RSA Security Corp.'s code, which analysts consider the world's most secure.

Because the broken code encrypted 50 times faster than RSA's code, it was thought to have widespread potential applications.

Ernest F. Brickell of Sandia Labs won $1,000 from one of the cipher's coinventors, mathematician Ralph Merkle, who offered the prize to anyone who could break the code he helped invent in 1976. Brickell's two-year effort to break the code required finding which of 100 numbers, each 60 digits long, could be added together to yield a 62-digit sum.

Why knapsack?

The system is called "knapsack," Brickell said, because breaking the code is similar to finding the optimal way of packing knapsacks given a specified number of objects. It could more accurately be called the subset sum method, he said, because the code is based on finding a subset of a given set of numbers that adds up to a given sum.

Using Sandia Labs' Cray Research, Inc. supercomputer, Brickell said, it took just over an hour for his algorithm to break the code. The code he cracked is not in commercial use, and Brickell said he now believes its potential is dashed.

Public key encryption differs from conventional ciphers that use one algorithm to encrypt and decrypt data, such as the Data Encryption Standard, the only data encryption algorithm endorsed by the National Bureau of Standards. Specialists said the weak link of the conventional method is the secret key, which must be distributed to the intended recipients of the encrypted data and must be prevented from falling into the wrong hands.

> *'What Ernie did was really put the icing on the cake. The significance of it was that it neatly closes down the traditional approaches to basing public key encryptions on knapsacks. That line of development is futile.'*
>
> — Ron Rivest, a founder of RSA and a professor of computer science at MIT

The public key method circumvents the key distribution problem through the use of two mathematically related keys: one published in a public directory that is used to encrypt messages; the other used to decrypt messages, known only by the person receiving the message.

If the public key encryption code that Brickell cracked had been in use and someone used his method to decipher it, "It would mean that person could find out the information being sent just as fast as the legitimate receiver," Brickell said.

RSA's algorithm, the most secure public key encryption method, is based on a classical mathematical problem — factoring large numbers into prime numbers. Breaking the RSA public key encryption method would require knowing which two numbers multiply together to yield a 100- to 200-digit number.

"There's no known way to do that," Brickell said. Sandia Labs has managed to factor numbers with 70 to 80 digits, but the difficulty increases 10 times for every 10 additional digits, Brickell said. According to Ralph Bennett, chief executive officer of RSA, it would take 255 days using a supercomputer to crack a 100-digit code and 36 million years to crack a 200-digit code.

Brickell said, "We can't actually prove there's not a faster factoring algorithm, but we have faith in RSA because it's such an old problem. People have been studying it for so long, it's unlikely they'll find a faster way."

'Blows away' security

Ron Rivest, a founder of RSA and a professor of computer science at MIT, said Brickell's work "blows away" the security of knapsack methods of public key encryption. But because earlier knapsack encryption codes had been broken by Adi Shamir, another founder of RSA, the credibility of the knapsack method had already been hurt, Rivest said.

"What Ernie did was really put the icing on the cake. The significance of it was that it neatly closes down the traditional approaches to basing public key encryptions on knapsacks. That line of development is futile," he said.

Bennett said because the knapsack method and RSA's method are both public key encryptions, some in the marketplace may relate the two. "We've got a bit of a [public relations] program we've got to undertake," he said.

Knapsack encryption technically is not dead, in Brickell's view. The knapsack method devised by Merkle, called modular multiplication, effectively disguised an easy knapsack problem as a difficult one, he said. A more secure knapsack encryption system was announced by Rivest and student Benny Chor in August. "I don't know how to break that one," he said. "But nobody is ready to go out and use it, because of the fact that every other knapsack method has been broken."

Customs worker faces computer law charge

MIAMI — A 25-year-old clerk for the U.S. Customs Service apparently will be the first person indicted under a new federal law [CW, Oct.15] prohibiting unauthorized entry into government computers, according to Assistant U.S. Attorney Ron Shur.

Albert Collins, who worked at the Customs Service's financial management division, was arrested Oct. 25 and charged with accessing a government computer and modifying data without proper authorization.

Collins was allegedly writing U.S. Treasury Department checks for cohorts Patrick A. Bell, Lonzie W. Hunt and Bernice Nelson. Between August and October, the four had cashed more than 40 checks worth approximately $160,000.

Bell, Hunt and Nelson were charged with attempting to file a false claim with the U.S. government, defrauding the government and embezzlement. They each face up to 25 years in prison and a $30,000 fine if convicted, Shur said.

Collins faces those indictments and the additional charge of accessing a computer and modifying information without proper authorization. He faces up to 26 years in prison and a $36,000 fine.

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NEWS

[illegible]

CULVER CITY, Calif. — Working in data processing at Metro-Goldwyn-Mayer/United Artists (MGM/UA) Entertainment Co. here is not much different from working for any other large company.

But this work does have its share of eccentricities.

For example, several of the company's MIS staff members were recently treated to a sneak preview of 2010, MGM/UA's [illegible] science fiction film, which is not scheduled for nationwide release until Dec. 7.

Movie stars and glitter

The MIS staff is accustomed to passing film stars on the lot or dining next to them at the commissary.

Bizarre costumes are as common a sight as [illegible]

MGM

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operating system on an IBM 4341-compatible machine, the department has installed and begun conversion to an IBM 4381 mainframe running IBM's MVS/XA operating system with a full set of systems software. It has also installed a large vertical application and is in the process of installing two more financial packages. Much of the installation and testing was done in six weeks.

The migration is intended to eradicate what MIS staff admits was an inefficient hardware/software environment. The studio was processing a lot of redundant and incompatible data using programs that had been written over 20 years ago, according to Bradley Heap, vice-president of MIS.

The computer room was a study in IBM compatibility: an IPL Systems, Inc. 4446 running Software Pursuits, Inc.'s DOS/MVT/VSE operating system with Storage Technology Corp. disk and tape drives and Memorex Corp. communications controllers. Not only was service unwieldy, but the continued viability of some of the vendors was in doubt as well, Heap explained.

Shades of Big Blue

Heap joined MGM/UA in February and began to paint the company's computer room in shades of Big Blue. "I knew we needed bigger machines, and we needed to go with [IBM's] MVS," he said. Within two months, MGM/UA had placed an order for an IBM 4381 Model P3 mainframe and MVS/XA with a full complement of IBM systems software, including CICS, TSO, ISPF, RACF, HSM and Vtam, according to Heap. The company also planned to install software from a number of independent vendors, including a version of Cullinet Software, Inc.'s IDMS data base management system.

MGM/UA installed the basic operating system software in two weeks using MVS Express, a service that IBM introduced last year. Under the terms of MVS Express, IBM pregenerates systems software on a development mainframe and ships the tapes to the user site for installation.

"We defined the devices on our system and sent that to Dallas, where IBM generated a nucleus," said Gerrie Caruso, director of technical services at MGM/UA. "IBM took the nucleus and installed all program products on top of it."

Functioning in two weeks

IBM shipped MGM/UA two tapes; one contained the MVS/SP nucleus, which MGM/UA used as an initial program load to download XA. The full operating environment was functioning in about two weeks.

Caruso noted that MVS Express only covers part of the installation process. For example, MGM/UA had to customize IBM's JES 2, add TSO users and install all its non-IBM systems software.

But, she said, "Without Express, we would have had to install each product and test separately," a process that she estimated would have taken about one week for each program product.

While the systems and hardware installations were being done, the applications development group, managed by Larry Histon, director of information systems development, was planning to install three large applications.

Theatrical Film Distribution On-Line System (Dons), a program developed at Warner Brothers Studios, Inc., will be a bread-and-butter program covering MGM/UA's nationwide distribution network. It is being put into production now.

Histon's group has also begun installing Cullinet's general ledger and accounts payable systems, with completion slated for late next year.

Factors behind smooth installation

Several factors were key to the fast and relatively smooth installation, staff members said. "I personally feel you need a cooperative relationship with the vendor," Heap said.

Also critical was convincing the studio's management that fundamental changes had to be made in the way the company processed data. "I sold my managers on these concepts, and once they were sold, we sold the chairman of the company together," Heap said. Thus, the MIS budget was increased from $5 million to $7 million this year.

Staff members agreed that the most important — and most difficult — part of performing such a large conversion was coordinating the involved DP groups. That was crucial for Histon, who was planning an application that would support data entry at 18 remote sites. "We met weekly, so no one was working in his own little world," he said. "We knew exactly what hardware was on order in each city, so we could plan for software support and changes."

Since completion of the new hardware and systems software installations, users have become more actively involved with MGM/UA's DP operations, Heap said. A senior executive steering committee, consisting of the senior vice-presidents of all the company's major divisions, is now included in all major MIS plans. The committee meets regularly to receive status reports and decide on changes to the development schedule.

"We now have an accepted and approved development plan through the end of 1985," Heap said.

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Test user of PBX faults lack of network power

By John Dix
CW Staff

WILMINGTON, Mass. — Without the much-touted local network capabilities, the first user of Ztel, Inc.'s so-called fourth-generation private branch exchange (PBX) found the switch to be a "plain wrapper PBX."

Compugraphic Corp., located across the street from Ztel here, agreed last summer to act as a test site for the PBX manufacturer's first product, the Private Network Exchange (PNX). Under the terms of that contract, Compugraphic, a large manufacturer of computerized composition systems, agreed to test PNX for 90 days.

Because Compugraphic did not really need a new PBX, it was agreed from the start that the switch would be operated in parallel with an existing PBX and would be removed after the test, said Dave Curreri, the company's telecommunications operations engineer.

Compugraphic is housed in ten buildings, most of which are located in an industrial park just north of Boston. Four of the buildings have PBXs, including three Rockwell International Corp. 580Ls and an AT&T Dimension 2000, which are interconnected with tie lines. Telephones in the remaining buildings are supported with off-premise extension links.

After wiring part of a Compugraphic building with the required four-wire cable, Ztel installed a 250-port PNX next to a 1,500-line 580L. Voice support with the switch was cut over two days later. Each user in the test group was given a Ztel Z28 electronic handset and the top-of-the-line Ztel electronic telephone, but also kept the standard analog telephone. Only one switch was in operation at any one time, but a technician could transfer between the two in case of failure.

Switch up 99% of time

During the 90-day test period, Curreri reported, the switch was up 99% of the time during working hours between system repairs. Ztel reportedly brought the machine down several times to update software and to make revisions to line cards. Many of these problems were ironed out by the end of the test period, and in the last 30 days the switch is said to have operated practically trouble free.

Curreri said he was pleased with the performance of PNX as a voice switch, an important watershed for a new switch manufacturer. He was not, however, "overly impressed" with its performance as a fourth-generation integrated voice/data PBX. That criticism stems from the fact that, with a few exceptions, use of the PNX did not enable Compugraphic to do anything it was not already doing with its current PBXs and data systems.

By definition — depending on the supplier of the parameters — a fourth-generation PBX has an internal local network that users can access and use as they would an independent local network. According to Ztel, software to drive the local net in its switch will be commercially available in the third quarter of 1986.

Without the local net capability, which Curreri is disappointed he did not get to test, the primary difference between the PNX and the Rockwell 580L sitting next to it was the ability to use the PNX to support terminals.

Voice/data integration tested

Voice/data integration was tested on 50 of the 250 PNX ports. Asynchronous Ascii terminals were connected through RS-422 interfaces on the back of the Z28 electronic telephones to the company's Digital Equipment Corp. VAX-11/780 and VAX-11/750 systems.

Because the PNX was configured to run in parallel with the Rockwell switch, all but three data circuits were dedicated rather than switched. Curreri said that this was done because the VAX ports are prioritized, and switching back and forth between the PNX and the 580L might mistakenly enable an unauthorized person to access a high-priority port.

Terminals in the 580L environment — pre-PNX and post-PNX — are supported with wires within the same cable used to support telephones. Each office in the company is wired with a 25-pair cable, of which two to three copper pairs are used to support data terminals. The voice and data pairs in each cable are split at centralized punch blocks and routed to either a PBX or a computer. In this way no data passes through the PBX.

With the PNX, data and voice can be supported over a four-pair wire, in which case all data is routed through the switch. This provides terminal users with some typical PBX voice capabilities. However, using the PNX as a data switch does create a single point of failure for both voice and data systems.

One thing is sure: Without the promised local net capabilities — which would enable higher speed transmissions, intelligent links between devices and greater connectivity — Compugraphic would have little incentive to turn out its present systems in favor of the Ztel product.

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PDSFAST	46 sec.	.7 sec.	122	[illegible]
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Iebcopy	[illegible] min.	14 min. 52 sec.	[illegible]	$92.05
PDSFAST	4 min. 3 sec.	[illegible] sec.	[illegible]	[illegible]
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MIGRATE

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exist, but the Vsam programs run as if they did, users of the software said.

Applied Data Research, Inc. (ADR) of Princeton, N.J., has sold its $20,000 Vsam Transparency package since May 1983 and is alpha testing a second package for IBM DL/1 systems, according to President Martin A. Goetz.

Spokesmen for Software AG of North America, Inc. of Reston, Va., said the firm has sold a dozen copies of its $10,000 Adabas/Vsam Bridge package after announcing it a month ago.

In mid-December, Cullinet Software, Inc. of Westwood, Mass., will beta test Escape/Vsam, another migration package, with the product expected to be available in mid-1985. Company officials are discussing a price in the neighborhood of $30,000, said Eugene L. Kaplan, Escape/Vsam product manager.

A Memphis chemical manufacturer, Buckman Laboratories, Inc., bought ADR's Vsam Transparency in July to use with Datacom/DB, ADR's relational DBMS. Without Vsam Transparency, it faced the task of recoding and recompiling the bulk of its program library.

"Each program would take an hour or two [to recode], but you'd have to multiply that by hundreds," said Thomas P. O'Hay, data processing manager for Buckman.

With the migration software, it will take two months to implement the relational data base fully. Without it, the task of program conversion would take 18 months to two years, O'Hay said.

"I have been through conversions before. This has got to be the least painful way of doing it," he said.

One day required for Bell & Howell's conversion

Before a migration package works, data must be transferred from the Vsam files into the new data base. At Bell & Howell Co. in Evanston, Ill., the conversion of Vsam files for accounts receivable was accomplished in a day, said Lewis R. Hoose, manager, financial and administrative systems.

Both ADR and Cullinet offer utility programs that make it easier to create duplicate files in the new data base. Hoose said Bell & Howell's Cobol copybook contains definitions of Vsam files, and an ADR utility program transfers the field names into the data dictionary.

Although the file transfer is quick, Bell & Howell spent two and a half months readying its accounts receivable programs, including the testing of how to use the new data base best, Hoose said.

The Sante Fe Energy Corp. in Amarillo, Texas, an oil and gas exploration company, is implementing a complete financial accounting system, Ogis, from American Management Systems, Inc., an Arlington, Va., software firm.

The package was designed for companies like Sante Fe Energy but requires Vsam files, and Sante Fe wanted to continue using Adabas, the Software AG data base it purchased in 1979. The answer: Software AG's migration package, Adabas/Vsam Bridge. With the Vsam Bridge, the Ogis package runs the way it was designed to and "doesn't know the data doesn't exist in Vsam files," said James A. Schulze, data base administrator at Sante Fe Energy.

In one instance, the migration software allowed a user of a fourth-generation language to migrate back to, instead of away from, Vsam files.

Like other Vsam Transparency customers, Shawnee County, which encompasses Topeka, Kan., wanted some aging Cobol programs to run against its new ADR Datacom/DB data base. At the same time, it had made a major commitment to UFO, an application development system from Oxford Software Corp. of Hasbrouck Heights, N.J. Shawnee County's four programmers were trained to use UFO and 75%, or 400, of its on-line programs were written for it.

UFO, however, was designed to use Vsam files, said Stephen L. Sherman, Shawnee County data base administrator.

The county bought ADR's Vsam Transparency but ignored its fourth-generation language, Ideal, that other customers were using with Datacom/DB. "I don't know whether ADR is going to appreciate hearing this," Sherman said, "but their Vsam Transparency allows UFO to work with Datacom/DB just fine."

CONVERT

from page 1

System/36 and decided upon the 36.

Garth Fuller, director of corporate information systems at ITT Rayonier, Inc. in Florida, has worked extensively with both systems and said that he understands why small companies are converting. The System/38 was mismarketed by IBM as a machine of great power and ease that everyone could run, Fuller said, but in reality it requires more expertise than the small shop generally has.

The advantages of the System/38 over the System/36 are the larger machine's unique, object-oriented data base technology, which small shops generally do not need, and its RPG-III language, Fuller said. The price/performance ratio shines in higher model System/38s, but not in the low end, he added.

Sysgen, Inc. of Durham, N.C., developed and sells an integrated accounting package for both IBM machines, said Gary Bowers, System/36 product manager. The accounting package for the System/38 sells for $49,995, and the System/36 version sells for less than $20,000.

"The 38 package has a lot more function, such as a purchase order system and financial modeling facility, but for less than half price you get 80% to 90% of what the big package does. For a smaller business it's more than adequate," Bowers said.

Cliff Girard, president of Girard Management Services, Inc. of San Carlos, Calif., traded his System/38 Model 5 for a System/36 about a year ago. "The 38 was just not paying off for our type of operation," Girard said. His firm develops applications software for companies with IBM System/34s, 36s and 38s, he said.

Girard now has one System/34 and two System/36s in-house. "We are probably saving $7,000 to $8,000 a month in machine and software costs and in the productivity of our staff" since trading in the System/38 for a System/36, Girard said.

Two Girard Management Services' clients in California are in the process of converting from System/38s to System/36s. The companies — both of which are in the $40 million to $50 million a year business bracket and growing at about 20% per year — are pointing to cost and ease-of-use factors as their reasons for changing machines, Girard said. Another consideration for his clients, he added, is that it takes two or three times longer to train operators and users of the System/38. In a state where job turnover is rapid, training time is important, he said.

James Woodruff, president of a privately owned, 40-employee plumbing and heating distribution company in the Midwest, is keeping his System/38 Model 5 for one more year until the machine's investment tax credit expires. After four years with the System/38, Woodruff said he is disappointed. "We're paying two times more for the 38 than for our [previous] System/34," he said, "and when all is said and done, the 38 uses 10 times more memory to run a program."

Woodruff pays close to $2,000 per month in rental and maintenance fees for his System/38, as opposed to about $250 per month that it will cost for maintenance on the System/36 after he buys it. "In my opinion, it's easier to use the 36 — the 38 has 100 commands and the 36 has half that, but that's not an advantage to me," he said, citing his one-programmer staff and 25 users. Upgrading his System/38 to a Model 7 or 8 would be like "putting good money after bad," Woodruff added.

Chewning and Bowers both used a translation package called RPG 2½ from BPS Information Services, Inc. of Cedar Rapids, Iowa, to convert RPG-III code to the RPG-II code used on the System/36.

The BPS package translated about 85% of the financial applications packages' code, Chewning said. "I wrote translations for [data description specifications] source specs and [file and input] specs that the RPG 2½ package requires for input, and it wasn't all that involved," he added. Chewning designed test programs that "had everything but the kitchen sink" in them to check RPG 2½'s effectiveness, display screens and other features, he said. Starting in January 1984, he spent most of his time translating, rewriting code and testing the converted code. The computer center shut down June 1 for 1½ days to implement the change, he said.

> *The System/38 was mismarketed by IBM as a machine of great power and ease that everyone could run.* —Garth Fuller, director of corporate information systems, ITT Rayonier

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SAS signs to take over Intel's System 2000

By Paul Gillin
CW Staff

After languishing in relative obscurity for several years, Intel Corp.'s System 2000 data base management system (DBMS) received new life last week. Intel and SAS Institute, Inc. announced an agreement in principle for SAS to acquire System 2000 and other members of the System 2000 family.

SAS Institute will assume all support activities for the DBMS, which has about 600 licensed users on IBM, Control Data Corp. and Sperry Corp. mainframes. SAS Institute will also develop interfaces between SAS and System 2000.

The agreement, which will take effect Dec. 15, covers System 2000 and related products including QX, a query-by-example query language, the Flex data base language and Report Writer. However, Intel's Idis and Fast 38 series products are not included.

"We had kept much too low a profile on System 2000," said Robert Wilson, general manager of Intel's End-User Systems Operation (ESO). "This is a move to allow us to concentrate on where Intel's direction is, and that's in microcomputers and not mainframes."

System 2000 users who were contacted by *Computerworld* expressed surprise at the announcement but were generally positive about the product's future. "I have a lot of respect for SAS. It's a good organization, and I think this [move] has good potential," said Roberta Armstrong, director of information systems and services in the student support services department at the University of Minnesota in Minneapolis.

Armstrong said Intel has added significant new features to the product in the last two years. However, "it never was a mainframe software company," she said.

System 2000 was one of those products that never seemed to find a groove in the market, observers said. A hierarchical DBMS with an unusual inverted-list access method, System 2000 boasted a number of unique features, including an excellent query language, according to Ron Ross, editor of the "Data Base Newsletter."

However, "it never was clear what Intel's intentions were," Ross said, "whether it was to establish a base to sell hardware or to get into a whole new market."

The agreement will effectively shift ownership of Intel's Austin, Texas, operations to SAS Institute. Intel also announced it will move ESO to Phoenix.

AMDAHL

from page 1

concurrently. The hardware enhancement also allows the IBM operating systems to be mixed in any combination of pairs within the same 580 series mainframes, according to Cassel.

With the MDF, each of the two coresident control programs occupies its own discreet domain — an arrangement that insulates one operating environment from the other's program bugs or similar ills.

With the help of 580/MDF's tuning parameters, a user can then divide a processor's available system resources equally or unequally between the two domains. If the domains later need to be reconfigured in response to shifting system requirements, the user can dynamically reallocate CPU resources by revising MDF's control menus from an operator's console.

Don't run in parallel

Although the Amdahl hardware enhancement, in effect, turns a 580 series machine into two virtual processors, the enhancement never allows the coresident operating environments to run in parallel. Instead, the two domains are alternately active and inactive.

At intervals predefined by the user, all processing functions within a currently running operating environment automatically cease. Control of all system resources is then relinquished to the other domain, which processes its work load for a prescribed period before again yielding CPU time to its partner, Cassel said.

During the intervals when an operating environment is active, it has access to all its processor's resources with at most a 5% degradation, he added.

For corporate MIS, MDF's potential applications include the ability to consolidate production applications and those in test mode on the same MDF-equipped machine. This allows a measured amount of main memory, channel capacity and CPU time to be reallocated dynamically to the production domain during periods of peak user demand.

When customer shipments of the enhancement begin during the second quarter of next year, 580/MDF will be available for a one-time charge of $20,000 plus a $6,000/mo leasing fee.

Amdahl is headquartered at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

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Bell Labs testing faster business algorithm

By Edward Warner
CW Staff

MURRAY HILL, N.J. — Bell Laboratories has claimed a breakthrough that could cut the runtime of an important breed of business programs and allow creation of programs that currently are too complex to run at all.

The breakthrough is a new problem-solving procedure, or algorithm, for use in software for solving linear programming, which is one of the most common types of business problem solving, particularly in the oil and airline industries. Such programs are not themselves computer programs, although they are solved by mainframe software currently using the simplex algorithm.

Developed in 1947, the simplex algorithm is limited by its speed, considering no more than roughly 10,000 to 15,000 different possible outcomes as it seeks a solution. The Bell Labs algorithm, still under testing here, operates faster, and therefore can consider thousands of more — possibly as many as one million — alternatives, according to Mike Garey, head of Bell Laboratories' Mathematical Foundation of Computing Department.

Would save businesses money

This clears the way, Garey said, to development of linear programming software "that would save [businesses] a lot of money and enable them to solve problems that they haven't been able to solve with the current method."

The algorithm could also be a boon to AT&T when incorporated into software it either licenses or develops — that is if the algorithm can be patented. "It's not clear what you can or can't patent; that stuff is being looked at very carefully," Garey said. "We are aggressively exploring the things we might do to make money from this."

Linear programming, Garey explained, is "finding the right mix of how you use your resources" and is probably the most common form of programming used by businesses. It is the means an oil company uses to determine how to allocate crude oil to each refinery, a paper company uses to divide up its rolls of paper stock to fill orders without waste and an airline uses to determine which flights to assign to its flight crews each day.

Besieged by calls

Since word of the new algorithm's development leaked out, Garey's office has been besieged by calls from various businesses. Bell Labs is now testing the algorithm's performance against standard linear programs volunteered by several firms, including a flight crew scheduling program offered by American Airlines.

The crew scheduling program is being given a benchmark on the basis of computer runtime, according to Thomas Cook, director of operations research at American Airlines. Another criterion that interests American, he said, is the reported ability of programs using the new algorithm to include a larger number of possible variables. The firm's current flight scheduling program, he said, provides "good answers but not necessarily the best answers. The quality difference could mean a lot in terms of dollar savings."

The Bell Labs algorithm was developed — reportedly using a pad and pencil — by a 28-year-old mathematician, Narendra Karmarkar, Ph.D. The Karmarkar algorithm, as some have come to call it, takes a shortcut as it sorts through the potential solutions to a problem.

As Garey, Karmarkar's immediate supervisor, explained it, mathematicians can think of a linear program as the conceptual equivalent of a geodesic dome, a roughly spherical structure made up of interlocking polygons. Where the points of the polygons meet is a potential solution, and the simplex method moves about the surface of the dome from one group of points to the next, constantly improving its idea of a solution until the best is achieved.

The Karmarkar algorithm takes a shortcut. Instead of moving along the surface point to point, it starts at the center of the dome and moves toward the exterior, considering possible outcomes from the inside as it goes. Both algorithms end up at the same point, but Karmarkar's does so more quickly, clearing the way for the practical use of programs with many more possible outcomes.

Prudence cautioned

One of the developers of the simplex algorithm, though, is cautioning prudence until Bell Labs produces verifiable test results on the new algorithm's speed. George Dantzig, Ph.D. and professor of operations research and computer science at Stanford University in Stanford, Calif., said he saw a presentation by Karmarkar on the new algorithm at an operations research conference in Texas last week, and Karmarkar "did not present any evidence on what he said it does." Dantzig, however, said he believes that his colleague can and will eventually produce proof of the algorithm's speed.

Another programming expert, Cornell University's Professor of Operation Research Robert Bland, warned that the new algorithm may, in the end, face its biggest hurdle from human beings instead of computer program variables. "When you get to, say, 100,000 variables, each specifying a level of consumption [of resources], the bottleneck is in the origin of the data."

Put simply, such programs could require an outrageously large number of data entry clerks.

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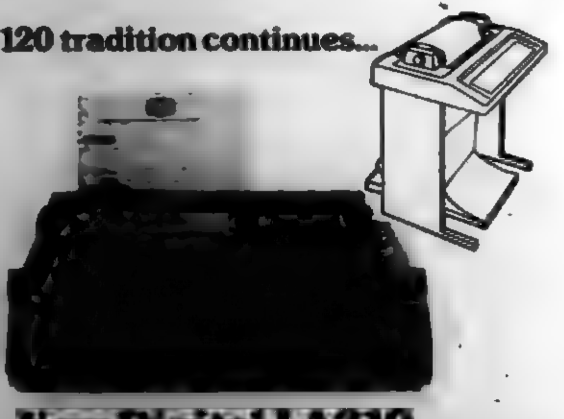

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Patent office project leaving design phase

By Mitch Betts
CW Washington Bureau

ARLINGTON, Va. — The automation project under way at the U.S. Patent and Trademark Office is not only massive — perhaps the biggest in the world — but also will have several innovative features in its computer architecture, according to Jeff Cochran, the office's director of systems engineering and telecommunications.

Cochran described the Automated Patent System at a recent presentation here for the Washington, D.C.-area division of the Office Automation Society International. The system is now emerging from its design phase, and major hardware procurements will be posted this month and in 1985, he said.

The automation project, slated for completion around 1990, is expected to transform an error-prone manual system for processing new patents into an electronic filing and retrieval system for patent examiners and the public. In addition, the system will create an electronic data base from the millions of technical documents that patent examiners use to check the validity of new inventions.

CW photo by M. Betts
Cochran

"There is a massive [number] of images to be captured, stored and distributed by the system," Cochran said. "We're anticipating storage of 20 trillion to 30 trillion bytes," he said, suggesting that it may be the largest automation project in the world. Moreover, Cochran said, a large number of workstations will be required for the system: Estimates now range from 1,700 to 3,200 workstations.

In addition to the sheer size of the undertaking, Cochran said, other noteworthy features of the system architecture include:

- The system will use fourth-generation private branch exchanges (PBX) for high-speed data transfer — an alternative to local-area nets.
- The system will feature distributed processing in which each node in the network will be controlled by an intelligent microprocessor.
- All microprocessors will be connected by the Ethernet interface protocol through hardware interfaces and the Fusion software package from Network Research Corp. of Los Angeles.
- The hardware will run a hybrid version of the Unix operating system, combining features of AT&T's Unix System V, the University of California at Berkeley's Unix Version BSD 4.2 and other Unix enhancements that provide added capabilities and performance.

> *'There is a massive [number] of images to be captured, stored and distributed by the system. . . We're anticipating storage of 20T to 30T bytes.'*
>
> — Jeff Cochran, director of systems engineering and telecommunications at the U.S. Patent and Trademark Office

Cochran explained that the system's architecture stems from two parallel (redundant) mainframes that are linked to the digital PBX network and that also allocate search tasks to 193 "search engine" micros, which search through the patent text files and diagrams. Thirty interface devices link the mainframes to the PBX net and the search engines transmitting at 10M bit/sec.

Next in the architecture come three digital PBX switches that link all system components in the network, each transferring 512M bit/sec. This network includes rapid-access and archival optical-disk storage devices; 26 file servers to support such office automation tasks as electronic mail, directory searching and software distribution; and many workstations.

The design of the custom workstations was driven by user demands for fast response time on searches, high-quality screen images, user-friendly features and flexibility, Cochran said. For example, he said, the workstations will have two full-page screens (one for text and the other for diagrams), a zoom feature to enlarge portions of a diagram and keyboard, mouse and graphics tablet input devices.

Cochran said each workstation will have 2M bytes of main memory, up to 300M bytes of disk storage and a laser printer capable of printing five page/min. In addition, the workstations will have such ergonomic features as tilt-and-swivel monitors.

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Useful tools called key to departmental DP

CW AT HAMMER FORUM '84

By James Connolly
CW Staff

CAMBRIDGE, Mass. — The key to a successful departmental computing system is to provide "function-specific" applications and decision-support tools, said consultant Michael Hammer at a conference here last week.

Hammer told approximately 200 data processing managers at the Hammer Forum '84 that the departmental computer is more than an office automation system or the distributed processing of the 1970s, which he said was little more than using remote terminals to do centralized processing.

The hardware for departmental computing can vary according to the needs of the department, perhaps including dumb terminals, personal computers, minis, local-area nets, mainframe links and special peripherals, with up to 200 users, he said. But the software should meet specific criteria, with the goal of providing decision-support tools that let the department workers do their specific jobs better.

> *'People don't work as lone wolves in an organization. People work as groups.'*
>
> —Mike Hammer, president, Hammer and Co.

"The departmental system is an information system to support the business activities of a group of people who work together to accomplish a business mission. People don't work as lone wolves in an organization. People work as groups," said Hammer, who is president of the forum's sponsor, Hammer and Co. of Cambridge.

The characteristics of the departmental system, as outlined by Hammer, include:

- Local control and scope.
- Data base orientation.
- Some custom development.
- Analysis-, not update-, intensive.
- Relatively small scale.
- Revenue, not cost, orientation.
- Highly interactive.

He stressed that the applications should be specific for the department, rather than just generic. He cited examples such as sales lead tracking and management, portfolio management, customer profitability and vendor performance analyses.

Hammer described one recent case where a department instituted a bank charge reconciliation program to monitor the fees that the company was being assessed. "In the first month, they discovered a $50,000 error in the bank's favor. That, by itself, paid for the system. You don't do bank charge reconciliation to save clerks, you do it to make money," Hammer said.

That case was typical of a departmental computing application, he said, in that it performed a task that the company never did before. He noted that traditional DP approaches have been to automate labor-intensive clerical functions, not to make money.

Hammer said that, contrary to what some industry watchers believe, departmental computing will not lead to the death of the mainframe but rather to phenomenal mainframe growth as companies require more and more disk space to support new departmental applications.

Hammer recommended common operating systems, environments and modularity that will ensure consistency and efficient communications for departmental computing systems.

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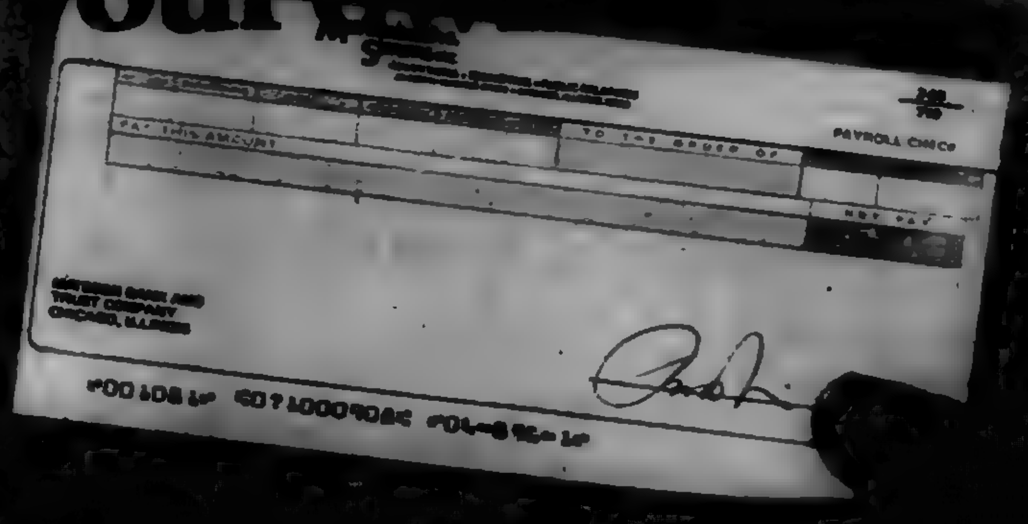

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DP groups begin computer crime law efforts

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Data Processing Management Association (DPMA) and the Videotex Industry Association (VIA) have begun separate efforts to draft model legislation to curb computer crime, in preparation for state and federal legislative activity next year.

Both projects, which are in very early stages at this time, could become the basis for testimony before U.S. House and Senate judiciary committees, as well as state legislatures, officials of each association said.

Richard Cashion, chairman of DPMA's committee on computer crime, said he is collecting information on existing computer crime laws and will conduct research to determine which provisions have been successfully prosecuted and which provisions have caused significant problems for law-enforcement authorities.

Prosecutors hampered by procedures

Cashion said that even with good computer-crime statutes, prosecutors can be hampered by related legal procedures, such as "rules of evidence."

In some cases the rules of evidence will classify a copy of a computer tape or disk as merely hearsay evidence, which has little weight in a courtroom, he said.

"There seem to be a lot of problems with the rules of evidence, and we're going to take a look at that," said Cashion, who is the assistant director for data processing at Tennessee Technological University in Cookeville, Tenn.

The VIA, a three-year-old videotex and teletext trade group with approximately 140 members, recently circulated its preliminary draft of a model computer crime act, according to Robert L. Smith Jr., executive director.

VIA draft established

Smith said the draft will be revised to reflect comments from legislative and industry officials. The VIA draft bill contains these major provisions:

- Fraudulent schemes to obtain money, property or computer resources through access to any computer system, network, software or data base would be a felony.
- Intentional alteration or destruction of computer property without authorization would be a felony.
- Intentional and unauthorised access to a computer system and theft of computer property or services are misdemeanors; if the crime causes a large financial loss (unspecified in the draft), it becomes a felony.
- Intentional and unauthorized actions to obtain, disclose, publish, transfer or use a computer access device (such as an identification card or code) are misdemeanors.
- Intentional interference with or denial of computer access by an authorized user is a misdemeanor.
- "An employee, unless established otherwise, shall be presumed to have authority to access and use any computer . . . owned or operated by the employer of such employee."

Unauthorized access costly

William W. Seelinger, VIA's chairman and the manager of videotex market development at IBM, said "unauthorized access is costly for a growing number of companies and can threaten the commercial development of videotex in the home or office."

Development of the model bill arose from the VIA-sponsored "Forum on Unauthorised Access" held here in February.

Experts at the forum recommended "formulation of a model law to help both state and federal legislators deal with this serious problem, which is legally and technically confusing," according to George Minot, chairman of the VIA-sponsored forum and senior vice-president of Compusecye, Inc.

Crwth seeking users for survey

SANTA MONICA, Calif. — Crwth Computer Coursewares is seeking 2,000 participants for its second annual survey on the status of the information center.

The company has developed a questionnaire designed to identify the stages of implementation, user population, staffing requirements and responsibilities of the information center.

Another purpose is to determine the software and hardware used by the information center and to ascertain the role of the microcomputer and mainframe within the center.

Questionnaire respondents will receive a free copy of the survey findings, the company said.

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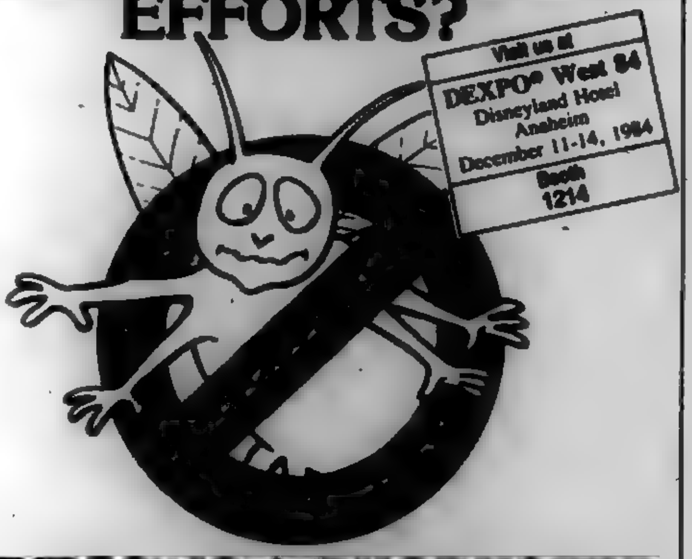

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System upgrades help state nab tax cheats

By Jeffry Beeler
CW West Coast Bureau

SACRAMENTO, Calif. — State officials here are expanding their use of computerized cross-matching, urging increased data sharing among government agencies and upgrading their hardware installations in a bid to reclaim billions of dollars in uncollected California taxes.

A heightened spirit of cooperation has overtaken state and local authorities following the Sept. 26 passage of revised legislation aimed at wresting unpaid taxes from thousands of delinquent California taxpayers.

Under the newly strengthened law, the state has declared a temporary amnesty for all individuals and corporations that have either underreported their incomes or neglected to file tax returns altogether.

Starting Dec. 10, California's major tax-collecting agencies will waive all penalties and criminal liabilities for welchers who voluntarily come forward and redress their past omissions by March 15. State officials expect the amnesty program to net $66 million in unpaid income, sales and use taxes from 130,000 delinquent individuals and businesses, according to Will Bush, a public affairs officer for California's Franchise Tax Board (FTB).

But once the amnesty period expires, the state plans to use a combination of stiffened legal penalties and improved enforcement techniques to pursue unrepentant tax cheats with a vengeance.

Agencies to cross-check records

For the first time in California history, the FTB and two other state agencies — the Board of Equalization and the Employment Development Department — will enjoy unrestricted access to each other's tax information. After swapping magnetic tapes, the agencies will cross-check the different sets of records on an IBM Series 3081G and note any suspicious discrepancies, Bush said.

Suppose, for example, that a company tries to cheat on its income tax returns by neglecting to report its sales tax revenue to the FTB. In the past, such an attempt at tax evasion might well have gone unnoticed.

But in a little more than three months, the FTB will begin to match its computer-stored tax records routinely against similar files at the Board of Equalization, which collects California's sales and use revenues. Any individual or corporation whose name appears in the latter set of data but not in the former may have some explaining to do, Bush said.

Similar enforcement measures will also be applied soon to the task of sniffing out Californians who fail to pay their real estate and business taxes. When the amnesty program ends in mid-March, county assessors' offices and city governments throughout the state will begin supplying the FTB with magnetic tapes containing their real estate and business tax records.

The FTB will then electronically cross-check the incoming data against its own taxpayer files in an attempt to spot possible tax delinquents, according to Ralph Shoemaker, assistant executive officer for the state's information services department.

But interagency data sharing and computerized cross-checking are by no means the only high-tech approaches that the FTG has recently adopted in its efforts to extract overdue payments from California's reluctant taxpayers. The state's revenuers have further strengthened their enforcement capabilities, Shoemaker said, through the acquisition of additional hardware, including:

- A battery of intelligent workstations for its auditors in the field.
- A network of automated tax-collection machines.
- A toll-free taxpayer information hot line, where state-employed telephone operators respond to tax-related inquiries with the help of on-line, 3270-type terminals.

Hardware upgraded

To support its improved methods of tax-code enforcement, the state has had to install additional terminals, double its central MIS site's disk capacity to 45G bytes and expand the 3081G's main memory from 16M bytes to 24M bytes. The increase in internal storage made necessary a changeover to IBM's Extended Architecture, Shoemaker said.

California's efforts to upgrade its tax-collection and enforcement methods are also forcing various state agencies to undergo data conversions to eliminate any inconsistencies in their taxpayer identification numbers.

"Until recently," Shoemaker recalled, "one of the main obstacles the state faced in collecting its back taxes was that various government agencies stored their files under different numbers and in different formats."

But once the relevant agencies complete their data conversions and assign their files common identification numbers, the barriers to automated cross-checking will quickly fall, Shoemaker said.

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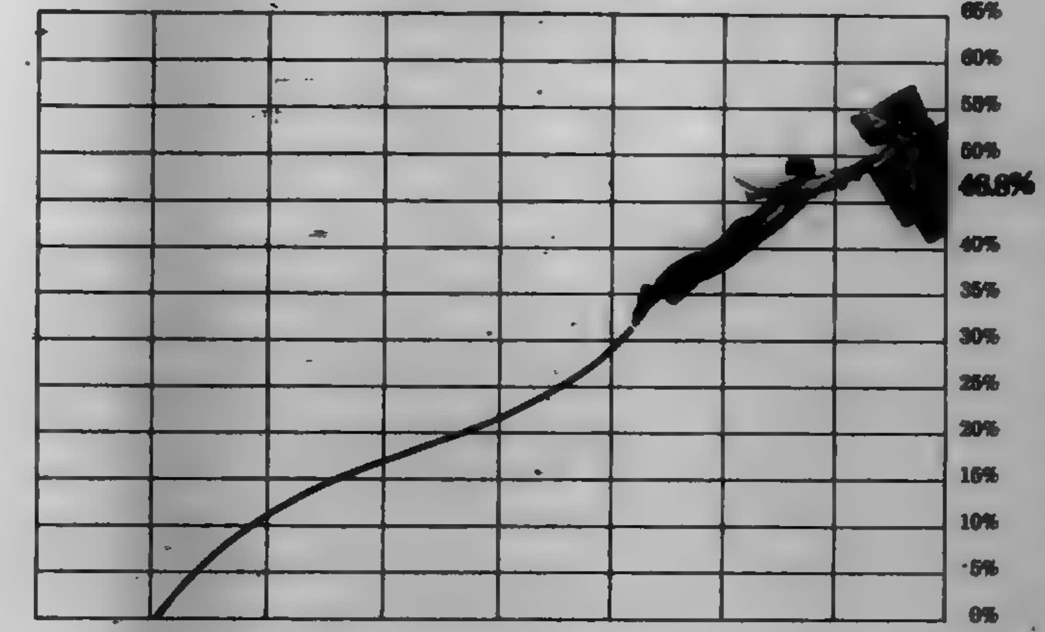

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*On-Line Software prepared a questionnaire for all InterTest users that was distributed under the control of Ernst & Whinney, one of the Nation's leading public accounting firms, who then received the questionnaires and compiled and tabulated the responses. Respondents were asked, assuming it would take 100 hours to test and debug a CICS application without InterTest, how long would it take using InterTest. According to the results tabulated by Ernst & Whinney, users claim it would take an average of 53.2 hours.
**Datamation, December [illegible] issue.

Holding company micro sales recommended

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Department of Justice has recommended to a U.S. District Court that the divested Bell operating companies should be permitted to sell personal computers because they can be used as communications devices. The department had previously said that personal computers were outside their line of business.

The Justice Department's move would allow U.S. District Judge Harold Greene, who presided over the antitrust trial of AT&T, to approve requests by Nynex Corp.; U.S. West, Inc.; Pacific Telesis; and the other regional holding companies for permission to market micros as part of a total office automation package built around communications.

The Justice Department position follows on the heels of an earlier recommendation that the divested Bell operating companies should be able to combine the marketing of their regulated telephone service with the sale of customer premises equipment (CPE). Nynex, one of the divested Bell operating companies seeking to integrate the two functions, must obtain waiver permission since it has not been clear that micro sales can be considered part of its telecommunications business.

In the latest recommendation, sent to Greene Nov. 16, the Justice Department said micros using "widely available software and connection devices such as modems will allow personal computers and word processors to perform as data communications terminals."

The Justice Department wrote that "there is no practical way to administer a distinction between small computer systems, such as personal computers, which are today used largely as communications terminals, and larger systems that may also be used with individual workstations to perform the same function."

The recommendation that Nynex be permitted to integrate its CPE sales force with its regulated telecommunications service prompted North American Telecommunications Association (Nata) President Edwin Spievack to charge, "The Justice Department has caved in — plain and simple. The department has essentially given the [divested Bell operating companies] carte blanche to define virtually all [OA] equipment as CPE."

Nata, which represents independent equipment suppliers, has vigorously opposed the requests by the divested Bell operating companies to expand their unregulated business in conjunction with regulated service. "Ominously for the future, the department appears to have given the [divested Bell operating companies] a blank check to enter a host of new ventures without first obtaining the court's permission," Spievack said. Nata urged Greene to reject the divested companies' request to sell micros in conjunction with communications services.

Special Report now accepting net news items

Are you lost in a forest of local-area or long-haul networks? Let Computerworld's February Special Report on communications networks update you on network architectures, communications software, independent software and satellite communications.

The Special Report will focus on corporate networking choices, including the feasibility of satellite, bypass and private-line networks.

Contributions to the Special Report should take one of two forms: tutorial articles discussing issues or trends or applications stories outlining a particular user firm's experience.

Articles may range from four to six typed, double-spaced pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a biography and a telephone number. The submission deadline for the February Special Report is Dec. 28.

If you have a story you would like to tell, or if you have any questions to ask, write to Janet Fiderio, Special Report Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Koppel to direct Softcon '85 panel

CHESTNUT HILL, Mass. — Ted Koppel, anchor of ABC-TV's *Nightline*, will moderate the keynote panel discussion at Softcon '85, being held March 31-April 3 at the Georgia World Congress Center in Atlanta.

Panelists at the conference will include Mitch Kapor of Lotus Development Corp., Esther Dyson of Rosen Research and John Scully of Apple Computer, Inc.

Conference programs at "The International Conference and Trade Fair for Software Merchandisers, Publishers and Corporate Institutional Users" will be divided into three groups: distributors and merchandisers, corporate and institutional buyers and software publishers and developers.

Registration for the program is $30 for exhibits or $195 for conferences and exhibits.

Information about exhibits and attendance is available from Softcon, c/o Northeast Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167.

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WASHINGTON UPDATE
Mitch Betts
CW Washington Correspondent

Energy Department plans to create Arctic data base

WASHINGTON, D.C. — The U.S. Department of Energy recently disclosed plans for creating a computerized data base of scientific and engineering information about the Arctic that would help energy firms drill for oil and natural gas there.

The said information about Arctic ice and permafrost conditions and engineering methods to cope with them is now dispersed at many institutions.

The agency said it is seeking a contractor to consolidate the information in a user-friendly data base, which would be stored in the Digital Equipment Corp. VAX-11/780 computer at the Department of Energy's Morgantown, W.Va., Energy Technology Center.

"The ultimate purpose is to promote extensive private use of this technology base to accelerate development of domestic oil and gas resources and to assist in meeting our national energy goals," according to a statement from the Department of Energy.

"Engineers and researchers will use this information to design equipment and procedures for Arctic operations," it added.

AID seeks contract-writing software for Wang micros

WASHINGTON, D.C. — The U.S. Agency for International Development (AID) recently announced plans to automate the production of procurement, contract and grant documents and specified that the software must operate on the agency's existing set of Wang Laboratories, Inc. Professional Computers.

The system would help AID contracting officers to assemble documents from the standard procurement and contract clauses that the government uses, AID said. The agency's Office of Contract Management issues about 50 bid solicitation documents and more than 3,800 contract or grant award documents each year, it said.

The agency said it is searching the marketplace to determine if software for an automated contract-writing system is available for the Wang microcomputers.

Health agency seeking VDT study suggestions

WASHINGTON, D.C. — The National Institute for Occupational Safety and Health (Niosh) will hold a meeting Dec. 17 to gather public suggestions on how to conduct its study of the effects of VDTs on pregnant women, Niosh announced last week.

The meeting, to be held at Niosh offices in Cincinnati, will "discuss the protocol for an epidemiologic study of adverse reproductive outcomes among women using VDTs," Niosh said. Comments from industry, organized labor, academia, government agencies and the general public are invited.

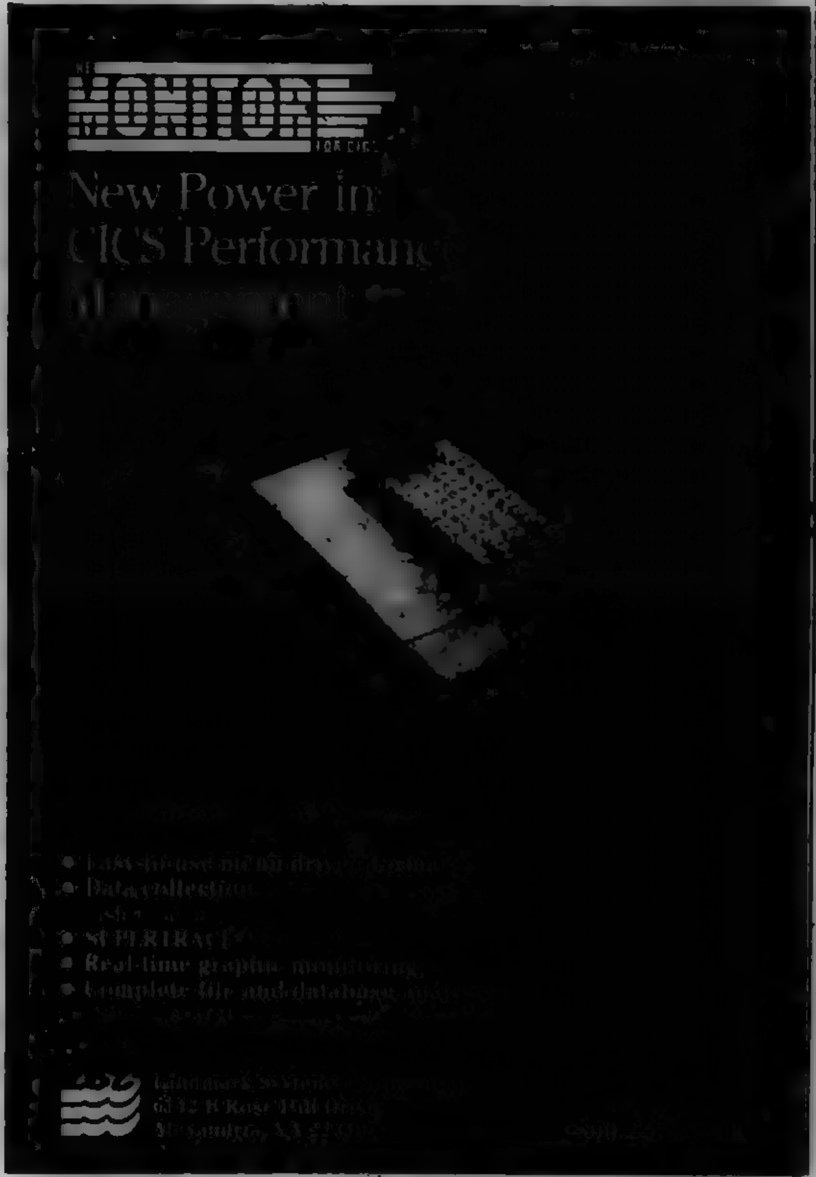
Continuing concern about possible harmful radiation emissions from VDTs prompted Niosh in May to initiate a three-year study of 6,000 married, employed women of childbearing age. Half of the subjects will be VDT operators in nonmanagement positions, and the other half will be nonusers acting as the study's control group.

DOD planning research center for supercomputers

WASHINGTON, D.C. — The U.S. Department of Defense announced last week that it will establish a Supercomputer Research Center in Maryland to develop a fifth-generation supercomputer capable of parallel processing for military and scientific applications.

The center will be built by the Institute for Defense Analyses, a nonprofit organization here, under contract with the Defense Department's National Security Agency. The National Security Agency is a major user of supercomputers for intelligence purposes.

The $12 million facility will be located at the University of Maryland's Maryland Science and Technology Center near Bowie, Md.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CW photos by P. Gillin

RANDALL DAVIS

Artificial intelligence has only begun to penetrate the commercial market in the last year or two, but at MIT's Artificial Intelligence Laboratory, the technology is nothing new. For more than 20 years, the Cambridge, Mass.-based AI Laboratory has been providing the advanced research that has made AI viable. The lab is considered one of the finest AI research facilities in the world.

Dr. Randall Davis is an associate professor at MIT's Sloan School of Management and a member of the AI lab. Davis has been involved in AI research since he was a graduate student at Stanford University in 1971. He has written more than 20 articles on the subject and has spoken at dozens of conferences and forums. He specializes in expert systems, an area of AI that is receiving attention for its advances in building systems that mimic human reasoning. Davis was interviewed at the AI Laboratory by Computerworld's *Senior Editor/Software Paul Gillin.*

Q ***There has been so much talk of AI this year, but without a clear understanding of what AI is. What is your own explanation?***

My favorite explanation is contained in the book *Artificial Intelligence* by Pat Winston [director of the MIT Artificial Intelligence lab]: It is that attempt to create programs that solve problems such that if people were solving those problems, you'd call those people intelligent. It says that while we may not be able to define [intelligence], we know it when we see it.

An old example is playing chess. There are no hard and fast algorithms for playing chess, and there are far too many positions to explore them all. If you look at a computer playing a grand master, you see that the computer can explore many more positions than the human. And yet the chess experts are better at exploring possibilities wisely than the machines. The human experts are working with something other than raw speed, and that is the intelligence to know how to choose.

Q ***What do you think of the term 'artificial intelligence'?***

The whole field knows it is a terrible term. There have been several efforts to find a better one, but nobody has managed to come up with anything that everybody can agree on. I think over time its connotation will disappear because people will stop trying to read into the words and understand that it is a label for a body of research.

Q ***What kind of work is currently going on at the MIT AI Lab?***

All sorts of things. There is work in robotics, using visual manipulation to make machines see and manipulate things. There is research getting programs to learn from experience. There is research in natural language, getting machines to understand English rather than formal computer languages. There is advanced research going on in architectures. A machine is being built here that will have a million parallel processors. There is work in advanced AI languages; the lab has long worked on new ways to program, based on experience in building AI systems. There is work in expert systems.

There is also work in commonsense reasoning, that is, those things that seem so easy and yet are so elusive; for example, the kind of reasoning a child can do about simple

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stories. There is a standard example, a simple story about a birthday party where two kids are talking and one child says, "What did you get Jack for his birthday?" The other says "I got him a kite," and the first says, "He already has a kite; he'll make you take it back."

Any five-year-old child can understand what is meant by "He'll make you take it back," understanding what "it" is, why he'll make you take it back and so forth. And capturing all that knowledge, giving it to a machine and telling it how to use it is very difficult to do.

There is also another form of reasoning that allows you to understand the simple physics of the world without the formal understanding that physicists have developed. It is a natural understanding of how things spill and fly and fall and so forth, and that is very difficult to capture.

Q ***We talk about knowledge engineering a lot. What you're talking about is almost intuitive processes, things that can't be defined in a knowledge base.***

Let's not mix apples and oranges. Knowledge engineering is a term that is used in conjunction with expert systems, and those systems typically focus on fields that require a great deal of training. It is somewhat paradoxical that it is easier to mimic the reasoning processes of a highly trained adult expert than it is to mimic the reasoning of a five-year-old. Expert systems are aimed at the former category, and the work at understanding common sense reasoning is aimed at the latter category. Both are important, but they're very different kinds of research.

Q ***Which areas of AI are more advanced in terms of practical use?***

On purely pragmatic grounds, there are three areas: natural language, robotics and expert systems. Things like [Artificial Intelligence Corp.'s] Intellect is an example of a system that does a certain form of natural language understanding. Similarly, with robotics, there are some simple robots working on assembly lines; and with expert systems, there are a few applications that are out there being used. [General Electric Co.] has a system called Delta that helps them diagnose locomotive failures. AT&T has a system called ACE that helps them work on trouble with their phone systems. [Schlumberger Ltd.] has a program called Dipmeter Advisor that helps them analyze oil well logs to help determine subsurface geology.

Q ***What do you see as the main barriers today to the development of commercially viable AI systems?***

In the short term, it is the availability of skilled practitioners. There is a much larger demand for the skill in the industrial world than there are people who can supply it. And there is also the problem of industry draining off people from the academic world that, in the short term at least, makes that problem worse. If you take people out of the academic setting, who trains the next generation?

In the longer term, what stands in the way is continued progress on the basic research issues. There are certain ideas being used now. The question is what ideas are going to be used 10 years from now, and the answer is that we don't know. That is what basic research is about.

Q ***A lot of what is passed off as AI now is really a sophisticated data base, as opposed to a knowledge base. Can you differentiate between the two?***

Let me take [Lotus Development Corp.'s] 1-2-3 as an example. With 1-2-3, we know what the data base is. We know what kinds of operations we can carry out on that data base. In the hands of a skilled financial manager, one set of operations will be carried out using 1-2-3, and in the hands of a less skilled financial manager, a different set of questions may be asked. What does the expert financial manager know that the less expert one doesn't know? That is the knowledge base. It is the knowledge and judgment to know what to do with a collection of facts.

Q ***What kinds of skills do people who program computers today have to develop to think in that vein?***

In a certain sense, they are not new skills. I think a lot of the reasoning is what people have been doing for a while. A large part of the difference is understanding that you can get the machine to do the kind of reasoning you were doing to prepare the program. So instead of writing down exactly how to do something, one might write a program that figured out what to do.

Q ***Do you think there will be commercial breakthroughs like 1-2-3 in a field like expert systems?***

There are several companies trying to build tools that would let people build their own expert systems, but it'll take longer. It is a harder problem. I don't know if anything will make the splash that 1-2-3 did because the perception was that we had never had anything like that before. I think we'll see the expert system tools evolve more publicly and more slowly.

Q ***What are you personally working on right now?***

There is a fascinating style of reasoning that people do that I'd like to understand, and my research group is trying to build programs that understand it. Say I have a malfunctioning television set. I can bring it into a repair shop that has been there since televisions were invented. The re-

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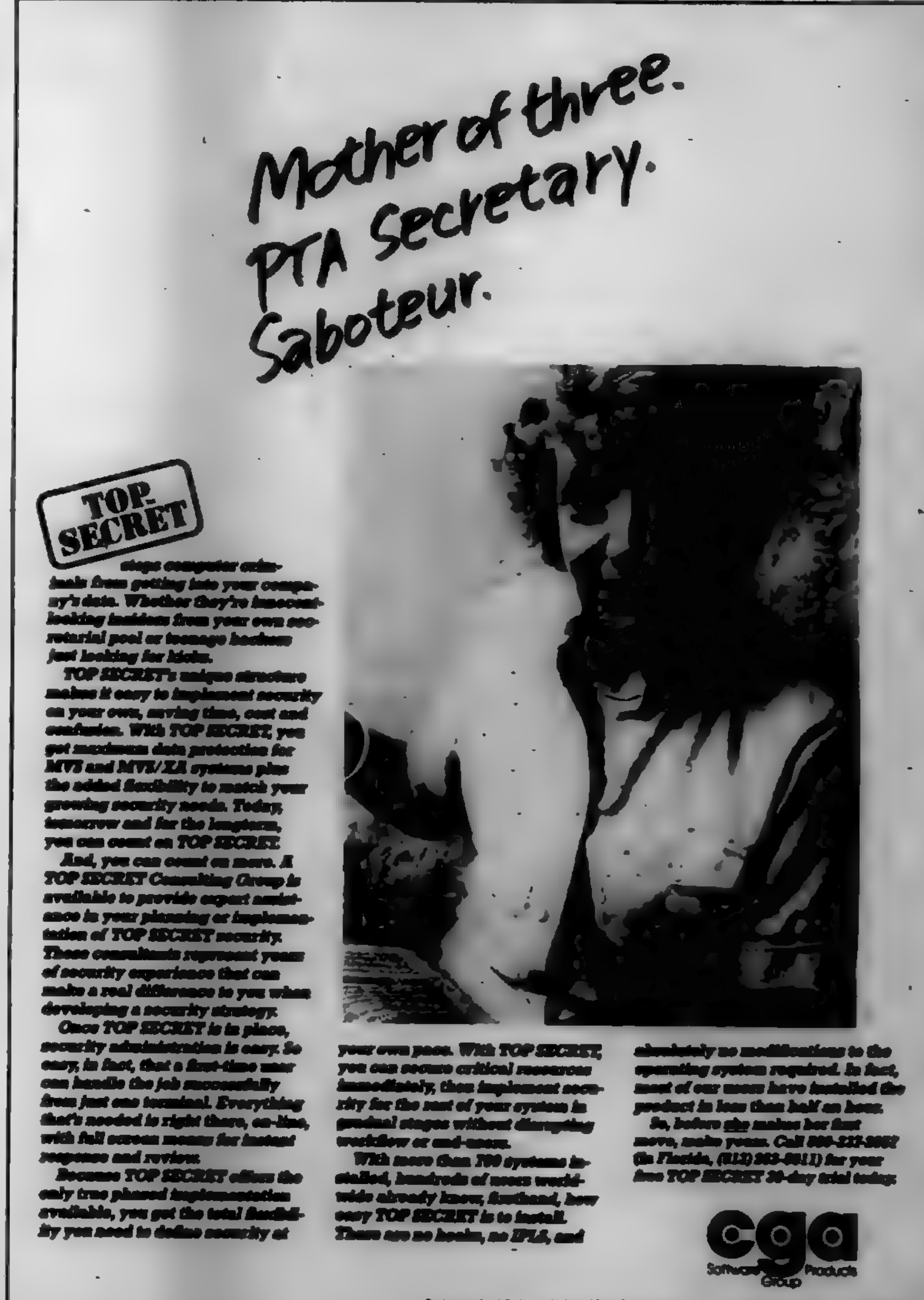
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Printing firm relies on old-timers

Twenty-year-old printers still efficient and cost-effective

HOLLISTON, Mass. — When a 115-year-old firm here decided to add computer-controlled printing to its capabilities, it selected printers that also go back into history.

The W. A. Wilde Co. began as a book publisher in 1868 and expanded into direct marketing services in 1955. Wilde used addressed labels or envelopes supplied by customers or service bureaus and printed its mailing pieces by offset lithography until 1½ years ago.

At that time, the company investigated a number of high-speed impact printers, including models by Storage Technology Corp., and laser printers from IBM and Xerox Corp., and compared the new models with IBM's 20-year-old 1403 Model N1, said Charles Barr, vice-president of Wilde. The old IBM model was certainly slower — 600 line/min as opposed to 1,500 to 1,800 line/min for the new ones — but that did not matter to Wilde, which is not a high-volume print shop, Barr said. "The 1403 is the most cost-effective for our needs," he said. "The impact quality is still one of the best in the industry."

Wilde paid between $2,000 and $3,000 for each of its six printers and added Spur Products Corp.'s S1403/Prime controllers to enable the company's Prime Computer, Inc. 850 minicomputer to drive the printers simultaneously, Barr said.

The machines print out personalized letters, renewal forms and solicitations and process response letters for the lead management services that Wilde performs for high-tech clients in the Northeast, he said.

Repairs for the old machines are no problem either, Burr said. Parts are readily available, and Spur Products' New England office provides necessary maintenance, he added.

Peters to speak at Fose '85

WASHINGTON, D.C. — Thomas Peters, coauthor of *In Search of Excellence*, will provide the keynote address at the Federal Office Systems Exposition (Fose '85) to be held at the Washington Convention Center from March 4-7.

According to the sponsor, National Trade Productions, Inc., Fose '85 will have as its theme "Integrated Office Systems: Redefining the Bottom Line."

The conference is designed for corporate and government executives, administrative managers, information professionals, business owners and association executives.

The exposition is scheduled to feature approximately 250 companies exhibiting a variety of office systems products and services.

Many technologies on display

Among the technologies to be displayed will be data communications, telecommunications, word processing and data processing, reprographics, micrographics, electronic mail, electronic printing, networking, facsimile, dictation systems and voice messaging.

Early-bird registration, before Feb. 4, for Fose '85 is priced at $275. After that date, registration is priced at [illegible].

More information about the exposition is available from National Trade Productions, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

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pairman stares at it, thinks for a minute, takes out a screwdriver, taps lightly on the side, and the television set is repaired.

Then I can imagine bringing it into the brand-new high-tech repair shop with the repairman who is just out of school. He pours through the schematics, thinks about how the symptoms he sees might cause the problem, says "Ah hah," pulls out a screwdriver, taps lightly on the side of the set, and it is repaired.

They have both diagnosed and repaired the television set, yet the style of reasoning is quite different. If we ask the first guy how he knew what to do, he would say, "I've seen that before, and when I tapped it on the side the last time, it worked." When you ask the second person, you get a long and detailed story about how the television set is supposed to work and how one can relate the surface symptoms to the television's underlying design.

That is the kind of reasoning we want to [study]. To some extent, I know how to build a program that mimics the former model. But we don't know how to build a program that mimics the latter. It turns out to be easier to make associations between situations and underlying causes than it is to build in the deeper understanding of why such a connection should exist. And that is what we're trying to do.

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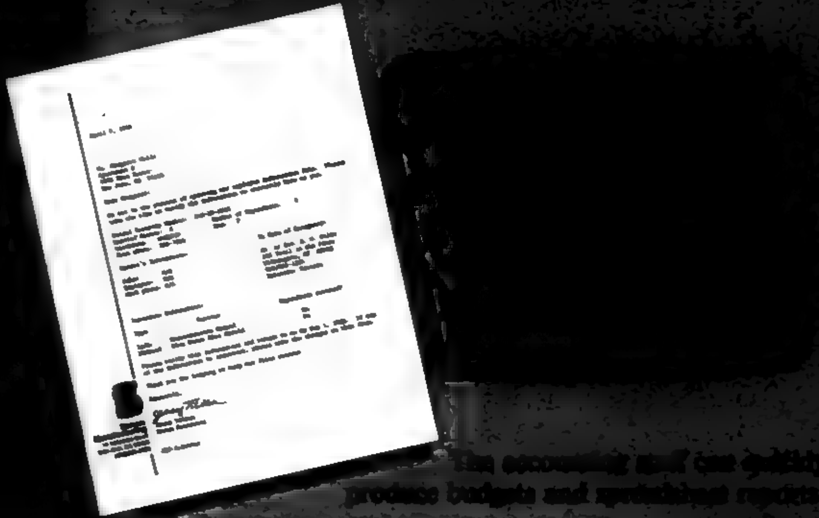

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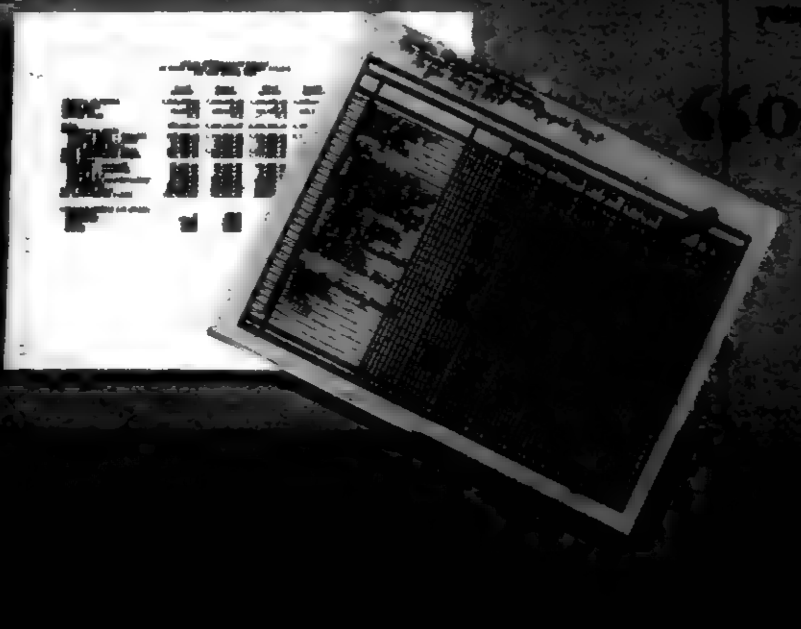

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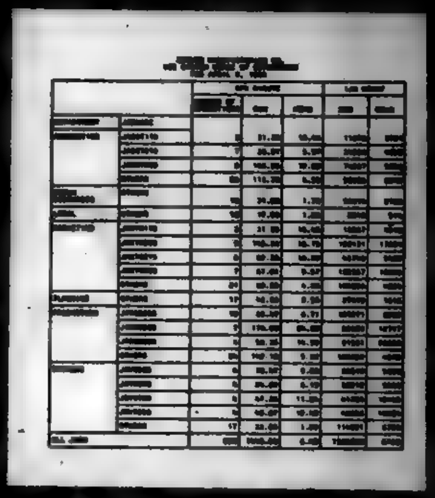

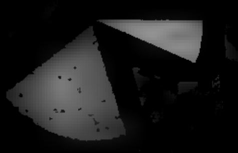

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TRW learns by redoing huge on-line DBMS

By Bryan Wilkins
CW Washington Bureau

ORANGE, Calif. — Converting a data base management system (DBMS) that has evolved over 14 years to a completely new one can be a daunting challenge in anyone's career. If the data base contains 80G bytes of credit information on 120 million consumers and eight million businesses and is used daily for on-line queries, a slipup means more than lost business.

After four years of preparation, Paul Palermo, vice-president of TRW Corp.'s Information Processing Services, said there are a few lessons to be learned in making a large data base conversion, in this case from an assembly-based software language developed internally by TRW Information Processing Services, to a new Cobol-based data management system.

Until recently TRW was planning to use IMS, a DBMS from IBM, but a late series of data runs forced the company's top management to drop IMS at the last moment because of cost considerations. The decision will mean a delay in implementing the switch-over.

"These are two different systems from any angle you look at them, and we wanted to set up our new system so it would be transparent to the on-line user and produce a comparable product as the current system," Palermo recently commented.

Palermo said that IMS will be replaced with an undetermined software product, but he predicted that scrapping IMS will not have that great an impact on getting new data base management software up and running, since the company is taking a modular approach to the development of specific applications packages for its customers.

Too costly

The reasons for dropping IMS related solely to the cost projections that TRW's Information Processing Services personnel uncovered in the process of testing the IMS system.

"There were no problems with updating and accessing the files with IMS, but the models that IMS used were not as close as we wanted them to be. We found that we were going to need more storage, which means more CPU cycles, all of which means the use of more power," Palermo said.

The firm said it ultimately wants a DBMS that will permit it to develop modular higher level applications that will debut in the future.

Over the next few weeks, TRW plans to start operation of its own new system, called Rewrite, which will run parallel to the existing system. According to Palermo, whether to create a DBMS internally that would permit organized administration of a growing data base is one of the largest questions that Information Processing Services is still wrestling.

"In the past, we had to develop our own [DBMS] because our data base was so large and there were no computers big enough, and the software commercially available was not good enough. We expect the data base to grow from 80G bytes to 120G bytes over the next few years," Palermo said.

"Just handling that much data makes the storage management a very important part of our product. Make or buy is a difficult decision. We decided that we didn't want to be in the business of writing [DBMS] but would rather be dealing in applications of them," Palermo added.

The level of planning and design expertise required people familiar with writing software, and TRW repeatedly relied on outside help to tailor its implementation. "This help was instrumental. Our original design projected more CPU capacity, and the IBM model made us go back and redesign it so that we were able to save some resources."

But with a peak of 40 TRW personnel detailed to planning and implementing the switch-over, TRW found that existing documentation to aid installation of the IMS system was not enough to get the job done.

Palermo said that in hindsight, with a system approaching implementation, "Lesson No. 1 is: 'You have to make a very good assessment of your resources and capabilities before you start.'

"Seventy-five percent of most DP shops spend their time maintaining their current data base and 25% [of them spend it] on implementing new systems. There are not a lot of people around who have experience building a new data base from the ground up, and most of us tend to overestimate our capabilities," Palermo said.

"Lesson No. 2 is: 'It is a bigger job than you think because you don't know what you will find out as you proceed.' Our current system was begun in 1971. Since then we've made many modifications to the original software with the result that it is very difficult to work on. It is inefficient because of its so-called architectural contraints, to the point that it is designed not to do what it was built for.

"There are little parts and corners

See TRW page 23

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Software safequards firm's credit records

ORANGE, Calif. — Keeping credit records on 120 million consumers and eight million businesses in the U.S. has prompted TRW Corp.'s Information Processing Services to implement safeguards to protect the privacy of that data.

Primarily because of the 1971 Fair Credit Reporting Act, consumers have the right to inspect and question the content of their credit history files in a data bank. At TRW, provision for this was made. For consumers, the procedure involves requesting in writing the particular record sought and paying $8 for a copy. The consumer must include his social security number and address.

According to Edward J. Brennan Jr., vice-president and general manager of TRW Information Processing Services, less than 0.5% of credit reports produced in a year are challenged for accuracy. Brennan said that if a fact in a credit file is challenged, TRW attempts to verify the item, and if that cannot be done, then the item is deleted.

If the item is verified, the customer has a right to add a statement to his file that becomes part of the credit report. According to Brennan, TRW receives approximately 750,000 requests to review credit files annually.

Another problem that has potentially serious consequences is the submission of inaccurate credit information by a TRW customer. When a credit history inquiry is received, the on-line software system automatically checks to see whether the request originated from an authorized customer. The request is then processed by a TRW software program called Accusearch, developed in the early 1970s to assure the fairness and reliability of the report.

According to TRW, Accusearch determines the statistically derived probability to resolve discrepancies that occur when different sets of data are matched on a particular individual. "When there are discrepancies in matching different sets of data in response to an inquiry, what is the probability that the person whose data is displayed is the one being inquired about? Accusearch was designed to offset as much as possible the fact that not all inquiries submitted to us are complete and error-free with consumer identification criteria," said TRW in a description of its safeguard system.

TRW said that it keeps negative credit information on consumers for only seven years, after which the information is deleted from the file. Bankruptcy information is kept on file for 10 years. TRW keeps information on 610 million transactions, of which it estimates that 10% can be considered negative information.

programming.

While doing research for their recent book,* James Martin and Carma McClure reviewed seventeen diagramming techniques and came to one overwhelming conclusion:

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Diagramming Techniques for Analysts and Programmers Prentice-Hall, 1984

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The Action Diagrammer software package sells for $495 and comes with a complete user guide, which includes a thorough overview of the action diagramming method. No serious programmer or analyst with access to an IBM PC or compatible should be without it.

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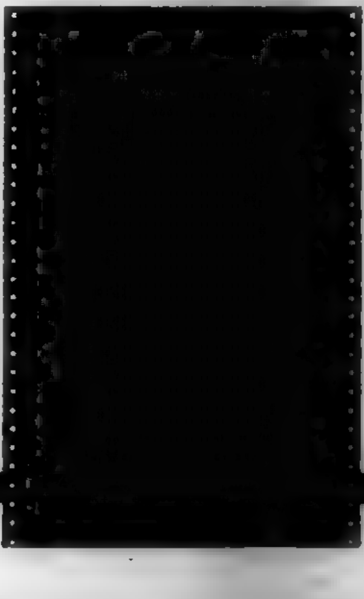

Computer show to target design professionals

NEWINGTON, Conn. — "A/E Systems Report," a newsletter on automation and reprographics in professional design firms, will sponsor A/E Systems '85, a computer and reprographics show for design professionals, June 3-7 at the Anaheim Convention Center in Anaheim, Calif.

The sponsor, based here, expects more than 15,000 architects, engineers, interior designers and facility managers to visit the estimated 1,000 booth exhibits and 150 educational sessions. The show theme will be "Building a Better Working Environment."

The basic price for eight seminars is $195. Other show-related prices will be set in the coming months.

Information is available from the Conference Director, A/E Systems '85, P.O. Box 11318, Newington, Conn. 06111.

TRW

from page 22

of the current system in existence that people have forgotten what they were for. Things were layered around the outside in order to avoid internal repercussions if major changes were made. This is safe but in the long run inefficient," Palermo commented.

In retrospect, Palermo maintained that "It is easier to develop a system from the ground up than replace one in existence" because conversion of an old system presents a problem for users.

TRW Information Processing Services will have its two systems, the old and the new, running side by side for at least six months. "This is the most expensive area of the entire exercise," Palermo noted. However, there is a small silver lining in that although the two DBMS require duplicate hardware expenses, the duplication will mean only one year's worth of expenses being moved up.

Palermo's final word of advice is: "Don't cut over to your new system until you are sure it is ready." In this case, TRW will test its new system against a benchmark — the old system it is phasing out.

NEWS

Volatile micro market frustrates DP trainers

By Maura McEnaney
CW Staff

PHILADELPHIA — With products and standards changing almost overnight, today's data processing trainers are in an uphill struggle to keep pace with microcomputer training needs.

During spot interviews at the recent Fifth Annual Data Training Conference and Exposition here, trainers told *Computerworld* about their efforts to deal with the changing microcomputer market, the volatility of available funds for training and company fragmentation of training responsibilities.

A feeling of frustration also came through at seminars held during the three-day conference, which drew more than 900 registrants, 300 exhibitors and 60 speakers.

"I don't know how to estimate what I need," said Cyndi Tucker, education coordinator for Conoco, Inc.'s Computer and Telecommunication Services department. "Should I be active or reactive?"

For now, a reactive approach works best at General Electric Co., according to Alan Schwartz, training specialist. Because personal computer needs are hard to determine, Schwartz said, GE's micro training is geared toward "what's popular. . . . Maybe that's a cop-out," he added, but for now, there are few solutions.

Training for variety of products

Most of the trainers agree that by the time a company can develop a training curriculum for their employees, a newer product is on the market and is being accepted just as quickly as the one for which they developed material. As a result, trainers are implementing training that will teach end users how to adapt to a variety of products.

Employees at Johnson & Johnson are taught a "generic awareness" of systems, according to Lois Carducci, a data trainer specializing in personal computers. Her company's micro training program for all levels of employees is only two months old. In that time, the company has used questionnaires to try to determine a user's needs, Carducci said. But because of the time involved in developing educational products and materials, employees have turned to other methods.

'My budget corresponds to corporate profits every time. Two years ago, my budget dropped 50%; today, I have megabucks.'
— Donald Frabutt, trainer, Ford Motor Co.

An intense variety of training needs and an improved economy have fueled corporate budgets for educational services over the past several years, according to Nancy Weingarten of Warren-Weingarten Publications, Inc., conference sponsors and publishers of *Data Training* magazine. As a result, many of this year's attendees brought with them a purchasing power that was absent years ago, she said. But the volatility of those budgets remains a concern for educational personnel.

"My budget corresponds to corporate profits every time," said Donald Frabutt, a trainer at Ford Motor Co. "Two years ago, my budget dropped 50%; today, I have megabucks." Management sometimes does not recognize that increased productivity through training is more often needed in periods of decline, he noted.

The increased emphasis on office automation and data processing has caused several companies to decentralize training functions, creating problems for the training manager, attendees said.

At the Federal Reserve Board in Washington, D.C., training administrator Walter Davis said data education is done in several different departments, including office automation, data processing training and human resource and development departments. He added that his organization needs someone to outline objectives for the entire training program.

Today's trainer is more sophisticated about technology, and their departments are more organized, Weingarten said. "Training is a recognized profession now."

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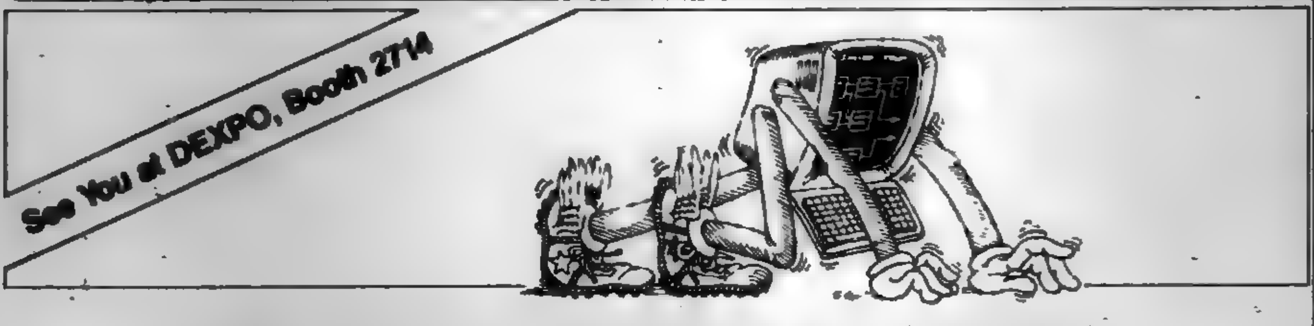
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CAD expo to discuss technology

NEW YORK — Computer automation in electronic design, testing and manufacturing will be topics discussed at the Cadcon West '85 Conference and Exposition at the Anaheim Convention Center Jan. 14-17 in Anaheim, Calif.

The four-day conference will include tutorials, technical sessions and workshops on computer automation technology. Topics to be discussed include computer automation selection, evaluation, start-up and expansion; microcomputer-based computer-aided design (CAD); managing the growing CAD facility; and exchanging data among computer-aided design and manufacturing systems.

Registration for the program is $365 before Dec. 28 and $395 thereafter.

More information on the conference is available from Morgan-Grampian Expositions Group, 2 Park Ave., New York, N.Y. 10016.

Interpersonal skills urged

By Maura McEnaney
CW Staff

PHILADELPHIA — Information managers must shed their departments' technical image and concentrate on perfecting interpersonal skills if they expect to survive in the changing MIS environment.

According to Richard DeFiore, president of Systems Management Associates in New York, "The microcomputer explosion is changing the entire complexion of the roles and responsibilities of the MIS function." Managers must learn to develop better listening and communications skills in order to work effectively with end users, he told attendees of the Fifth Annual Data Training Conference and Exposition here recently.

DP managers were once looked upon as "technical gurus," but micros have slowly changed that image, DeFiore said. It is up to company training departments to help MIS departments treat their clients as partners, not adversaries, he said.

Attempt to manage DP functions

"Too many people in the MIS organization are looking to hold on to control [of all DP functions]," he said. "With the [personal computer] explosion, there's no way to control it. However, you may be able to manage it . . . ."

To keep up with these changes, data trainers must educate DP professionals in several critical areas, DeFiore said. Helping the MIS professional get a better perspective of the business is one key area, he noted. Trainers must also help the MIS practitioner turn his loyalty to the profession into loyalty to the company.

"Three years down the road we are going to have to have team players, not individual achievers," he said. "It is the trainer who must help develop a team spirit [among technicians and users]."

When people are involved in change, conflicts are inevitable, DeFiore said. However, the method of handling conflict can be the difference between success and failure, he said. "Too many of you spend too much time seeking hardware and software solutions and not enough time dealing with [people problems]."

The consultant suggested that companies work toward establishing an MIS culture, where open communication, innovation and productivity play an important role.

"Switching personnel between MIS and end-user departments will give DP professionals empathy" for other department concerns, he said. You are in the innovation business," DeFiore told the group, "tax people's brains, allow them to participate" in problem solving.

OA systems strategy '85 conference topic

ATLANTA — Howard Anderson, managing director of the Yankee Group, will be the keynote speaker at the 1985 Office Automation Conference to be held from Feb. 4-6 here at the George World Congress Center.

Anderson's address is titled "Integrating Office Automation Systems Strategy and Tying-In With Corporate Strategy." The Yankee Group is involved in market analysis of the computer, communications and OA industries. Anderson overees four groups for Yankee: communications/information systems, critical path, home of the future and factory systems.

The conference is aimed at professionals and managers who need to evaluate current technology, new products and industry trends. Forty-eight technical sessions have been organized into six tracks on the conference theme of "Today's Partnership: People & Technology."

Exhibitors will include representatives from telecommunications, software, OA, computer systems, personal computers, data base management and information service, peripherals, computer graphics, consulting and publishing concerns.

OAC '85 is sponsored by the American Federation of Information Processing Societies, Inc. (Afips).

Advance registration for the conference is $125, and registration on-site is $150. More information on the conference is available from Afips, 1899 Preston White Drive, Reston, Va. 22091.

Publishing meeting set

CHICAGO — The Corporate Electronic Publishing Systems: a Conference/Showcase will be held Jan. 8-10 at the Hyatt Regency Chicago at Illinois Center.

Sponsored by the Cahners Exposition Group of Stamford, Conn., the conference is designed to inform executives of the latest developments in electronic publishing.

The keynote speaker on Jan. 8 will be Robert Adams, president of the Xerox Systems Group in El Segundo, Calif. The exposition will be open all three days of the conference.

Conference registration costs $695 for three days and $295 for one day. Admission to the exposition is $15 at the door or $5 for preregistrants.

For information contact Corporate Electronic Publishing Systems, 999 Summer St., P.O. Box 3833, Stamford, Conn. 06905.

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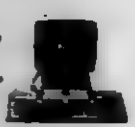

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Link developing in Canada

Telecom Canada hoping to tie retail POS systems into nationwide electronic funds transfer network

By James Connolly
CW Staff

OTTAWA — Telecom Canada, an association of Canada's nine largest telephone companies, is developing an architecture to tie retail point-of-sale (POS) systems into a nationwide electronic funds transfer (EFT) network.

The plans by Telecom Canada, outlined in a recent address by Senior Vice-President Mike Corlett, include development of standards for POS systems and, eventually, an EFT switching system run by Telecom Canada.

> *'We're proposing that Telecom Canada provide data transmission, network switching and network management. . . .'*
>
> — Mike Corlett, senior vice-president, Telecom Canada

"We're proposing that Telecom Canada provide data transmission, network switching and network management, working in a cooperative effort with the retail and financial communities. A nationwide network that allows separation of individual systems is the answer," said Corlett in a speech to the Payment Alternatives Communication Exchange, a coalition of retail, financial and vendor organizations.

Later, expanding upon Corlett's remarks, Telecom Canada industry manager-retail, Pierre Taillefer, noted that Telecom Canada is in a position to establish nationwide POS standards because it has nationwide involvement in telecommunications. Taillefer contrasted the Canadian approach with that of the U.S., where, he said, regional POS systems have developed largely by being "piggybacked" with other services.

Taillefer, stressing that his company is not currently installing an EFT switch, said Telecom Canada expects to outline POS standards in early 1985, addressing how to best use existing technologies.

He said a natural approach would be to have Telecom Canada's existing Dataroute digital transmission network and Datapac packet-switched network play key roles in a nationwide POS network.

Canada is unique in that it is a large country with a small population spread across a 3,000-mile band and with only five major banks serving most of the nation, according to Taillefer. He estimated that 220,000 Canadian retail outlets offer credit card service and that a nationwide network could service that group. He said the nationwide network would connect, not compete with, the POS systems that many of those retailers are developing.

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Aussies line up distributorships at Comdex

By Susan Mahoney
CW Staff

LAS VEGAS — Anton Mayer measures the success of a trade show by how many sales and distributorships he can line up. Mayer was happy with the way things were going at Comdex/Fall '84 held here recently, noting that "attendance is down, but the [high] quality of visitors is still very much here."

Trade Commissioner and Consul Mayer led the Australian Department of Trade's contingent of eight venders to Comdex. The government-paid booth at the show was intended to showcase Australian wares and to entice dealers in the U.S. to represent Australian products.

"This is my third Comdex, and I've noticed a lot of empty spaces here," Mayer observed. "Several companies have gone out of business since the time they bought their exhibit space. You could still buy main hall exhibit space last week because it wasn't being used.

"I think the U.S. computer industry is going through a period of rationalization right now," Mayer theorized. "It seems to be thinking more about where it spends its R&D dollars. Development in software, for example, is so expensive that it's only the big companies that can do it," he said.

When asked if this period of rationalization was mirrored in Australia, Mayer said it was not. "In Australia, the growth curve of the industry is still going up. In the U.S., it's flat because of the shakeout."

Mayer said the Australians were making their mark in the IBM-compatible software and peripheral arenas, and both industries were making healthy strides. "IBM is the de facto standard in Australia, so we tend to concentrate on serving this market."

Mayer said that while Australia is feeling the Japanese presence, "Japan is 10 years behind the U.S." He added that Japan was making a "hard push" in Australia; it was not, however, importing Australian products nearly as much as Mayer would like.

"With the U.S., the information flow and the flow of technology is a two-way street. We sell about $3 billion worth of products every year to the U.S. and buy about $6 billion."

Lamenting that very large computer contracts were still going to U.S. vendors, Mayer said, "You can't buy a product if it is not as good and more expensive than another one — no matter how nationalistic you might be. It's too bad, but that's the way it goes."

NBS issues standards directory

WASHINGTON, D.C. — The National Bureau of Standards has issued a directory of standards developed by trade associations, technical and professional societies, federal agencies and state governments.

"Standards Activities of Organizations in the United States (SP-681)" summarizes the activities of more than 750 organizations in the U.S. as well as 420 private sector groups. The directory also contains a list of 632 nongovernment groups that develop standards, contribute to the standardization process or are sources of documents and information.

The standards directory, stock number [illegible], is available for $13 prepaid from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

PC World Expo set for Houston Jan. 16-18

HOUSTON — The PC World Exposition will be held at the Astrohall here on Jan. 16-18. This year's show, sponsored by CW Communications, Inc.'s *PC World*, will emphasize personal computer implementations and software applications products for business users in vertical markets, the sponsor said.

Conferences will be presented on networking, software for various industries or offices and the packaging, marketing and distribution of personal computer products. Four hands-on centers will provide experience with personal computer products.

The admission for conferences and the exposition is $35, and admission to exhibits only is $15. More information is available from PC World Exposition, Mitch Hall Associates, P.O. Box [illegible], Westwood, Mass. [illegible]

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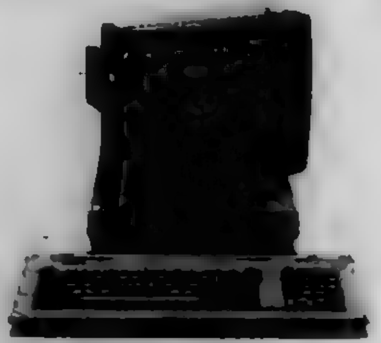
1 There's our position on the bottom line. Simply put: No one can match our emulations, editing and ergonomics for $549.
Can anyone better this price?

2 Only at the expense of features. Often it's obvious where they've cut corners:
With a pug-ugly box.
But as you can see, the Ampex 210 is sleekly ergonomic.



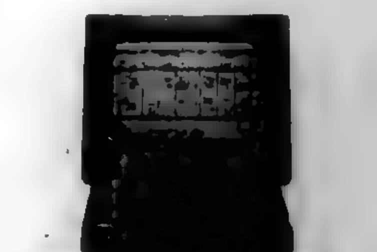
3 We human-engineered the Ampex 210 with a full 14" screen that tilts and swivels to just the angle you need. So it's comfortable to use, no matter how you're positioned.

7 As well as the local editing and block mode transfer capacities you need to speed work flow.

8 Plus 16 resident emulations you can switch at the touch of a key. Including the TeleVideo 910, 910+, 912, 920 or 925*..

9 The Lear Siegler ADM 3, ADM 3A, 3A+ or ADM 5*..

13 What's more, we'll add more. In OEM quantities, we'll customize our 210's appearance, personality and programming so it's perfectly suited to your needs.



14 And if you need a more powerful terminal with even more features, consider the next step up in our family of terminals: the Ampex 230.

15 We back every Ampex terminal with a six month warranty and a worldwide service network.

*TeleVideo, Lear Siegler, Esprit and Qume are trademarks of TeleVideo Systems Inc; Lear Siegler Inc; Esprit Systems Inc and Qume Corporation respectively.

Singapore unplugs electronic bulletin board

By Abdul Rahman
Special to CW

SINGAPORE — This country's first computerized bulletin board service has been shut down because it was said to violate regulations governing the use of the national telephone system.

The bulletin board functioned like a public notice board, allowing people connected to it to send and receive electronic messages and exchange public domain software. To access it, users simply connected their terminals to the service via a modem.

Stephen Saftler, the man who introduced the service, said that since the bulletin board started in June, it had attracted about 300 users here — 100 of whom are regulars.

"This is a free, no-strings-attached, not-for-profit computer system intended to increase people's knowledge of computers," he said. Throughout its operation, interest in the bulletin board had steadily increased, according to Saftler, and there had been very few abuses of the facility.

The bulletin board service is micro-based, and messages are stored on two Control Data Corp. 8-in. disk drives and two half-height drives for a combined storage capacity of 5M bytes. To access the bulletin board, users need Bell Laboratories 103, 212 and CCITT V.22-compatible 1,200 bit/sec modems.

Telecoms inspection

Saftler explained that three officers from Singapore's Telecommunication Authority (Telecoms) visited him recently to inspect his installation.

"They found it to be quite to their liking and properly licensed," he said. "However, we were in disagreement about three of the items outlined in Telecoms Datel Service Agreement."

Saftler said the terms covered the provision of telecommunications services by the subscriber to others, using the modem to communicate with others and using non-Telecoms equipment to provide switching services without prior written consent from Telecoms.

He has admitted that he violated some of the terms and said he would write in for formal approval to operate the service.

Saftler, who came from Boston in February, is technical support manager of LTX Corp., a producer of semiconductor test equipment. He said he had no problems when he had previously operated a similar service in Boston that had around 3,000 callers from 39 states.

Rahman is an associate editor at The Asian Computerworld, *a sister publication of* Computerworld *with offices in Hong Kong and Singapore.*

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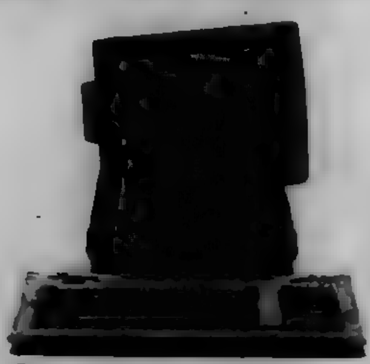
4 We also equipped it with a low-profile, Selectric-style, adjustable-slope keyboard for easy typing.

5 And with a soothing, flicker-free amber screen for easy reading. (If you prefer, you can have the option of green at no extra cost.)



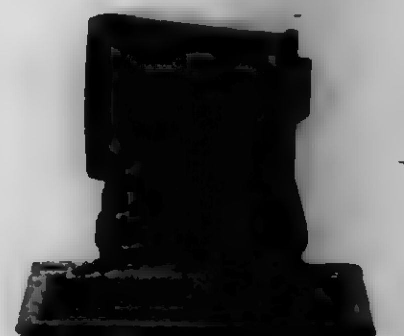
6 But ergonomics are just the beginning. The Ampex 210 is as beautifully engineered inside as outside. With line graphics and a bidirectional printer port as standard features.

10 The Esprit (Hazeltine) 1400, 1410 or 1500*..

11 ADDS Regent 20, 25 and Viewpoint.†..

12 And Qume's QVT 102*

16 How can we pack all that into the Ampex 210 for just $549? We're in a position to be competitive. We can take advantage of over 25 years of video, computer peripheral and offshore manufacturing experience.



17 So if you need a well-designed, full-featured terminal, call us at 800 621-0292. Or 800 821-9473 in California. We'll show you how you can be very comfortably situated for just $549.

AMPEX

18 The Ampex 210 is from the Computer Products Division of Ampex Corporation. One of The Signal Companies

†ADDS, Regent and Viewpoint are trademarks of Applied Digital Data Systems Inc.

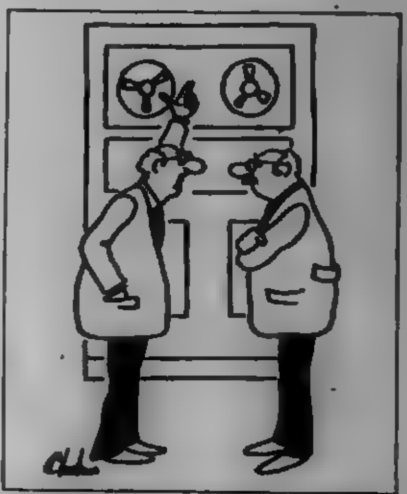
Japanese fair set to welcome U.S. vendors

NAGOYA CITY, Japan — As many as 200 American firms, many in high-technology fields, are expected to register for the Made in USA Fair to be held here March 11-14, according to the fair's sponsors, the U.S. Department of Commerce and the Japan External Trade Organization (Jetro).

Among those already planning exhibitions are Amlab International; Hershey International; and Xport, the trading company of the Port Authority of New York & New Jersey, Jetro said. The fair is intended to stimulate U.S. exports to Japan, the trade agency added, by allowing U.S. firms to exhibit before a large Japanese audience.

Over 10,000 Japanese buyers are expected to attend the show, according to a Jetro official. The show will take place in the 80,000-sq-ft International Exhibition Hall here, where facilities will be provided free. However, vendors must bear the travel and shipping charges.

Jetro is located at 1221 Ave. of the Americas, New York, N.Y. 10020.



'We were going to call our computer system the Titanic — but the Titanic only went down once!'

UK software specialist supports IBM's System/38

Company considers advantages of DBMS capabilities when developing software

By Jane Lawrence
Special to CW

LONDON — Mike Newman does not just like his IBM System/38 mid-range machine — he loves it. He can praise its data base management capabilities for hours. Recent announcements from IBM, indicating continuing support for the machine, made him very happy.

Insight Database Systems' (IDS) managing director is, in fact, more attached to his System/38 than most. Before starting up IDS, Newman spent 10 years with IBM — most of which were spent working on the development of the machine, which is now approaching its sixth birthday.

He left IBM in 1979 and set up IDS to be a System/38 software specialist company. The firm now has 260 users of its Insight financial software in the UK alone and 550 worldwide.

The company opened its doors five years ago with four people, private financing and revenues that amounted to practically nothing. By 1981, the staff numbered 15, and sales swelled to $1,008,000. Currently, Newman employs almost 50 people, and 1983 sales were $1,764,000. IDS established an office in New York, and development work is being carried out in Ireland.

The Insight software products have grown from financial modeling to include financial management, banking and insurance systems. Each of these systems takes advantage of the System/38's data base facilities — the only IBM machine with an embedded data base management system.

Insight encompasses modeling, general ledger, accounts paid and received and, as of recently, a facility called Databridge that links data from an existing user's software to the Insight range.

But Newman is admittedly not through developing Insight, and he listens carefully to any user criticism of the product. "We realize users need to be able to work with their data," he said. "It's a general malaise with software — data needs to be able to be consolidated and often can't be.

"Everyone is trying to solve such problems, but we feel we're at the leading edge and can do something about [them]," he said.

Another upcoming development at IDS is a product for the IBM Personal Computer. Soon users will be able to work in the System/38 mode while connected to the central machine or in the Personal Computer mode when the micro is not connected, according to Newman.

"This means the System/38 is freed for data handling — the thing it's good at," Newman explained. "Power-draining tasks like financial modeling can then be done on the [Personal Computer] using its local processing abilities."

> *'A software house that is not selling hardware could be left out in the cold; . . . its new market will be subcontracting to the agents.'*
>
> — Mike Newman, Insight Database Systems

In terms of hardware, Newman said he believes "you're nowhere if you're not an IBM agent." And his relationship with the giant American vendor is highly important to him. "We have, after all, an exclusive emphasis on IBM systems," Newman pointed out and said that he wants to establish his company as a major agent for IBM in 1985.

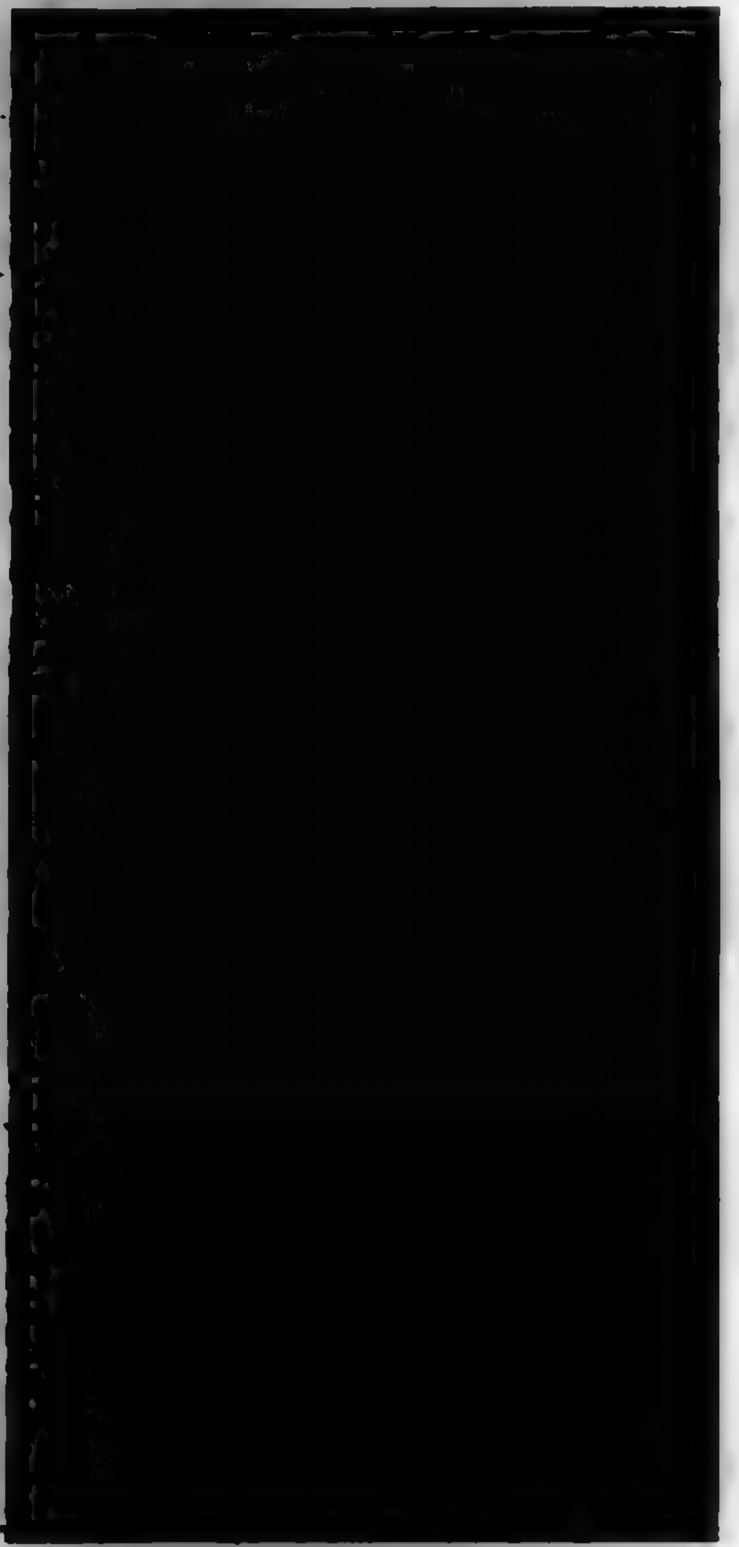
"It's likely by then that everyone will be thinking of becoming an agent to sell IBM hardware, and a shakeout is sure to follow. We plan to position ourselves early, so that we are one that stays around," he said.

IBM has already made it clear to leasing companies that it will continue to sell its own equipment at the 4381 level and above. But below that line, the vendor will be happy to allow third parties to move the boxes, Newman predicted.

"This is going to make a tremendous difference to the old-style software houses," Newman said. "As an agent, clients will be dealing directly with us for both their hardware and software. We, in turn, will be dealing with IBM.

"A software house that is not selling hardware could be left out in the cold; . . . its new market will be subcontracting to the agents," he said.

Lawrence is the news editor of Computer News, *the British sister publication of* Computerworld.



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INTERNATIONAL REPORT
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AUSTRALIA

SYDNEY — Torrential rains caused severe flooding in three of four exhibition halls used for the recent Australian Computer Conference '84 here, and power was lost in the main hall, it was learned. The electrical switchboard in the Royal Hall of Industries was reportedly submerged under almost 3 meters of water and will have to be replaced at a cost of approximately $100,000. Carpeting and computer equipment throughout the hall were also damaged by the flood, and the hall remained open without power on Friday, the last day of the show. Vendors were unable to demonstrate systems or software to the sparce crowds, and show sponsors Riddell Exhibition Promotions waived the entry fee because of the inclement conditions.

■

BOX HILL — In a dramatic turnaround from previous years, Data General Australia Pty. Ltd. posted a 73% jump in revenues and a "substantial" but undisclosed profit, according to sources. The result mirrors DG's worldwide results, which showed a 40% increase in revenue in its fiscal year ended Sept. 30.

■

ADELAIDE — An order for 224 NEC Corp. APC 111 computers was recently placed by the South Australian Department of Technical and Further Education (SA Tafe). According to SA Tafe official Jeff Porter, "IBM was not in the running in terms of price." Apple Computer, Inc.'s Macintosh was likewise ruled out because of high costs, Porter said.

■

PERTH — The Australian Wool Testing Authority has ordered almost $2 million worth of computer equipment from Burroughs Corp. The authority previously used six Burroughs' B1800s, which reportedly offered no suitable upgrade path and needed to be replaced. The order calls for three Burroughs A9 mainframes, 30 of the vendor's B25 workstations and Linc 4GL software. The authority will use the equipment to tabulate its 500 annual tests conducted each spring for wool buyers.

■

MELBOURNE — Australian computer maker Labtam Pty. Ltd. has signed a contract valued at over $1 million with the Chinese government to supply 50 of its Model 3003 Z80A-based systems, along with the components needed for the Chinese to manufacture an additional 250 systems. The computers reportedly will be used to automate government factories.

■

TASMANIA — A point-of-sale system based on the IBM Personal Computer is newly under production here. Sources said IBM Germany backed the undertaking, and the state government here has provided a $500,000 grant for the project. IBM reportedly will demonstrate the newly developed PC Cashier at the 1985 Hannover Fair in West Germany this spring.

FRANCE

PARIS — European manufacturers CII-Honeywell Bull, Siemens AG, Nixdorf Computer AG, ICL Co. and Olivetti Corp. will form an association to promote a common version of the Unix operating system in Europe. This announcement came in the wake of the formation of a joint R&D center by ICL, Bull and Siemens and follows a written agreement by 12 European computer makers to utilize the same Open Systems Interconnect standard. It is thought that the European manufacturers' move is intended to counter IBM's and AT&T's strong presence in the European market. They have projected that the number of corporate Unix users here will jump from 2,000 this year to 8,000 next year and wish to secure themselves a place in this market, sources said.

Olivetti's close affiliation with AT&T did not hamper its desire to belong to the the European pact. Insiders find it curious, however, that the Italian manufacturer, which sells the AT&T 3B series here, has joined with European high-tech companies. It is thought that Olivetti has an acute conflict of interest: Its financial and technical allegiance to AT&T seems in direct opposition to its cultural and geographic kinship with other European computer companies.

JAPAN

TOKYO — Hitachi Ltd. has developed the HT-5683 Kanji-character line printer. The $540/mo machine is said to be capable of speeds of 200 line/min, and can reproduce graphics, figures and pictures, as well as data. The impact printer can be used with the vendor's L-450/470 midrange mainframe and also with the Hitachi T-560/20 data system and M-220 processor family. The printer will be available in March.

WEST GERMANY

BERLIN — The IBM Personal Computer, Personal Computer XT and Personal Computer AT will act as multifunction end-user products capable of videotex, it was learned at the IBM-Videotex Congress, held here recently. This capability reportedly was made possible by an IBM adapter card that supports the Postal Telephone and Telegraph Administration decoder.

When a big story breaks, you'll hear about it faster thanks to the new UPI Computer System, which utilizes the Zenith Z-150 PC as its central hardware component. UPI chose the Zenith Z-150 only after testing and even "roughing up" dozens of leading microcomputers, because it delivers the total performance that helps radio and TV stations report the news as quickly and accurately as possible.

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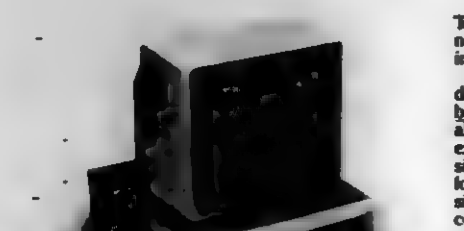

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Network to save institute $100,000 annually

BEAUMONT, Texas — A state organization expects to save $100,000 a year with the help of an office automation system, although only 24 employees use the system's 16 personal computers and minicomputers.

The John Gray Institute, chartered in 1981 and located on the Lamar University campus here, is a privately funded, state-operated organization whose primary responsibilities are to improve relations between labor and management, study ways to increase productivity and provide educational programs and training. Its aim is to improve economic opportunities in the Gulf Coast area.

The institute last year spent $250,000 to install Xerox Corp. office automation equipment, linked on an Ethernet local-area network, to create, manipulate and transfer text, graphics and statistics. The institute expects the network to pay for itself within two more years.

"What this technology has done is give us more time to perform the tasks the institute is chartered to perform," said Steven Lawrence, assistant director for administration at the institute. "Without these information processing tools to help us, our present staff couldn't do all of the work. We'd have to hire at least three more secretaries, our research staff would have to be expanded, we'd need another bookkeeper and we'd have to pay commercial rates for a lot of the work our equipment enables us to do right here."

'We learned that most computer companies train their people to sell to management, not to users.'

— Steven Lawrence, assistant director for administration

The Xerox 8000 network system at the institute includes two Xerox 8010 Star information processing systems. Tied to those systems through Ethernet are six Xerox 820-II personal computers and three Xerox 16/8 small-business computers used for document creation, a Xerox 8037 80M-byte file server and five Xerox 860 information-processing systems used for document revisions.

The communications capabilities that let the varied computers transfer work among themselves were the key factor in choosing the Xerox system, according to Lawrence.

But ergonomics was another important element in the process.

"We made a conscious effort to think first of the people who would work here. We knew that their environment would affect their productivity. We determined not only to give them the right to work, but with the right setting," Lawrence said.

During the selection process, the institute sent three secretaries with a needs list to three vendors.

"We told those companies we wanted our secretaries to turn on the machines, load the software, learn whatever they needed to perform the tasks they defined, then report their findings," Lawrence said. "It was a frustrating experience, both for our secretaries and for each company's sales representatives. They just weren't geared to sell their products this way. One company even chided us for allowing our secretaries to have a say in what it considered to be strictly a management decision.

"We learned that most computer companies train their people to sell to management, not to actual users. Aside from being able to show a few standard demonstrations designed to dazzle executives, many sales people don't really know how to use the machines they sell."

He added that Xerox best met the institute's needs. The system replaced stand-alone CPT Corp. word processors that the institute used on a temporary basis for just over a year.

Lawrence said the greatest cost savings came in the initial keyboarding and revision of research papers, newsletters and brochures. "We do a lot of original manuscript typing in the course of our research here, and since it's virtually impossible to dictate this kind of material, the equipment helps the authors simply by being so easy to use," he said.

Researchers do the initial manuscript typing on the 820-IIs and 16/8s and transmit to the 860s for secretarial revision. The smaller computers also are used for data analysis and data base management. The 8010 workstations produce graphics and incorporate graphics into text for final output.

Printing is handled by a 12 page/min Xerox 8046 laser printer.

Lawrence noted that as a new organization, the institute had an advantage in automating the office. He said of the two-year-old project, "Some people struggle with the idea of when and how to automate their offices, but we had automation in mind right from the beginning."

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☐ What is the difference between a program and a software product
☐ How to package your program
☐ How to name your product
☐ How to price your product
☐ How to develop sound Documentation, Cost Justifications, and Competitive Comparisons
☐ How to sell your package to a software vendor company
☐ Successful author-vendor agreements
☐ How to make appointments with the President or "Top Man" of a corporation
☐ How to make a successful sales presentation
☐ How to start your own software marketing company
☐ How to develop sound customer support
☐ How to develop prospecting procedures, product education, maintenance and enhancements
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Integration halves fireplace maker's DP costs

MOUNT PLEASANT, Iowa — A manufacturing company here slashed its data processing budget almost in half by converting to a new system.

Heatilator, Inc. — a division of Hon Industries that makes steel fabricated fireplaces for home installation — spent a half million dollars a year in data processing for equipment rental, maintenance, a 10-person DP staff and software development costs, said David Mayes, MIS manager at the time of the conversion. The company wanted to add a fully integrated manufacturing package to its IBM 4300 batch processing system, he said.

Heatilator hired Mayes to evaluate the current installation and make recommendations for either upgrading or changing it, he said. "I surveyed the costs of bringing in a fully integrated manufacturing system for the 4300, and it would have been $300,000 to $500,000 for the software alone," Mayes said. The company had set aside a budget of $150,000, he added.

New system cost less than an upgrade

Mayes investigated minicomputers and found that a Prime Computer, Inc. Prime Information System with a fully integrated manufacturing package met the company's needs and stayed within the budget. After waging what he called "quite a battle with corporate directors who did not believe you could put in a good, new installation for less than the cost of an update to the old one," Mayes ordered the system.

Nine months later, the system was fully implemented. The company bought a used Prime 11000 with a 160M-byte disk to start. "We went from batch to totally on-line processing, cut our spending on data processing companywide by 40% to 45%, decreased the DP staff from 10 to two people, and we're doing a lot more processing," Mayes said.

After the installation of a labor reporting system a few months down the road, response time became a problem, and Mayes upgraded to a Prime 750, he said. Since the installation, the facility has gone from 15 to 24 Applied Digital Data Systems, Inc. Viewpoint terminals and includes a Printronix, Inc. T300 system printer and six slave printers by Datasouth Computer and Mannesmann Tally Corp., totaling $260,000, he said. In the same period of time, the company's business has increased 50% in dollars and unit volume with the same number of employees, and nobody works overtime, Mayes said.

Little technical knowledge required

The software includes a full accounting system — general ledger, accounts payable, accounts receivable, order processing and payroll written by Compufact of Santa Ana, Calif., Mayes said. The old system had no manufacturing software, he said. The new one, Mayes continued, provided 90% of the capabilities that the manufacturing facility needed with Compufact's Man-Fact II manufacturing system, which includes financial, marketing, MRP II, payroll and personnel modules. All modules are fully integrated and designed so that user interfaces are the same, he added. Because the Prime system is a relational data base environment, Mayes said, it requires little technical knowledge to learn and operate. In fact, the company now has no operators on staff. "We put responsibility on the users to understand the system, train their people, provide their own documentation and initiate jobs from their terminals," he added. The DP staff now consists of a system administrator and a programmer.

The company's users led implementation plans with DP playing a support role, Mayes said. A project team, led by Plant Manager Phil Hecht, consisted of representatives of each major functional area, augmented by other users when needed. The DP staff would show how a particular module worked, the team raised questions or requested modifications, and together they would work out a solution, Mayes said. Often, they could add elements without any programming at all and, in the nine-month period, the staff made 80 hours worth of programming modifications to the system.

Part of the success of the conversion is that the environment of participation led to enthusiasm among users, Hecht said. Key users in each area of operation now make up the Business Systems team, which can request changes for DP to fulfill, and they can develop their own reports with the systems report writer, he said.

The company is waiting for installation of a procurement module for its Compufact software, Hecht said, and then the system will be complete.

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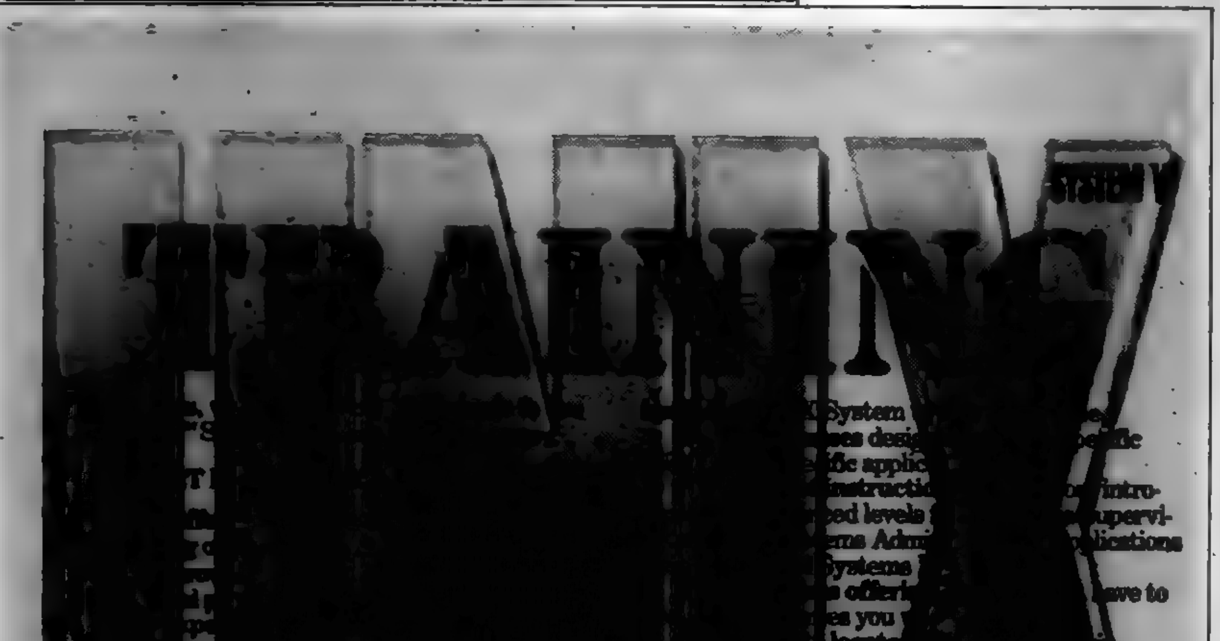

Association elects 1985 candidates

SAN FRANCISCO — The Information Industry Association, a Washington, D.C.-based national trade association, elected candidates for its 1985 directorships at the group's recent annual meeting here.

Appointed to four-year terms were: Jack Simpson, president, Mead Data Central; Marsha Carow, vice-president, Harcourt Brace Jovanovich, Inc.; James McGinty, vice-president of group government relations, The Dun & Bradstreet Corp.; and Daniel Sullivan, president, Frost & Sullivan, Inc.

Appointed to one-year terms were L. John Rankine, director of standards and data security for IBM; and Brad Henderson, director of product development, American Banker.

Robert November, managing consultant at Link Resources Corp., was elected the association's chairman, effective in January.

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7

Mainframe conversion speeds mill orders

TRENTWOOD, Wash. — Orders in an aluminum mill here that once took three days to turn around now take one day with a mainframe-based information system, according to the manager of the mill's production control and planning.

Kaiser Aluminum and Chemical Corp.'s Trentwood Works, which makes aluminum sheets, plates and coils, has an IBM 3083 tied to the company's Northwest Regional Data Center, which runs an IBM 3083 Model E mainframe. Installed in July 1983, the 3083 has three times the capacity of its predecessor, an IBM 4341, Model Group 2, said Michael Stemm, production control and planning manager. Communications between the regional center in Spokane and Trentwood are over 56K bit/sec telephone lines. Average response time to users is two seconds, with from 82% to 85% of responses between 1 and 1.5 seconds, Stemm said.

> *'We're building a framework which will make future on-line systems productive and give accurate information on a timely basis.'*
>
> — Dick Goodnight, Kaiser Aluminum and Chemical Corp.

The Spokane center was built in the summer of 1981 for data processing and plant support in the Northwest region. Kaiser management has approved funds for a second center in Columbus, Ohio, which will support up to 13 plants in the Midwest, according to Dick Goodnight, group manager for the Northwest region.

"We're building a framework which will make future on-line systems productive and give accurate information on a timely basis," Goodnight said. "In order to build a foundation, we had to set up a network of computers that would provide sufficient capacity and get us out of the DOS world and into the world of MVS."

Kaiser Aluminum went through some rough spots to implement the system. The company had to upgrade equipment, build a center, complete the 4341-to-3083 conversion and develop new applications all at once. "We hired the best people we could find," said Glen Norton, Operations Manager. "We placed people on projects who knew plant operations and we had them actively involved in establishing requirements for the system."

A number of on-line plant applications have been implemented, including order entry, shipping, inspection, maintenance, sales on-line and practice planning. A major application under development is intended to tie all plant manufacturing centers to the main plant data base via IBM Series/1s and process control computers. The system, called the Trentwood On-Line Production System, will aid the plant in keeping better control of in-process inventories, provide more timely information for customers and track an order through production stages.

The Corporate Maintenance System schedules maintenance workers, keeps track of spare parts and prints preventive maintenance schedules. The system ties directly to the Corporate Accounting System and records all dollars spent on maintaining plant equipment. The Sales On-Line System provides on-line status of customer orders. The Packaging and Shipping System oversees release dates of products, the maintenance of reliable finished goods inventory as well as the optimization of freight car and truck loading.

In addition to shipping and inspection, all orders are scheduled via the on-line Practice Planning System. Mass changes that previously took days, can now be made in minutes, the company said.

Manufacturing plants can also access data bases to determine order information at other Kaiser facilities. For instance, the status of an order booked at Trentwood but processed in West Virginia can be checked instantly from a Trentwood terminal. Previously, telephone calls were made or information mailed, sometimes resulting in delays of several days in getting an order to a plant with the capacity to run it.

"Helping plants become more productive required the network and installation of compatible equipment — from the large IBM 3083 computer down to IBM Personal Computers and Displaywriters," Goodnight said. He said the 3083 has a 99.8% uptime and is currently processing 45,000 transactions monthly.

Programmer productivity on the system is said to be enhanced by TSO and a Screen Definition Facility (SDF), a CICS programming tool. "SDF has made a major difference, probably increasing programmer productivity 30% to 40%," Goodnight said.

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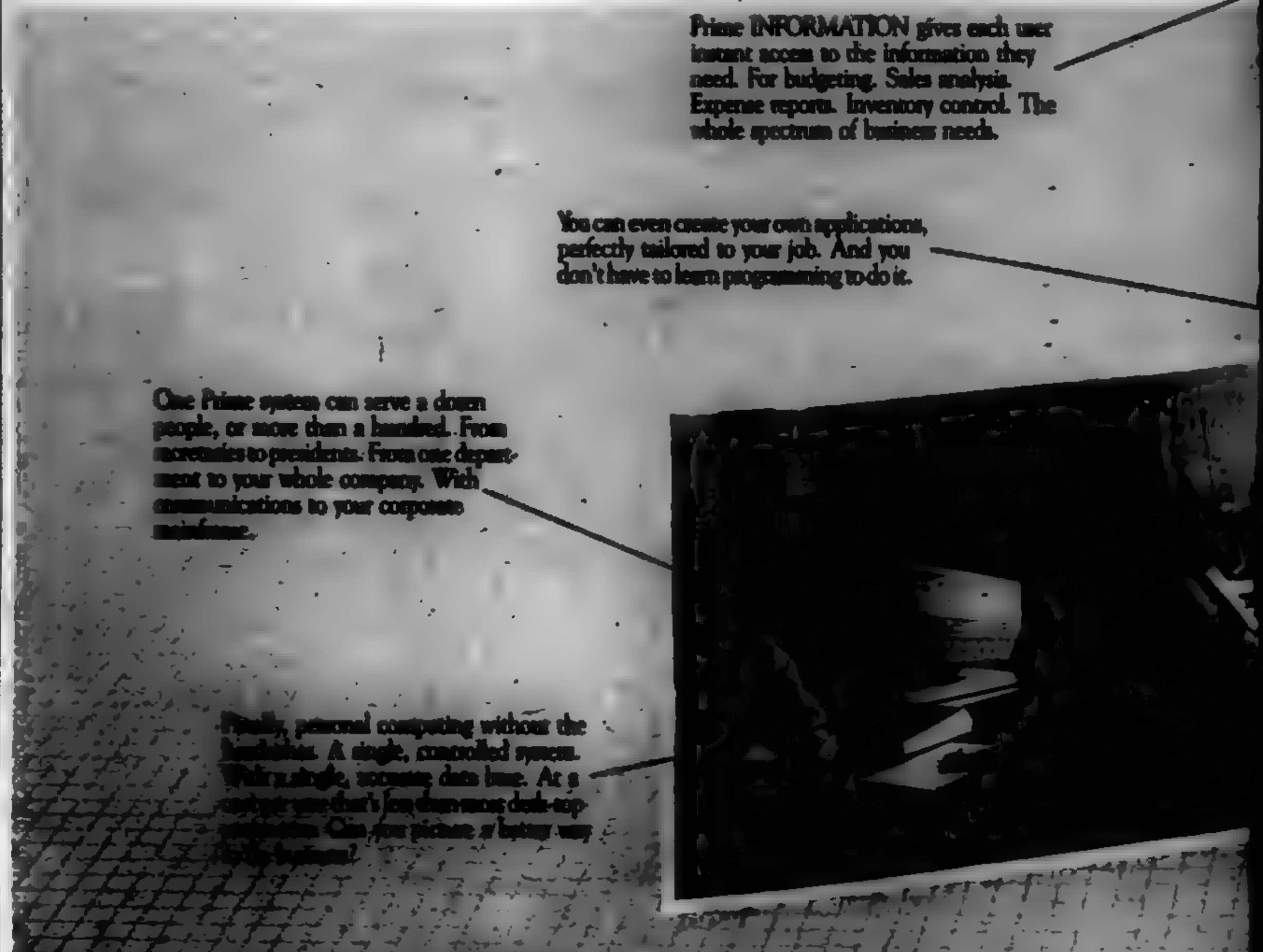


Dasd system restores business' lost storage

MADISON, Wis. — Converting to an IBM MVS operating system created a disk storage space problem for the DP division of a large telephone company here. But when TDS Computing Services, Inc. (TDSCS) implemented a direct access storage device (Dasd) management product, storage was reorganized, creating more than 1,600 cylinders of Dasd space.

As a subsidiary of Telephone and Data Systems, Inc. — the ninth largest telephone company in the nation — TDSCS provides data processing services for its parent company, independent telephone companies and other businesses. Recent rapid growth of the parent company led to the decision to convert from IBM VM/DOS to MVS.

DMS/OS Dasd Management System, manufactured by Software Laboratories, Inc. of San Bernadino, Calif. and marketed by Sterling Software Marketing, Inc. of Sacramento, Calif., was installed on TDSCS' IBM 4341 Model 12 mainframe. Within two weeks, TDSCS gained back more than 1,600 cylinders of Dasd space. Today, DMS/OS is being used on the company's Amdahl Corp. 470V/8 mainframe.

Dasd needed control

"We got MVS fired up, and all of a sudden we realized we had to do something to control our Dasd," said Gary Annen, systems programmer for TDSCS. "We were bringing 3,350 volumes out of the DOS world into the MVS environment, and in one week's time that Dasd space was used. There were just no controls whatsoever. DMS/OS put that all back in perspective," he said.

"We initially ran the Idle Space Release facility and gained back roughly 200 cylinders," Annen said. "Since we were being hard pressed to find five cylinders of continuous space, we thought that was great." TDSCS then ran several other DMS/OS facilities, including Explicit Archive and PDS Compression, and gained back more than 1,400 additional cylinders.

Annen used another facility, the Volume Configurator, to move data sets from 3350s to 3380s. "It was excellent," he said. "Everything worked as documented."

Still another facility, the ISPF interface, is used regularly by several of TDSCS' applications interactive users. "We've now got DMS/OS available to all of our interactive users. They can queue requests to archive, backup and restore." Annen was also able to provide the interactive users with access to PDS reports through the ISPF interface.

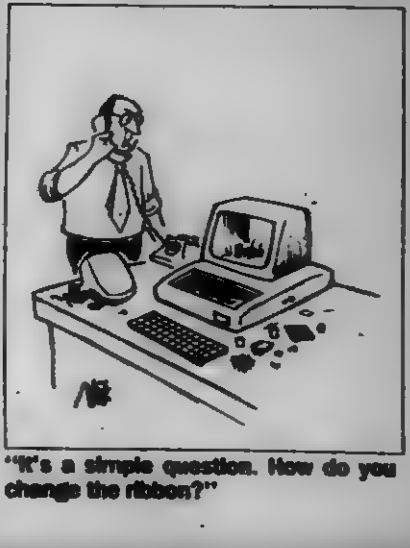
TDSCS recently used DMS/OS to perform disaster recovery, Annen said. "We lost a 3350 in a head crash, so we had to do a full volume recovery. DMS/OS was great. You come in at one o'clock in the morning, and you expect the worst. But it was relatively smooth. DMS/OS did its job just the way it was documented."

Computer law to be discussed at conference

PHOENIX — The Third Annual Advanced Computer Law Invitational conference and workshop will be held at the Pointe Resort at Squaw Peak here on Jan. 14-16, 1985. Called Computer and Communications Law, the event is sponsored by the Arizona Law and Technology Insitute and the Arizona State University College of Law.

The keynote address will be delivered by U.S. District Court Judge Harold H. Greene. The conference will concentrate on emerging legal and business issues in a post AT&T divestiture enviroment. Workshops will focus on electronic funds transfer, cellular radios and legal and business planning in cooperative ventures among computer and communications companies.

The price of the conference and workshop is $545 until Dec. 25, at which time it becomes $595. More information can be obtained from Dr. Edward A. Johnson, Center for the Study of Law, Science and Technology, Arizona State University College of Law, Tempe, Ariz. 85287.



"It's a simple question. How do you change the ribbon?"

Retrieval system codifies NBC video footage

Computer-aided system assists Network Archives department file news segments

NEW YORK — When NBC network documentary viewers see historical videotape, perhaps from the Vietnam War, a previous space shuttle voyage or a previous presidential inauguration, chances are good that a minicomputer from Ultimate Corp., in the News Archives department here, helped locate the tape.

The News Archives department uses a computer-aided retrieval system for filing every news segment shown on NBC. Beginning with the early morning *Today* show, operators review news programs, segment by segment, and then enter a technical and visual description and ID number into the system. The News Archives serves as a resource for documentary, news and other show producers.

Although the actual videotape archives and the research department are located in the NBC News headquarters in Rockefeller Center, data is input at Fort Lee Films in Fort Lee, N.J. Nine operators view each day's news programs, feature by feature, and then input certain key pieces of information using eight searchable fields — ID number, reporter, cameraman, affiliate station, place, data, personality and subject.

First automated in 1976

According to Alan Bernstein, NBC News achives data base administrator, the news archives were first automated in 1976, when the department purchased a Microdata Corp. 4000 retrieval system. Prior to 1976, all record-keeping and retrieval functions were accomplished either by storing information on microfilm or in extensive manual card files.

By 1982, the archives needed to expand beyond the 4000's limit of 16 users, so NBC acquired a system from Ultimate based on a Honeywell, Inc. DPS 6 Model 4303D minicomputer, with 256K bytes of main memory and 24 ports. The Ultimate system was chosen primarily because it ran the Pick operating system from Pick & Associates, Inc., allowing an easy conversion from the Microdata system, which also ran Pick, Bernstein said.

Since 1982, the archive has been updated to an Ultimate system with 32 ports and 512K bytes of main memory, Bernstein said.

Now has 16 terminals

The department now has 16 terminals in the New York office, nine in Fort Lee and four terminals in Washington, D.C. News bureaus in California, London and Boston can dial into the system. Other domestic bureaus such as Miami, Atlanta, Houston and Chicago are expected to have access within the next year.

Approximately 125 records per day are entered in the system, and more than 126,000 records are now on file.

Employees at the News Archives department can access data by using any of the eight search fields or by using Recall, Ultimate's inquiry and retrieval language. Recall is said to access data on an as-needed basis by using dictionary-driven commands in plain English.

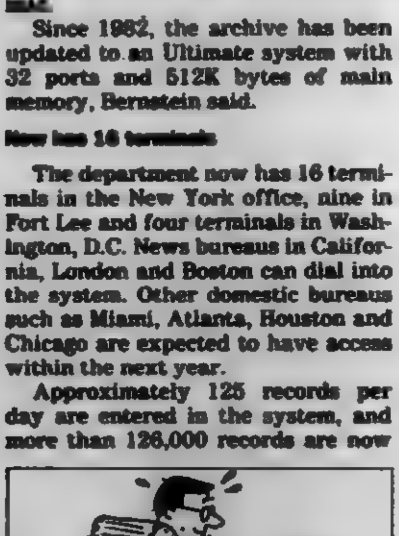
For example, if a user wishes to locate videotape coverage of the space shuttle, the user types a one-line command. The screen displays how many videotape records pertain to the space shuttle program. By asking increasingly specific questions, the user can pinpoint the exact video clip or clips desired and then display the tape's description on the screen before actually ordering the tape.

"Since we have installed the Ultimate system, we have greatly improved response time," Bernstein said. He estimated productivity has increased at least 50% since the system's installation.

One program allows the historical filing of events — which involves chronicling many NBC News film clips. The civil rights movement and political campaigns for the last 30 years have been completed, and the staff is currently logging in the Vietnam War with a total of 7,600 records, a project expected to take two years to complete.

Bernstein said he has had few problems with the system: "Downtime is negligible, and Ultimate's technical support is excellent," he said.

To improve performance further, Bernstein is acquiring an optional processor board intended to speed throughput. The time to do a videotape search should be cut from 30 seconds to 10 seconds with the option, he estimated.



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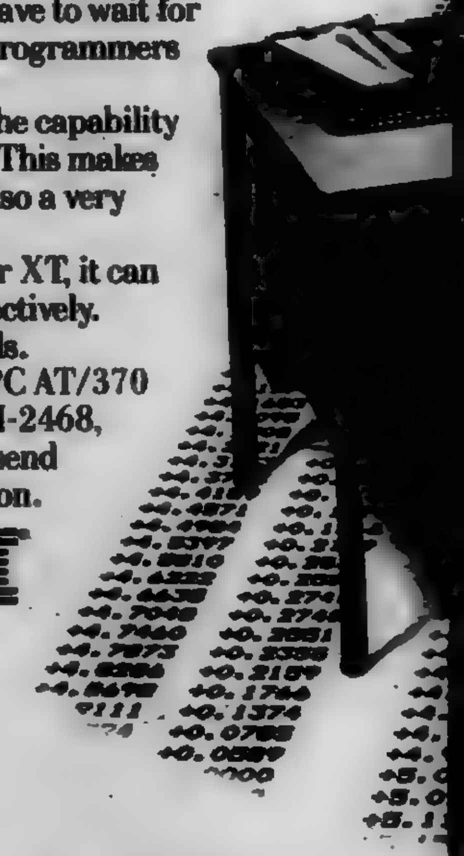


Temple project to connect five campuses

PHILADELPHIA — A seven-year, $45 million communications installation project here will eventually allow Temple University students to access university library data bases from within their dormitory rooms and ease employee work loads with automated student registration and record keeping.

According to John Patterson, Temple's director of communications, the first phase of the $45 million project began in August, with the $12 million installation of a microwave system link throughout the university's five area campuses, the installation of two Intecom, Inc. Integrated Business Exchange (IBX) S/80 switches and new wiring between the school's 105 buildings spread over five campuses.

"This creates the backbone for subsequent development," Patterson said, particularly the school's eventual goal of creating a universal workstation, whereby microcomputers and minicomputers throughout the university can communicate with remote data bases.

Reduce phone costs

Saving money on telephone costs was the driving factor behind the communications project, Patterson said. A university feasibility study suggested that the school could save about $6 million over a 10-year period if it switched from a Centrex system to a private line.

Telephone costs now exceed $3 million a year, including equipment costs, utilities and line charges for 10,000 academic and administrative telephone lines, he said. "After we received the bids, we believed we could save $9 million over 10 years," Patterson said.

"We wanted to created a framework of transport architecture, with a digital switching matrix that would support a wide-range of video and audio products," Patterson noted.

With a plan in place, it took 10 months for the university to write the funding proposal, get it passed and evaluate vendors, Patterson said. The school received seven proposals.

In its selection process, Patterson and school officials examined each system's price; its transport architecture; the quality and technical characteristics of the switch vehicles; data switching architecture, including switches and price performance; and the ability of the vendor to sell, install and maintain the system. According to Patterson, two finalists were Bell Atlanticom Systems, Inc. and Northern Telecom, Inc.

"We spent three months negotiating a price with each vendor," Patterson said. The final decision was based on the price/performance evaluation." Temple selected Bell Alanticom's voice, data and video system based on Intecom's IBX S/80 voice/data switching equipment.

According to the vendor, each IBX is a nonblocking packet-switched system based on a star topology and contains 8192 voice and data ports. Asynchronous transmissions, at speeds ranging from 50 bit/sec to 19.2K bit/sec, are said to be accomplished by connecting the RS-232C port on a personal computer, for example, to an Integrated Terminal Equipment (ITE)-type telephone. The ITE can be connected to an IBX voice/data port over standard two-pair telephone wire. In synchronous transmissions, a concentrator is linked to a voice/data port and transmission speeds run from 1,200 bit/sec to 57.6K bit/sec, the vendor said. Local-area network functions are handled at up to 10M bit/sec in burst-mode packet switching.

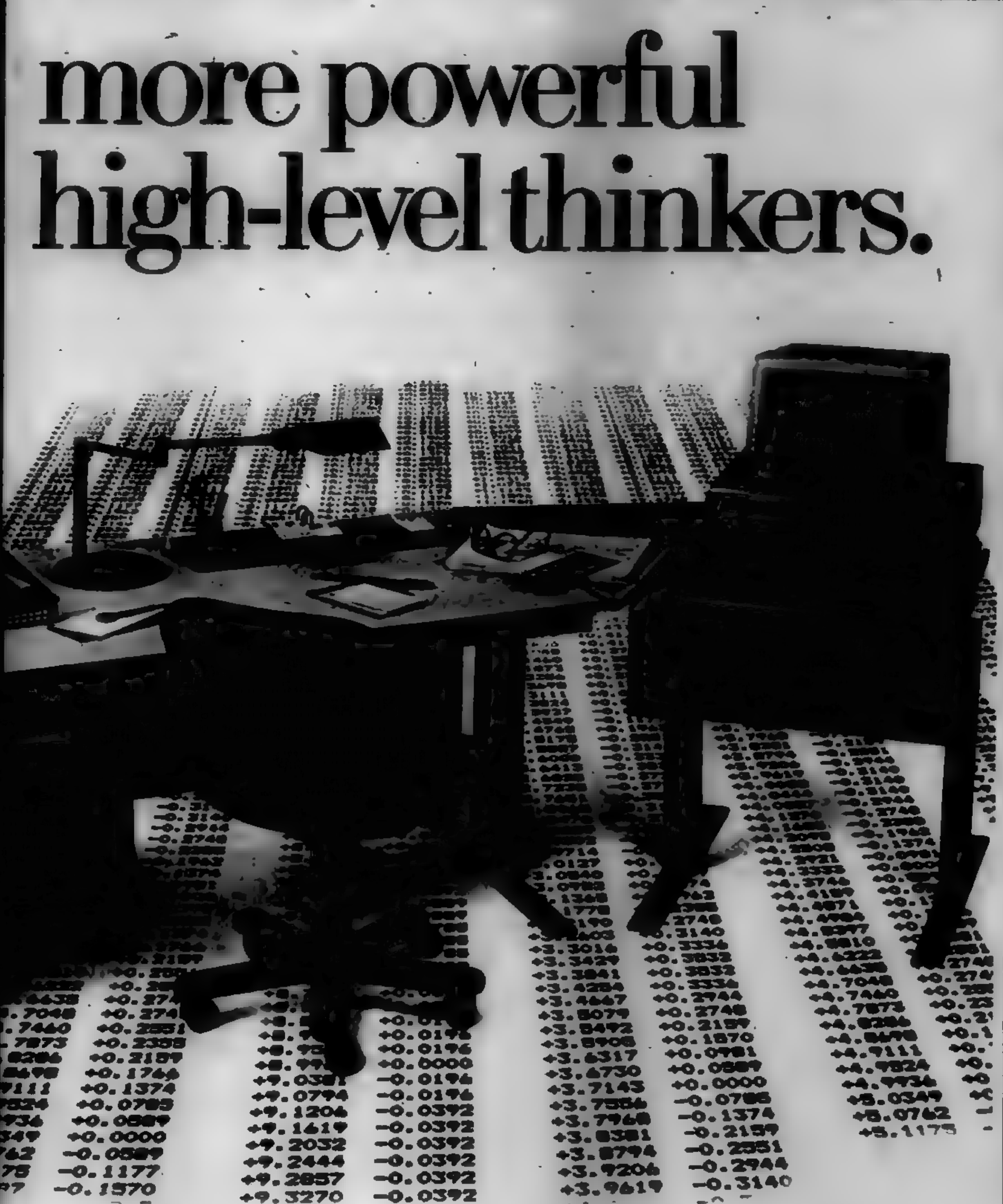
When installed, the system will connect telephones and computers in virtually every room at the main urban campus, the nearby Health Sciences and Medical School, the Temple University Center City campus and two other campuses in the Philadelphia suburbs.

Students link via phone jacks

The Temple system is connected by about nine miles of fiber optics and eight microwave transceiver stations that will link the 104 buildings of the school's five campuses. In the library, the communications system will have the capacity to link about 1,000 faculty microcomputers, up to 750 microcomputers for students (located in 25 microcomputer laboratories), 195 minicomputers, 110 standalone word processors, as well as three mainframe computers with up to 625 terminals. Students with personal computers can now link into the system via the phone jack in their dormitory rooms. Systems currently being used in the university include IBM 3081, 4341 and 4331 mainframes, a Control Data Corp. Cyber 750 and about six Digital Equipment Corp. VAX-11s.

Cable installation throughout the university is on schedule and just about complete, Patterson said. By December of next year, all campus dormitory rooms will be furnished with voice and data capabilities.

Patterson is pleased with the progress to date, particularly with how quickly the university was able to get the project under way. "All the planets just lined up at the right moment," he said.



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Texas-based inns accurately lodge more guests

SAN ANTONIO — As a timesaver and marketing tool, a string of minicomputers is helping a Texas-based motor inn chain grow by 25% a year.

With $125 million in sales in 1983, La Quinta Motor Inns, Inc. is one of the fastest-growing lodging chains in the U.S. Inns have been opening at a rate of more than 15 each year.

La Quinta, with more than 150 locations from Florida to California, caters to value-conscious travelers and focuses on providing rooms and amenities at a price 20% to 40% lower than competing motor inns and motels. Managers use Texas Instruments, Inc. minis at each La Quinta inn to track the dozens of details that accompany each reservation.

Jerry Wiggins, La Quinta vice-president of operations for systems and planning, said La Quinta started to consider computerizing individual inns in the late 1970s. Applications would encompass all front desk functions such as reservations, check in, checkout and guest billing.

La Quinto reviewed existing software packages and found none to be satisfactory. "All the packages on the market had been written for large resort properties, and extensive reprogramming would have been required to fit our operation. So we then looked at hardware vendors, with the aim of writing the programs ourselves or with the help of a vendor," Wiggins said.

Hardware requirements, according to Wiggins, included a proven operating system, flexibility in configuring the system and expandability. "We also needed a manufacturer that could provide maintenance at all our locations as we continued to open inns in new cities," he said. La Quinta decided upon TI's DS 990 minicomputers. TI also provided programming services, coding the software to fit La Quinta's specifications.

Test system set up

La Quinta set up a test system, consisting of a TI 990 Model 4 with two TI 911 terminals, at a San Antonio inn in December 1978 and eventually expanded it to all the company's inns.

Although the hardware changed as La Quinta computerized its inns, the company has continued to run the same software without any changes other than application enhancements. La Quinta now uses TI 990 Model 5s in 28 inns and, in the remainder of its nonfranchise inns, TI's Business System 671A with 512K bytes of random-access memory and 18M bytes of hard disk storage. Each system has three TI Model 931 terminals and three Model 850 dot matrix printers.

La Quinta-Highland Mall Manager Jean Klingel said the TI system was installed at the Austin, Texas, inn several years ago and added, "We went to a much more livable situation. I now have more time to spend with our guests. The computer changed my life."

More than 90% occupancy

Klingel said her 122-room inn maintains an occupancy rate of more than 90% and recently recorded 97% occupancy for one month. "Maintaining reservations on our old manual system was very difficult for a property that moves this fast," she said.

With the TI system, she noted, she always knows what type of rooms are clean and available; if someone calls for a reservation, the desk clerk can give an immediate answer. If reservations are made through a travel agent, the system automatically figures the agent's commission. When a reservation is made, the clerk enters the name, address and method of payment. "Then when the guest checks in, that reservation information becomes a preprinted registration slip for the guest to review," Klingel said. The system tracks miscellaneous guest expenses, such as long-distance telephone calls, and adjusts the bill.

Night audit, or the complete accounting for each day's business, is easier with the system, she added, noting, "What used to be an eight-hour job now takes only two to three hours. For example, it previously took an hour and a half to post room and tax on the manual system. Now it takes less than two minutes. The night auditor has time for additional job responsibilities."

Each inn's information is transmitted daily to a Sperry Corp. 1100/70 mainframe at La Quinta's headquarters here via a dial-up polling network. The company analyzes the data for financial and marketing information, such as where guests live and what type of rooms were reserved.

Wiggins said the TI systems have fulfilled their main objective — relieving the managers' paperwork burden so the managers can devote more time to taking care of guests.

"Our accuracy in knowing room availability is much better," Wiggins said. "Previously, a manager might not realize he had rooms available when someone called for a reservation, simply because manual tracking methods were inaccurate. Those days are gone. The potential to sell more rooms is greater because of accurate information."

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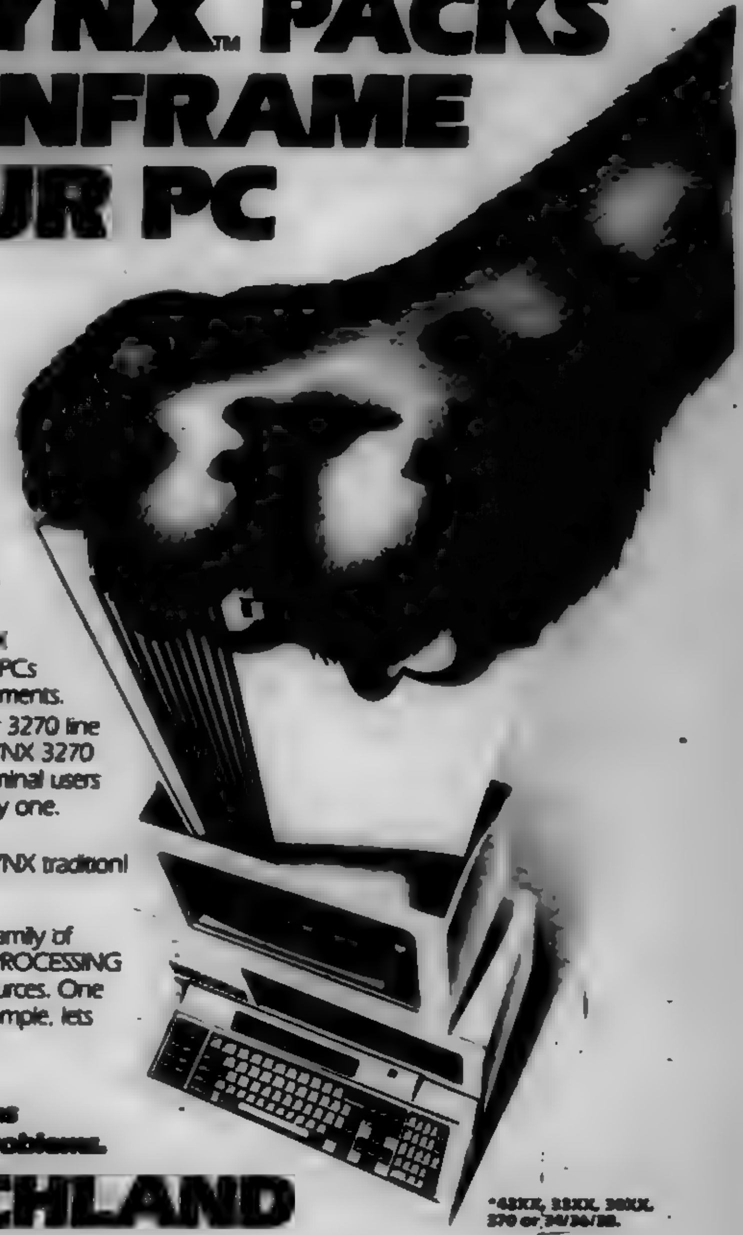

Orchestra tuned to computer convenience

SAN FRANCISCO — The instrument that Dave Murdoch performs on at the symphony," Murdoch said, "where they do the most good."

Murdoch is the San Francisco Symphony Orchestra's computer systems manager. "We're using computers in the business and artistic administration side of the symphony," Murdoch said, "where they do the most good."

Other symphonies utilize computers, but probably none to the extent of San Francisco's, Murdoch said. "Ours has the capability to process the season ticket system, box office system, donor system, financial/accounting systems, artistic administration systems and the word processing system — and all the parts are integrated with each other," Murdoch added. The symphony uses a Hewlett-Packard Co. HP 3000 Model 58 running under HP's MPE/5 operating system.

The symphony — a nonprofit venture that relies heavily on individual and corporate donations — generates only 60% to 65% of its revenue through ticket sales, Murdoch said. A 125,000-name mailing list is kept on the data base, and HP's Word III word processing package is used to develop and send solicitation letters and other correspondence. The data base also holds historical information on donor activity, which is vital to fund-raising efforts, he said.

Season ticket sales — with a complex web of telephone orders, renewals, seating upgrades, paperwork, seating charts, ticket distribution and credit card authorization — has evolved from nightmare to dream status at the symphony, Murdoch said.

"We now maintain sales history information going back several years, which can be accessed instantly with one keystroke," Murdoch said. In the past, such information was kept on paper in file cabinets. Even the tickets — whether season or single — are printed out on command.

A graphics feature — part of Micro Consulting, Inc.'s Pact/3000 ticket services system — illustrates seating charts on a terminal so ticket sellers can see immediately what is available for each performance, Murdoch said.

Paperwork reduced

In May of this year, the symphony's computer was linked directly to the Wells Fargo Bank's computer, Murdoch said. This permits automatic credit card authorization and same-day deposit capture of funds, while virtually eliminating paperwork associated with credit card processing, he added. Because the bank's paperwork has also been reduced, it has reduced service charges to the symphony, he said.

The first major computer applications at the Symphony began in 1982 with donor mailing lists and with the marketing and financial departments, Murdoch said. A customized budget system — in conjunction with Lotus Development Corp.'s 1-2-3 package on an IBM Personal Computer — was linked to the HP3000. Data was fed into the budget system, which produced spreadsheets and reports to compare actual expenses with budget figures, he said.

HP's GA3000 general accounting system, including a general ledger and accounts payable subsystem, also was brought on line, Murdoch said. The budget system was integrated with the general ledger system, giving the symphony fast and accurate budget control, he said.

The symphony is in the process of converting to HP's FA3000 accounting system, which includes modules for general ledger, accounts payable, accounts receivable and fixed assets, Murdoch said.

The Pact/3000 ticket service program began in late 1983, after Murdoch was hired to make recommendations to the board of directors, he said. "We are heavily committed to computerization now and plan to have the most sophisticated automated system in the arts when we're finished," he added.

On the artistic administration side, performance repertories — scores and arrangements making up a concert — are also filed in the system, along with program notes and public relations releases, Murdoch said. He is planning to bring the symphony's operational aspects on-line next year, with modules to track orchestra personnel data, including guest artists and conductors, musician audition history and a six module music library package, he said.

A visiting artist or conductor will, for example, be able to call up the music used in a previous appearance, add music from the library file, determine how staging would be affected by the changes and find an audio tape of the earlier performance — all in a matter of seconds, Murdoch claimed.

The HP computer's word processing system — Word III — has been expanded in the marketing, publications and public relations areas. Murdoch is slashing project processing time in half in the marketing area, he said, where season brochures — all quite similar — go through about 12 revisions a year. Press releases and media mailing lists can also be easily edited and updated.

Personnel measuring guide out

WOBURN, Mass. — Information on measuring and reporting on the performance of DP personnel can be found in a recently released report published by The Winchester Group, a consulting firm located here.

According to the publisher, the report, titled "Human Resource Performance Management — A Guide to Productivity Improvement," was written by Kenneth Rau, author of "A Guide to EDP Performance Management." The report outlines a plan for viewing personnel performance, productivity techniques practiced at eight organizations and forms for use in measuring and improving MIS performance.

"Human Resource Performance Management — A Guide to Productivity Improvement" is priced at $39.95. The Winchester Group can be reached at Suite 300, 12 Alfred St., Woburn, Mass. 01801.

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Firm's program language cuts time on reports

MINNEAPOLIS — Since choosing a fourth-generation language for its corporate information center and for the information center's end users to use in writing their own applications, Graco, Inc. here has found its users producing applications that, in one department, saved five hours per week in report preparation and, in another department, improved filing accuracy of plant orders by nearly 30%.

The fourth-generation language used by Graco's information center, Nomad2 from D&B Computing Services Co., is provided for applications development work to about 130 of the firm's total of 1,500 employees via 75 terminals linked to the firm's information center. John Green, information center senior analyst, said the users are "a very large cross section of the company" — mostly junior managers and administrators. Green said the users liked Nomad2's ease-of-use and the fact that "you don't have to specify things, you specify the result that you want."

Graco is a $120 million company specializing in fluid-handling technology. Its product line of more than 700 items and custom-designed systems includes pumps and dispensing systems, robotic painting devices, fluid-handling systems for paint production lines, painting devices for architectural structures, chemical bonding devices and lubricating equipment for motor vehicles.

Inaugural training

An IBM 3083 handles the information center's needs and is used for the company's traditional on-line CICS, applications development, batch processing of production data and other uses. The information center came on-line in early January 1983 and, in that month, the first group of 11 Nomad2 end users began their three days of training. By the end of the period, which included classroom discussion, hands-on terminal practice and on-line tutoring, the students were preparing simple applications for use in their individual jobs, according to Green.

Three end users from marketing showed other department members how to access and use the applications they had built soon after the training session. In a matter of days, members of marketing were utilizing the information center service. Today, marketing still has the highest concentration of end users and requires three terminals to meet the demand.

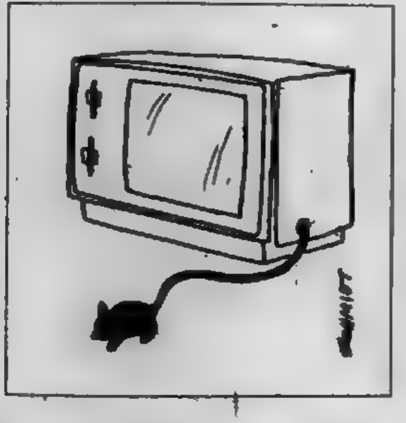
"It didn't really surprise me that the marketing people took so well to the information center. From the beginning, they were very active in the steering committee. They also have a rather large data base to work with," said Steve Kuhlmey, an information center analyst.

"If the reaction of the marketing people is any indication," Kuhlmey added, "we won't have to worry about selling others on the capability until 1985. As it stands now, we can train 10 to 12 users a month. And right now, we're all booked up until 1985. The information center really is selling itself."

The selection process for a fourth-generation language for the information center began with a choice from several contenders. Kuhlmey recommended to a steering committee of executives from such areas as accounting, manufacturing, distribution, plant and information systems that Nomad2 be purchased. The software was evaluated on the basis of its ease of access to corporate data files, flexibility in data base design and data structure, the quality of the training programs the vendors supplied for both the end user and DP professional, security features and other criteria.

Nomad2 was approved. Since its acceptance, many applications have been written with assistance from Kuhlmey and Green. Graco's traditional product pricing program has been converted to the Nomad2 information center. The procedure is now reportedly completed in half the time previously required. A more detailed customer call program has also been prepared. This data base provides marketing with extensive information on customers, their locations, key contacts and the types of Graco products each purchases.

Projects currently under way include a data dictionary to support the DP staff's systems analysis efforts and to reduce analyst and clerical time spent in updating previously developed documentation. They are also working on a sales forecast simulation for end-user applications.



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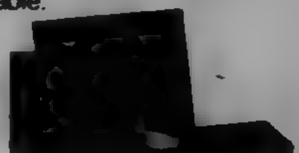

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*National Institute For Occupational Safety and Health Study, August 1981.

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Manual system no longer hampers company

LAWRENCE, Mass. — A 120-year-old manufacturer of specialty pumps here decided to switch to an information management software program after concluding that its manual record-keeping system was bogging down its operations and impeding growth.

Lawrence Pumps, Inc., a privately held company with a worldwide business and 150 employees, found that its manual method of record keeping was failing to get data to the appropriate people quickly and consistently.

"Our manual systems resulted in a number of duplicate bookkeeping entries in various departments within the company," said Waldemar Arndt, general manager. "Of course, while it was necessary to have multiple bookings of information, the more times any piece of data is handled, the greater the risk of inaccuracies creeping into the information. The information we were getting was also not very timely," Arndt continued. Much of the data the company eventually did collect, Arndt added, was not standardized, and in intradepartmental meetings, a combination of data entry discrepancies and nonstandardized formats made it difficult to handle existing problems. The company decided to explore how a computer could provide solutions to some of these problems.

Lawrence Pumps conducted an extensive research and evaluation process to locate the best hardware and software solution for the firm, Arndt said.

"We really felt the software should adjust to meet our particular requirements and way of working — within reason," Arndt said. "What we were really looking for was a way to reduce the immense clerical participation in our manual systems and to give our managers more decision-making time with better data."

The company identified four potential vendors and, after evaluating their offerings, decided on a software program from Interactive Management Systems, Inc. named MRP II (material requirements planning), a financial and manufacturing information management package. Interactive's name was later changed to White Hat Systems, Inc., headquartered in Woburn, Mass., following a January 1984 merger with Manufacturing Resources, Inc.

According to Arndt, White Hat Systems fit the company's requirements from a product perspective and met its expectations for a company that would be large enough and stable enough to meet the need while also being attentive to Lawrence Pump during the transition.

"We also wanted a fully integrated, divisionally and departmentally compatible system." Arndt said. At the same time, the company was in the process of evaluating and installing an Auto-trol Technology Corp. computer-aided design and manufacturing workstation running under a Digital Equipment Corp. VAX-11/750.

Arndt said the company liked the fact that White Hat's software would run on the DEC equipment, and "we felt they offered one of the more complete software packages."

Lawrence Pumps said it has experienced operational efficiencies and cost savings with the software. Inventory levels have been reduced by about 20%. Current information on payables and receivables dramatically improves cash flow, Arndt said.

"We all speak the same language now in terms of data received from department to department," he said. "And all our managers, from the factory floor where the system performs shop-floor control to production costing to the warehouse where our inventory is being better monitored, understand how and why the system works."

3 2 7 0 S T R

You have to think
ahead a few moves to win
the network game.

Minis gear direct-mail firm for election cycle

ALEXANDRIA, Va. — Four years ago, the president of a direct-mail company here was looking for an outside firm to handle the growing needs of his clients. When he could not find a company to meet his standards, he decided to form his own.

Bud Esper is the president of Clesa Systems Development Corp. Today his clients include various charitable organizations, schools and churches that provide business for Clesa throughout the year. But the company also has many politicians as clients. And the weeks before the November general election were the busiest time of the year for the firm.

During its first few years in business, the company leased data entry terminals. But when the 1984 election cycle began to gear up a year ago — and mail volume began to grow — Esper decided to replace his existing equipment.

"I was looking for a system with bus architecture [and] distributed processing. I also wanted equipment that was flexible and could handle various application programs and peripheral devices," Esper said.

Esper decided that tape conversion would be easiest in a minicomputer or superminicomputer environment. He looked at various systems and decided on Recognition Equipment, Inc.'s (REI) Tartan Terminal System.

"The REI system offered the features I was looking for and has the strongest data entry software available," he said. He said that tape conversions with the REI system are averaging 45 minutes to one hour.

"We've been able to lower our costs in both key entry and production, and we've been able to give our clients better service through faster turnaround and by being able to reduce our prices [for] our clients," Esper said. "We've seen a 30% reduction in prices for production."

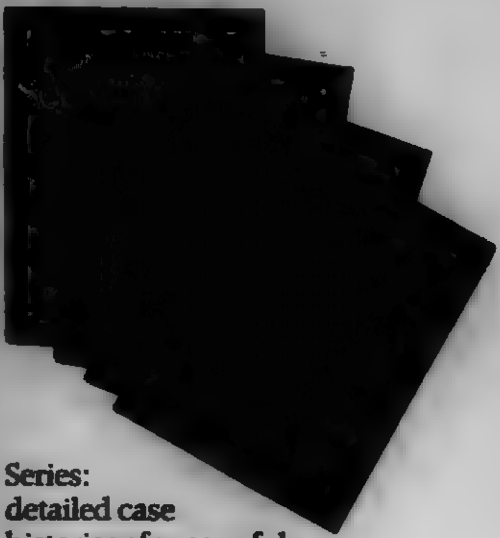
Targeted mailings

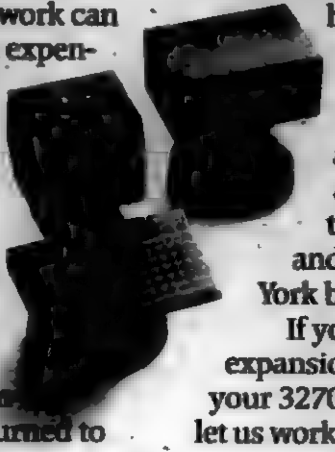
To provide its service, Clesa maintains a detailed mailing list and data base for each client, which allows the client to direct each letter specifically to a target audience. Such targeting by Clesa's clients is typical, and it puts more demands on a data entry system than a more routine use.

Esper uses 12 Tartan terminals and eight letter-quality printers from REI. During the months before the November election, the company was running three shifts daily.

Each Tartan terminal and each peripheral has its own independent processor connected through high-speed buses. As additional terminals or peripherals are required, they can be added. When the system is completely filled, an additional cabinet, bus, interbus connector and terminal can be added. For software, Esper uses a key entry program from REI.

After more than a year of using the equipment, Esper said routine downtime is rare and keystrokes per terminal are high.





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NEWS

CALENDAR

WEEK OF DEC. 9

DECEMBER 10, ORLANDO, FLA. — **Introduction to Personal Computing.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 10-11, COLLEGE PARK, MD. — **Organization and Management of a Preventive Maintenance Program.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 10-11, WASHINGTON, D.C. — **Data Security Implementation and Management.** Contact: Grumman Data Systems Institute, Center for Professional Development, 250 Crossways Park Drive, Woodbury, N.Y. 11797.

DECEMBER 10-11, HARTFORD, CONN. — **Data Communications Systems Concepts.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 10-11, LOS ANGELES — **Personal Computer Communication Systems Seminar.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424. Also being held Dec. 13-14 in Honolulu.

DECEMBER 10-12, NEW YORK — **Automating the Office: A Tactical Guide for Success.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

DECEMBER 10-12, ORLANDO, FLA. — **Data Dictionaries: Concepts, Contents and Uses.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 10-12, COLLEGE PARK, MD. — **Data Base Administration and Control.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 10-12, NEW YORK — **Personal Computers in Business — The Micro-Mainframe Connection.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 10-12, LOS ANGELES — **Personal Computer-to-Mainframe Links and Personal Computer Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 10-12, ORLANDO, FLA. — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 10-12, WASHINGTON, D.C. — **IBM's Systems Network Architecture: Architecture, Data Flow, Analysis.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 10-12, WASHINGTON, D.C. — **Third National Conference on Small Computers in Government.** Contact: U.S. Professional Development Institute, Small Computers in Government, 1620 Elton Road, Silver Spring, Md. 20903.

DECEMBER 10-12, SAN DIEGO — **Planning an EDP Disaster Recovery Program.** Contact: Computer Security Institute Educational Resource Center, 43 Boston Post Road, Northboro, Mass. 01532.

DECEMBER 10-11, ORLANDO, FLA. — **Software Configuration Management.** Contact: Data Processing Management Association, c/o Technology Training Corp., Department SCM, P.O. Box 3608, Torrance, Calif. 90510. Also being held Dec. 13-14 in Washington, D.C.

DECEMBER 10-14, ST. LOUIS — **OS/VS Multiprogramming Services.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

DECEMBER 10-14, HARTFORD, CONN. — **CICS/VS Command-Level Coding Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 10-14, HARTFORD, CONN. — **ANS Cobol Programming Workshop I.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 10-14, BURLINGTON, MASS. — **Statistics for Quality Improvement.** Contact: Ken Wright, American Electronics Association Quality & Productivity Center, P.O. Box 10045, Palo Alto, Calif. 94303.

DECEMBER 10-14, HARTFORD, CONN. — **Project Management Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 10-14, PHOENIX — **Advanced C Topics Seminar.** Contact: Suzanne Battista, Plum Hall, Inc., 1 Spruce Ave., Cardiff, N.J. 08232.

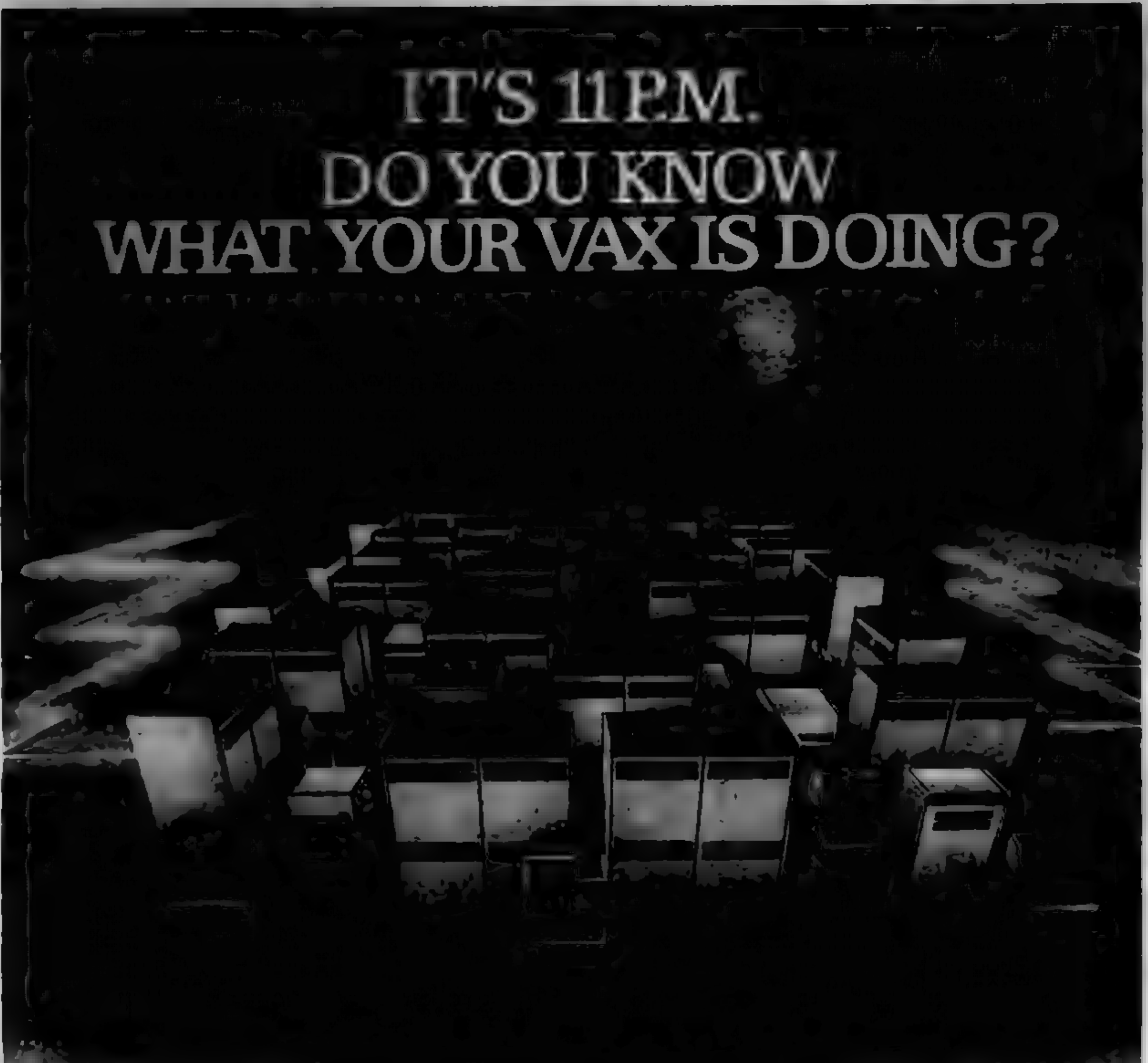
DECEMBER 10-14, RICHMOND, VA. — **MVS/SP & XA: Internal Logic, System Design and Performance.** Contact: Computer Systems Research, Inc., 40 Darling Drive, Avon, Conn. 06001.

DECEMBER 10-14, HARTFORD, CONN. — **Structured Cobol Programming Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 10-14, CHICAGO — **CICS Command-Level Programming.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

DECEMBER 10-14, SEATTLE, WASH. — **C Programming — A Hands-On Workshop.** Contact: Specialized Systems Consultants, P.O. Box 7, Northgate Station, Seattle, Wash. 98125.

DECEMBER 10-18, HARTFORD, CONN. — **Assembler Language**



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Coding Workshop. Contact: Don Florek, The Harford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 11, IRVINE, CALIF. — **Positive Supplier Relations.** Contact: Ken Wright, American Electronics Association Quality & Productivity Center, P.O. Box 10045, Palo Alto, Calif. 94303.

DECEMBER 11, BOSTON — **Audit and Control of Electronic Funds Transfer.** Contact: EDP Auditors Association, New England Chapter, P.O. Box 616, Boston, Mass. 02102.

DECEMBER 11, GAITHERSBURG, MD. — **Computer Networking Symposium.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

DECEMBER 11-12, ORLANDO, FLA. — **Dbase II.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 11-12, SANTA CLARA, CALIF. — **Managing Performance.** Contact: Linda Drago, American Electronics Association, P.O. Box 10045, Palo Alto, Calif. 94303.

DECEMBER 11-12, HARTFORD, CONN. — **Relational Data Base Concepts.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 11-12, LOS ANGELES — **Technology and Market Forecasting in Electronics.** Contact: Futurecast Learning Center, 40 Birch St., Redwood City, Calif. 94062.

DECEMBER 11-13, BOSTON — **Selecting a Local-Area Network.** Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

DECEMBER 11-14, BOSTON — **Digital Image Processing.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

DECEMBER 12, COLUMBIA, MD. — **How to Increase Sales Through Telemarketing.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742. Also being held Dec. 13 in Reston, Va., and Dec. 14 in Rockville, Md.

DECEMBER 12-14, ANAHEIM, CALIF. — **Strategic Planning for Data Communications and Networking.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 12-14, NEW BRUNSWICK, N.J. — **Concepts of IBM SNA Networking and Gateways.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 12-14, HARTFORD, CONN. — **Data Base Systems Concepts.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 13-14, ORLANDO, FLA. — **Lotus 1-2-3.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 13-14, HARTFORD, CONN. — **SQL/DS Concepts and Facilities.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 13-14, NEW YORK — **Communicating: Effective Business Dialogue.** Contact: Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 15, ALBANY, N.Y. — **Introduction to Lotus 1-2-3 and Label Maker.** Contact: [illegible] Associates, 27 Norwood St., Albany, N.Y. 12203.

WEEK OF DEC. 16

DECEMBER 17-18, ORLANDO, FLA. — **Wordstar.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 17-18, WASHINGTON, D.C. — **Assertiveness for Success.** Contact: Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-19, HARTFORD, CONN. — **CMS for Application Programmers.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-19, HARTFORD, CONN. — **OS/VS TSO/SPF Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-19, NEW ORLEANS — **The Institute of Electrical and Electronics Engineers First International Conference on Office Automation.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

DECEMBER 17-19, WASHINGTON, D.C. — **On-Line Operations Management.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

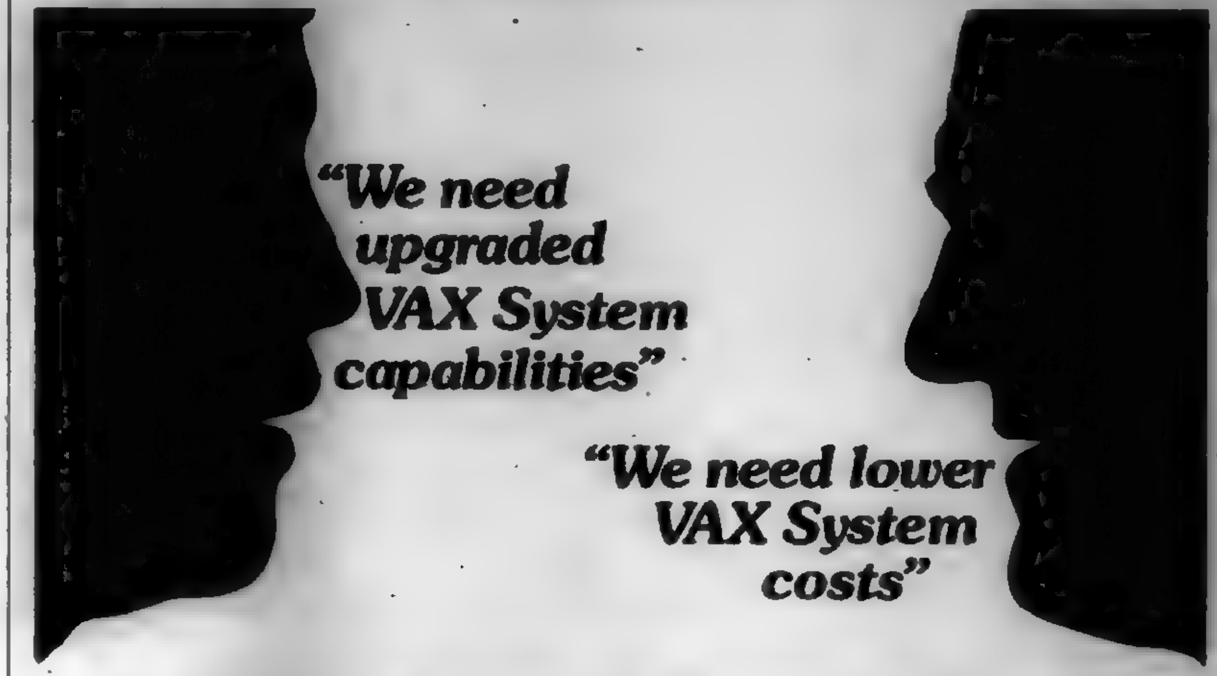
DECEMBER 17-19, WASHINGTON, D.C. — **Configuration Management of Software Programs.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

DECEMBER 17-20, HARTFORD, CONN. — **Pascal Programming Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-20, CHICAGO — **Data Communications: Components, Systems and Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-21, HARTFORD, CONN. — **Structured Analysis & Design Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-21, NEW YORK — **CICS Internal Architecture.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.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EDITORIAL

Will the U.S. call Big Blue too big?

It was no surprise that the U.S. Department of Justice, in reviewing IBM's proposed merger with Rolm Corp., was more concerned about the prospect of reduced competition in the area of military appropriations than in the area of private enterprise.

The consent agreement — by which Rolm and IBM agreed to spin off Rolm's Mil-Spec Computer Division — and the clean bill of health given the remaining parts of the merger are defensible when the agreement is studied microcosmically.

With Rolm already accounting for approximately half of the market for computers made for military specifications but using commercially available design and software, and with IBM's admission to the Justice Department that it intends to enter that market, the potential for IBM domination was a legitimate concern.

In the telecommunications area, however, Rolm is just one of many players — albeit one of the largest and most promising — and IBM has had little success in this area.

The consent agreement falls in line with the antitrust philosophy of the Justice Department under the administration of President Reagan. That philosophy, of course, was delineated with the Jan. 8, 1982, decision to drop outright a decade-long antitrust action against IBM, with the declaration that there was no basis for the action.

Macrocosmically, the Rolm-IBM merger could prove to be a major factor in the ongoing concentration of the U.S. computer industry.

Since the antitrust action dropped in 1982, IBM has shown that in certain key areas it can dampen competition simply by pursuing its business goals.

In the area of large mainframe computers, IBM's established base and its ability to develop and move new equipment rapidly has effectively shut off from competition some 70% of the large-scale CPU market. In the area of storage for those large-scale systems, IBM's newfound efficiency has effectively narrowed domestic competition down to one company. In the microcomputer area, the fear of IBM's ability to tie up small companies in court has effectively quashed the hopes of several relatively small companies that had planned to grow on a commodity operating system that IBM sanctified as a standard but had limited through use of a proprietary basic I/O system.

IBM has not yet been able to constrain the mini/superminicomputer market, but it has clearly turned its withering gaze on that area. It also has uncharacteristically declared its intent to be in the forefront of factory automation and networking.

IBM has made evident its intent to be a major factor in the relatively infant arena of deregulated telecommunications. With its majority stake in a long-haul carrier, its unfolding local-area network, its computer products hitting every category from top to bottom and now the acquisition of a major private branch exchange vendor, IBM clearly is positioning itself to be the *total* systems provider.

Competitors must fear IBM's potential to do with telecommunications what it did with mainframe computers and what it appears to be doing with microcomputers. Such events might assuage the Reagan administration's fear of the Japanese vendors, but they certainly won't do much for a competitive domestic environment. And at some point, the power of Big Blue is going to attract the scrutiny of a Congress that thrives on protecting individual commercial interests.

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Jim Orton Computerworld

'Stop, thief!'

LETTER

A clear case for documentation

The real story is sorely lacking in "Multiusers micro a tough DP sell" [CW, Oct. 29]. IBM chose not to offer a high-performance micro because the machine would compete with a lucrative System/34 and System/36 marketplace.

Therefore, MIS types — largely uninformed about new technology and alternative processing methods and led by the nose by IBM marketing — will continue to fear that [other] departments will find out they do not really need MIS.

I, for one, am sick of hearing the typical small systems scare stories created by this largely unprofessional group. The new breed of supermicros runs up to 2.5 million instructions per second and [has] 8M bytes of real memory, serves 16 or [more] users and [can handle] more than 1G byte of disk [memory]. They run numerous truly relational data bases, all vastly superior to those IBM offers.

I also fail to see user-friendliness in IBM's multiuser operating systems. As for developing software, supermicros and superminis offer excellent environments for the development cycle.

Hardware in the $20,000 to $150,000 price range should be serving departments and other functional pods of processing within large departments, but MIS will generally not allow [this because it might diminish] its centralized empire.

In short, supermicros are not acceptable to large corporations because they are not made by IBM, and they promote decentralization. The headline could have just as well referred to conventional minis or superminis.

Randall Cullinan
Richmond, Va.

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VIEWPOINT

Draggin' out the dragon

LECHT ON SCIENCE
Charles P. Lecht

"Tokyo University Succeeds in Non-Neuman-Type Computer — In Quest of Fifth-Generation Machine" read the headline in the *Asahi Evening News* on Nov. 7. It was exceeded in print size only by the pronouncement of President Reagan's victory and shared the top of the daily's front page. Someone's draggin' out the Japanese dragon again, I thought. For the past five years, it has been the most effective government fundraiser for computer research we could find, exceeding even the Soviet hair-raising threat of a nuclear Armageddon.

If the Japanese fifth-generation project can produce such sensational results to be worthy of such notice, we may want to consider joining the Japanese government to present it to the Russians as a reason to get on with serious disarmament negotiations. Or we may want to think about subcontracting all our computer systems research to Tokyo University.

The scare-producing fifth-generation dragon's nourishment over the past five years has been roughly $450 million; IBM and AT&T alone can be expected to spend in excess of $6 billion in R&D during 1984. Our Department of Defense is spending $600 million on the same type of work as is the Japanese government in its fifth-generation computer project. Draggin' out the dragon in the Asahi newspaper should help get this hiked. As a minimum, it should increase the flow of cash into our universities that sorely need it, so its effect cannot be judged as all bad.

I'm sitting here in Tokyo trying to figure out who or what has been and continues to be behind the idea that the Japanese computer and communications industries are anywhere close to ours in their ability to create computer systems — not to speak of competing with these in the world marketplace. Not that we can complacently ignore Japan's achievements as meaningless in the scheme of things commercially competitive. But we do have to keep our perspective on the issue. As 1984 draws to a close, the Japanese are still so far behind us in the development and volume manufacture of medium- and large-scale computer systems that it is doubtful that they could ever catch up to us in this century. And their use of personal computers is so far behind ours that one gets the impression that there is a law in Japan requiring that all personal computer technology be exported. Even if Japanese citizens have home computers, they are still unable to use them as easily as we do in America: All communications in Japan are still hard wired.

As 1984 draws to a close, the Japanese are still so far behind us in the development and volume manufacture of medium- and large-scale computer systems that it is doubtful that they could ever catch up to us in this century.

With IBM and other data processing companies now joined by AT&T and other communications companies, the new DP communications industry in the U.S. — which, for lack of a better name, we can call the information services industry — can account for about $150 billion.

Include in this our new DP communications companies, our software companies and Merrill Lynch & Co. and IBM or just plain banking with data processing like New York's Citicorp — and the growing community of others of similar genre — and I think it would be conservative to estimate the value of the entire lot at over $200 billion.

Today's Japanese computer industry cannot account for more than a small percentage of the world marketplace commanded by our information services industry. Even when Nippon Telegraph and Telephone Co. (NTT), soon to be deregulated, and other companies like the Japanese National Railway join Japan's computer industry, its combined volume will be less than 20% of ours, the overwhelming majority of which will be in Japan.

A paltry few percent

By installed base, the Japanese share of the world marketplace, once again, is reduced to a paltry few percent. To put this in perspective, remember that Japan has a population that is roughly half the size of ours.

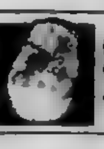
Of course, measuring the information services industry is no easy task — in America or Japan (after NTT's deregulation). Its constituent parts frequently have foggy boundaries where the bucks are biggest. No longer can we simply count chips or small, medium and large computer systems, multiply these by known values and come anywhere close to estimating the size of a country's part of the world marketplace. The emergence of massive time-sharing systems that dispense the powers that computer systems provide — like telephone service — and which serve to extend the powers identified with a particular computing device on an ad hoc basis, provide us with example enough to bring home the point.

As if this were not confusing enough, consider the fact that many industries previously not thought even remotely connected to electron-

See DRAGON page 52

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Cutting the fat out of user training budgets



HUMAN CONNECTION
Jack Stone

Configuring an optimum computing system for user training in personal computers is an interesting challenge for large organizations seeking ways of cutting the fat out of their internal educational budgets while maintaining, or improving, effectiveness. The time is ripe for reconfiguration studies because of the vast numbers of compatibles currently flooding the marketplace and the accompanying price cutting.

Let's take a look at some ideas that may have merit for your company. First, the classroom situation with the live instructor. Many firms organize their hands-on personal computer training rooms around single-user machines with essentially the same configurations as in operational departments. All well and good. However, a number of companies have not yet chosen to standardize on a single system (plus clones) and currently operate several incompatible systems, for example, Digital Research, Inc.'s CP/M, Microsoft Corp.'s MS-DOS and AT&T's Unix.

Clearly, a classroom for each vintage is nonsense. On the other hand, a powerful, multitasking personal computer, outfitted with a single processing unit plus terminals at the student stations that can run all major operating systems — concurrently and as fast as lightning — makes very good sense. Such is the capability of, for example, Dallas-based Microcraft Corp.'s Dimension 68000 Personal Computer.

Cost-saving prospect

Dimension incorporates the Motorola, Inc. 68000 L8 processor chip, which provides the speed required to support up to 16 student terminals. In addition, special-purpose emulation hardware, when coupled with optional coprocessors — one for each type of operating system — supports virtually any 8-, 16- or 32-bit-oriented software. Clearly, using Dimension or some similar system offers prospects of substantial cost savings over multiple single-user machines.

For those organizations committed to the IBM Personal Computer and compatibles, recent price slashing has produced some interesting machine alternatives for the classroom setting. For one, the IBM PCjr starts to look very attractive as a low-cost alternative to IBM's Personal Computer since discounters are selling the basic setup — 128K bytes of random-access memory (RAM) and a single 360K-byte disk complete with color monitor (of less than exemplary quality) — for under $900, even less in quantity. Most important, one can avoid the expensive upgrades of RAM and disk (to 256K bytes and twin drives) usually associated with business programs in common use (Lotus Development Corp.'s 1-2-3, Multimate Software Systems, Inc.'s Multimate and others) because the PCjr programs are supplied in read-only memory (ROM) cartridges and will run on the basic PCjr configuration.

Although the new keyboard arrangement of the PCjr and other of its features are still less than desirable, a savings of about $1,200 per station by using a sale-priced PCjr instead of a full-blown Personal Computer (discounted to about $2,100), tends to justify it for the training function.

Alternative to PCjr

An alternative to the PCjr for this environment is the Tandy Corp. Tandy 1000, the newest Personal Computer clone. Discounters are now offering this machine with monochrome monitor and the same base configuration as above for about $1,150. In addition, they toss in a kindergarten version of an integrated program, replete with word processing, spreadsheet, filer, telecommunications, office utilities and so on, which, by the way, may be just the ticket for some elementary computer literacy training.

And on the subject of literacy and Tandy, the TRS-80 Model 100 4-lb laptop is worth some investigation. The 32K-byte RAM — plus 32K-byte ROM — version is now available from discounters for about $500 (as opposed to $900 original list price). Add to this machine some new, low-cost, simple software from Tandy and the independents to offset the deficiencies in the current built-in programs, and you have an economic self-training machine that can familiarize some members of the user population with computers and bring them into a semiliterate state. Furthermore, when and if the Model 100 fulfills its elementary training mission, it can be used operationally as a terminal for data entry or as a remote operator console for an IBM Personal Computer. ⌧

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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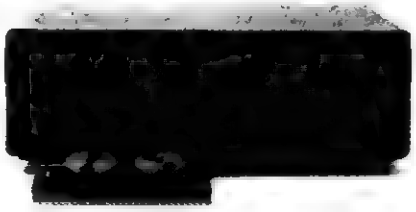

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VIEWPOINT

DRAGON

from page 53

ic data processing or communications are now solidly in its midst, (for example conferencing and entertainment) and the mind begs to ask where it will end.

No job for bean counters

Thus, sizing the industry is no job for the bean-counting economist of the past. And I suspect that whatever model we may create will fail to provide us with the kind of certainty we would like in the future; a new framework is needed, one that is as yet undiscovered.

The English language newspapers in Japan during the week of Nov. 5 betray the confusion that consumes the world computer and communications industries in figuring out who is ahead of who. Consider the following article in the *Asahi Evening News* by Philip M. Boffey, New York Times News Service.

> *'The Japanese marketplace is more open than we care to admit; [the U.S. marketplace] is more closed than we believe. Our relationship to Japan is the most important bilateral relationship we have — bar none.'*
>
> — Mike Mansfield, America's Ambassador to Japan

The headline read: "The Race for Computer Supremacy — Military, Political and Economic Stakes are High." A second line read: "U.S. and Japan Slug It Out Chip For Chip." After pointing out that American opinions of the Japanese computer industry may have been a bit exaggerated, the article went on to confirm it.

"As the great computer race intensified, so too did the confusion generated by a blizzard of claims and counterclaims, scare stories and reassurances, media exaggerations and self-serving pronouncements from individuals who stood to gain or lose from whatever government actions might be taken to counter the Japanese."

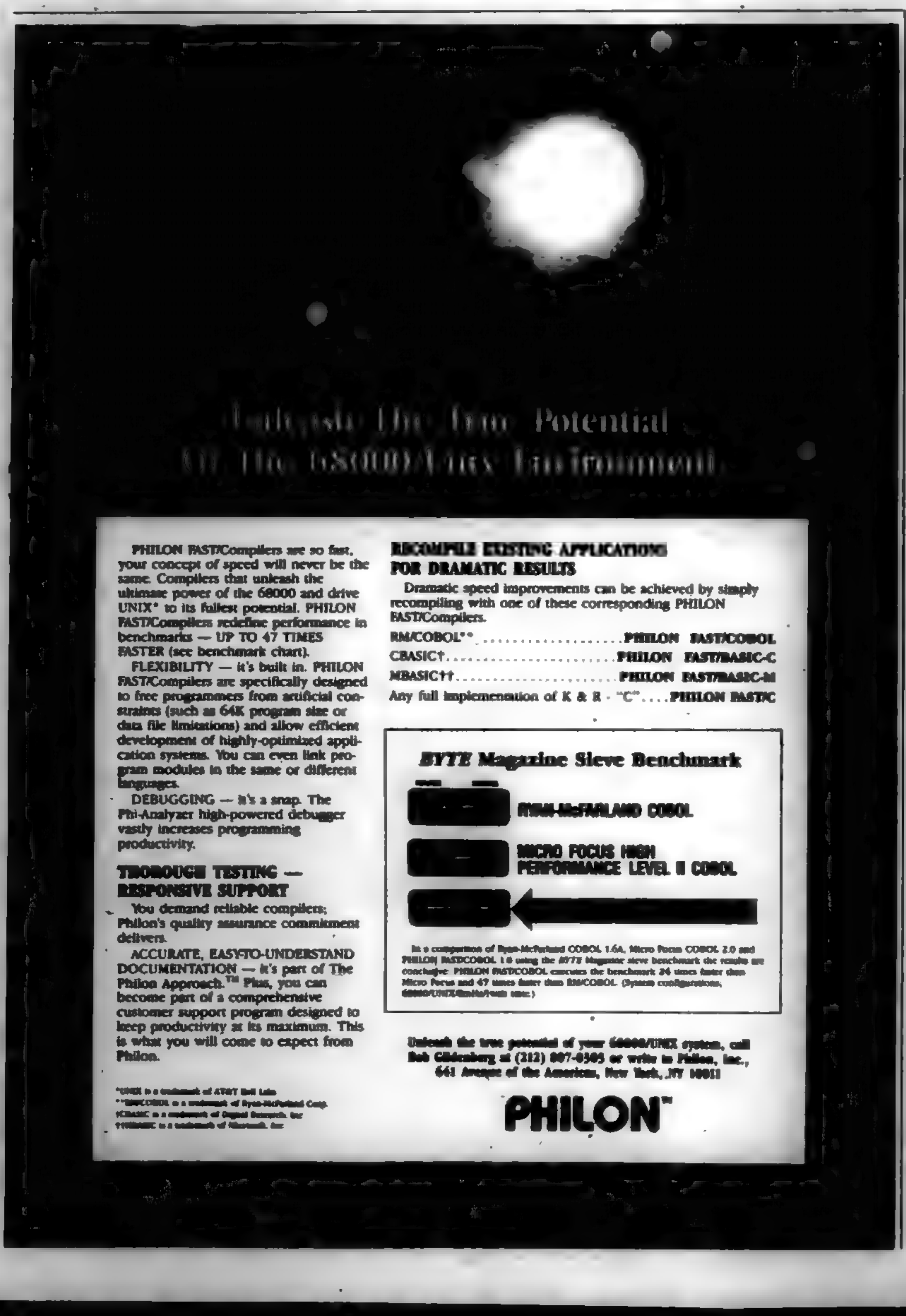
The article went on to say, "The computer race excites conflicting emotions in the technical community." George A. Keyworth 2nd, the White House science advisor, has been quoted as saying in reference to the so-called Japanese threat, "It's important, but I think it's been blown out of proportion."

Notwithstanding the sensationalist headline the article sports, the backpedaling on the Japanese threat to our computer supremacy by members of the American scientific community represents a shift in the attitude of some American scientists. This shift is heartening, and one hopes it catches the attention of the others who seem too happy to drag out the Japanese high-tech threat every time they get to fund-raise.

Maybe we can get things back on track again so that we can better focus upon our real adversaries in this increasingly technological world. Americans forget that the Japanese may be our only ally in this world who finance our forces abroad on their own territory, thus contributing to our safety at home.

This includes housing, utilities, labor and free rent, according to America's Ambassador to Japan, Mike Mansfield. "The Japanese marketplace is more open than we care to admit; ours is more closed than we believe," he said. Summing up his remarks on my visit to his office, he said, "Our relationship to Japan is the most important bilateral relationship we have — bar none."

I cannot help but agree with the ambassador. In fact, I believe that Japan may be one of the only friends we have who is not on the dole. And, in a world increasingly technological, we can use all the friends we can get. I suggest that Americans put away the dragon; we've got enough cause to support increased spending on high technology without it.



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BYTE Magazine Sieve Benchmark

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LETTERS

Resting on GOP's laurels

We want to rest on the GOP's laurels.

"Data base gives Republican campaign resource edge" [CW, Nov. 5] mentioned the Republican National Committee's data base. However, you omitted the name of the data base management system (DBMS) the committee uses.

Since 1979, the Republican National Committee has used Software House, Inc.'s System 1022 DBMS for almost all its applications. Whether it's tracking financial contributions for a direct mail campaign or researching quotes for a rebuttal, System 1022 is the Republican National Committee's supporting software.

[illegible]
Cambridge, Mass.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

SOFTWARE & SERVICES

ACF2 snatches top spot

IBM's RACF lands near bottom of security stack, according to Xephon Technology Transfer poll

By Maura McEnaney
CW Staff

Users of IBM's Resource Access Control Facility (RACF) were among the least satisfied security systems users surveyed recently by Xephon Technology Transfer Ltd. of Berkshire, England.

RACF placed sixth out of seven packages examined in the survey. In the category of overall satisfaction, RACF came out just in front of Boole & Babbage, Inc.'s Secure.

Topping the list in overall satisfaction was Cambridge Systems Group, Inc.'s Access Control Facility 2 (ACF2), followed by On-Line Software International, Inc.'s Guardian; Top Secret by CGA Software Products Group, Inc.; Electronic Data System Corp.'s Security Access Controller (SAC); and Boole & Babbage's Secure/CICS.

Using a 100-point scale, respondents were asked to rate their access control packages in the categories of ease of installation, ease of administration, facilities offered, security, degree of disruption, reliability, performance overhead, vendor support, documentation, training and monetary value. RACF's rating was below average in each of the categories except reliability and vendor support, the survey said.

Despite these low ratings, however, the survey indicated that the majority of RACF users rate it satisfactory or better, and none said he would not recommend the package to other users.

In the ease-of-installation category, RACF had the highest percentage of users (18%) who found installation more difficult than expected, the survey noted. ACF2, which had the most users phasing in the package, had the highest percentage of users who found installation easier than expected.

The average time users spent installing the packages exceeded the time suggested by the vendor. ACF2's recommended time of installation is a half day, but 45 man-hours in 21 days elapsed before the average installation was completed, the survey

See SURVEY page 64

Independents gaining ground in IBM-dominated DBMS mart

By Charles Babcock
CW New York Bureau

While IBM still dominates the market for data base management system (DBMS) software, independent suppliers are gaining market share, according to a recent survey by International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

By 1988, the market for DBMS is expected to reach $1.6 billion, with independents expected to capture just under half of those sales. That represents a gain for the independents; figures from the end of 1983 showed that IBM accounted for 62.8% of the market, IDC said.

In particular, the independents "have really made headway in cracking open [the IBM 4341] marketplace," wrote Ann L. Morley, IDC senior software consultant and author of the report.

"The independents have obviously been effective in targeting the idea of the information center data base and dual data base strategy," she observed, noting that 4300 series users often buy an independent's DBMS to supplement IBM's 14-year-old IMS.

According to a questionnaire IDC mailed earlier this year to 1,003 IBM mainframe sites, the two biggest gainers in the DBMS marketplace appear to be Cullinet Software, Inc. and Applied Data Research, Inc. (ADR). A total of 96 users said they would buy a DBMS product by the end of 1984, and their purchases would be broken down among the following vendors:

- IBM's IMS — 10.4% of the purchases. If the sample is accurate, the figure represents a potential decline in IMS market share. IMS accounted for 20.8% of the in-

See DBMS page [illegible]

Version 4 of Method/1 out

CHICAGO — Arthur Andersen & Co. has introduced Version 4 of its Method/1 systems development methodology.

Enhancements to the latest version are said to include on-line, menu-driven software tools for system design, as well as a user guide.

Method/1 is primarily intended to support personnel involved in the planning, development and implementation of information systems for medium- to large-size companies, the vendor said.

Software packages

The product includes four system development software packages — Estimate/1, Track/1, Design/1 and Change/1; "how-to" manuals describing the system development process; 25 days of consulting assistance; and 40 hours of self-study materials.

All software packages operate on an IBM Personal Computer, Personal Computer XT or Personal Computer AT. Each package is said to support different but interrelated portions of the Method/1 process. For example, Estimate/1 is an on-line software tool that automates the estimating process for the systems design and systems installation phases of Method/1.

The software is priced at $50,000.

For more information, Arthur Andersen is located at 69 W. Washington St., Chicago, Ill. 60602.

AI techniques considered for DBMS use

By Bryan Wilkins
CW Washington Bureau

KIAWAH ISLAND, S.C. — An increasing amount of academic research is being directed toward applying the artificial intelligence techniques of expert systems to data base management systems (DBMS).

At the First International Workshop on Expert Data Base Systems held here recently, university and business researchers traded views on the desirability of using new AI query and inference techniques to manage complex DBMS.

Sponsored by the University of South Carolina's Institute for Information Management, Technology and Policy, the workshop produced a consensus that in the future, large data bases will require built-in logic aids to help programmers thread their way through the data.

According to Dr. Larry Kerschberg, workshop director, the worlds of AI and DBMS are meeting on a common ground of identical needs. "Data base management techniques are in a position to support AI where large data bases are required and where there need to be some strong rules of data management, such as [those contained in] dictionaries," he said.

"Data bases, while they are good at storing facts, have not generally been able to apply rules that are based on reasoning and inferences," he said. "We are trying to extend the concept of expert systems to handle large data bases."

Kerschberg said expert systems can update their knowledge base with data base processing information based on experience. They can also explain the sequence they use to arrive at a conclusion. Ideally, they could upgrade data bases with new data by deleting redundancies and inaccuracies, he said.

In the keynote address, John Miles Smith, vice-president of research at Cambridge, Mass.-based Computer Corp. of America, concluded, "In cases where expert systems and DBMS systems represent the same knowledge, both can support similar querying and explanation functions. However, DBMS can answer queries much more efficiently than expert systems."

Smith said expert systems still use a lot of computer power while DBMS have evolved to the point that they are more economical in computing and searching. The merging of an expert system with a DBMS should only be done where the power of inferential searches is really needed.

A strong difference of opinion arose over which of the two common AI programming languages, Lisp or Prolog, is more appropriate for the merger.

Lisp already has a strong presence in the AI market, yet there are inherent problems with Lisp programming, according to Kerschberg. Lisp has no reasoning capability, he said, while Prolog is capable of reaching inferential conclusions based on data rules already contained in memory.

However, another participant noted that Prolog is the language of choice for the Japanese Fifth-Generation Computer Project. Dr. Donald Marchand, director of the University of Southern California's Institute for Information Management, said a computer with Prolog could manage large, shared data bases with reasoning and explanation capabilities.

- Datasolutions International, Inc. introduced a set of productivity aids for the Hewlett-Packard Co. HP 3000 computer/60
- Amdahl Corp. announced two capacity management products for large mainframe installations/60

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X

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Program writing routines out for HP's Vplus/3000

WARWICK, R.I. — A set of program writing routines and a subroutine library to be used in conjunction with Hewlett-Packard Co.'s Vplus/3000 data entry and forms management package were announced recently by Datasolutions International, Inc.

According to the company, Command/3000 V/Access is said to reduce VIEW SCREEN access to four program calls, allowing a programmer to write programs that provide users with an on-line access to their computer-based files.

The procedure reportedly can be used in conjunction with any Cobol application program for data entry, data base inquiry, data base update or any application that displays data through a terminal form.

V/Access routines are said to include an on-line stream facility, display control, print file access, automatic message file access, automatic two-stage refresh, function key control and an alphanumeric string edit and conversion. Command/3000 V/Access costs $2,500.

Datasolutions also announced the Command/3000 Subroutine Library, said to increase the range of I/O data handled by any program.

The product reportedly includes a series of string-access and manipulation routines, bit-access routines and a string-to-numeric conversion routine. Command/3000 Subroutine Library costs $695.

Datasolutions International is located at 88-89 Jefferson Blvd., Warwick, R.I. 02888.

Amdahl offers two tools for large DP environments

SUNNYVALE, Calif. — Amdahl Corp. has announced two software products for the improved management of large and complex data processing environments.

An interactive programming tool, the Modeling and Analysis Package (MAP), enables users to construct models of their computer systems in order to predict future capacity and performance requirements. MAP produces models to answer "what-if" questions in IBM 370 architecture environments, including IBM's MVS, MVS/XA and VM.

The MAP program replaces previously required manual compilation of variables, such as work load growth, system upgrades and configuration changes, thereby allowing users to forecast future needs more accurately, the vendor said.

Amdahl's System Utilization Reporting Facility/IMS (Surf/IMS) allows users to generate synthetic IBM IMS/VS applications in order to predict the effects of both software and hardware changes on current and planned IBM systems, according to the vendor.

Surf/IMS enables users to manage their software environments as they grow, the vendor said.

The annual license fee for MAP is $10,000, and the annual license fee for Surf/IMS is $6,600, with discounts available for multiple procurements.

More information can be obtained from Amdahl through P.O. Box 3470, 1250 E. Arques Ave., Sunnyvale, Calif. 94088.

SYSTEMS SOFTWARE

APOLLO COMPUTER, INC.
RJE Access Gateway

Apollo Computer, Inc. has introduced the Domain Networking Remote Job Entry (RJE) Access Gateway, which reportedly offers Apollo users bidirectional text file-transfer capabilities with a variety of remote host mainframes.

According to the company, the RJE Access Gateway software is said to emulate IBM's Hasp and 2780 and 3780 communications environments. With enhanced queue management facilities, the RJE Access Gateway gives all users on an Apollo Domain network access to remote environments using KMW, Inc.'s protocol converter, the company said. Through this method, users can transmit and receive text files in a batch mode to and from remote computer systems.

Apollo RJE Access Gateway is priced at $1,800.

Apollo Computer, 330 Billerica Road, Chelmsford, Mass. 01824.

KOLINAR CORP.
Kprobe enhancements

Kolinar Corp. has announced enhancements to its Kprobe dump analysis tool, which now supports any machine under IBM's VM/XA migration aid and IBM's VM/HPO Release 3.4. The package runs in conjunction with Kolinar's Xmenu/E display system.

The enhanced interactive, on-line system and dump viewing facility also supports preferred machine-assist guests and IBM's Assembler H labels and allows users to write transient command extensions. In addition, it offers a command for interrogating logical device blocks and

Continued on page 62

T S O users

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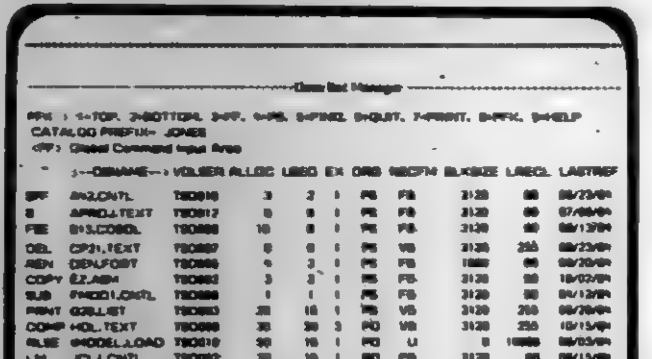

- DSM provides full-screen displays of cataloged files and supports TSO functions with simple, easy-to-remember command names.
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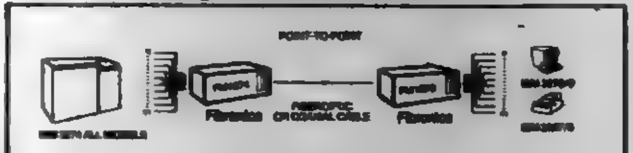

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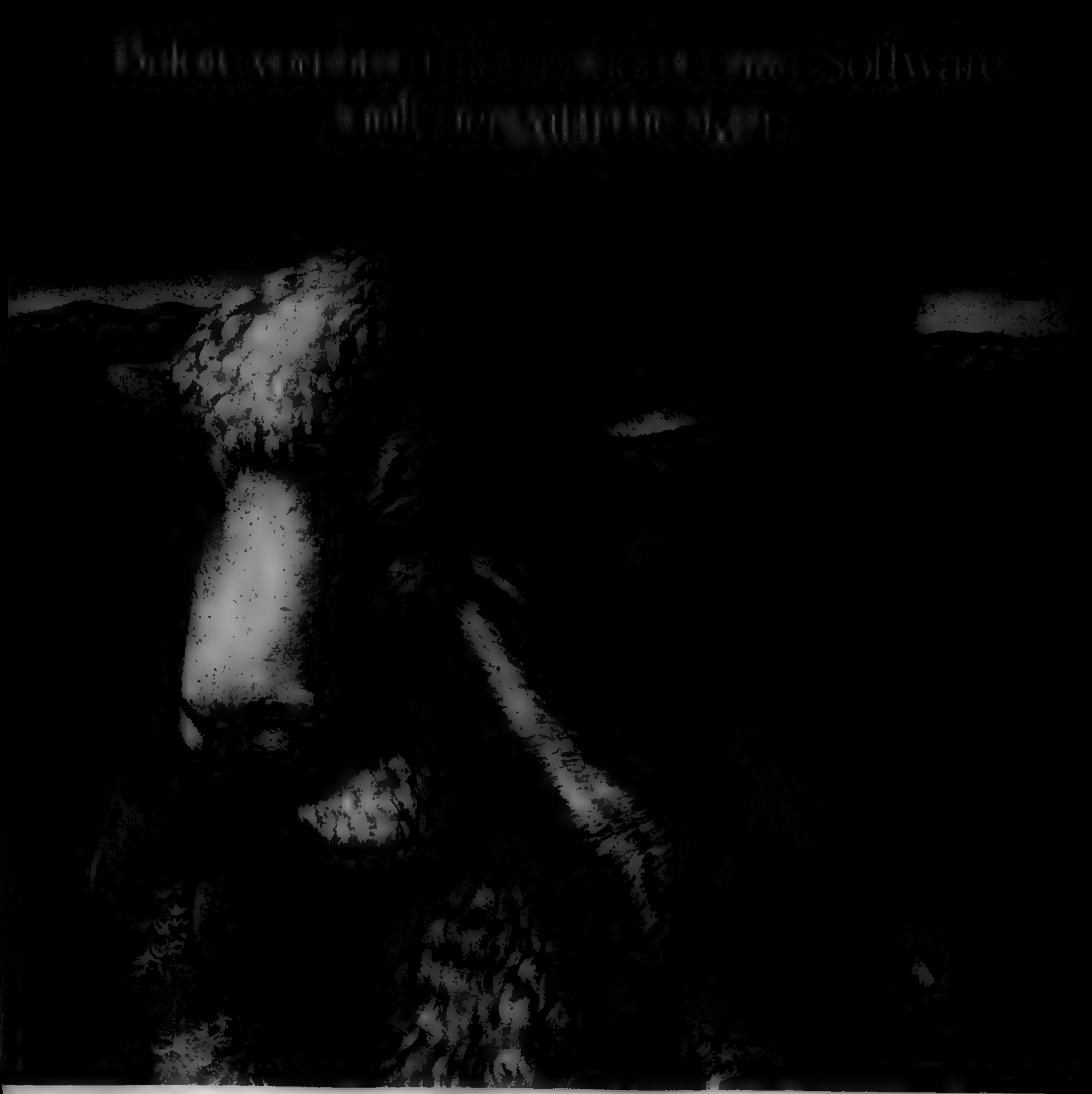

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For more information call or write Infodata Systems Inc., 5205 Leesburg Pike, Falls Church, Virginia 22041. (800) 336-4939. In Virginia call (703) 578-3430.

INFODATA®

SOFTWARE & SERVICES

Continued from page 61

provides user-definable storage for analyzing non-Ebcdic dumps.

Kprobe and its source code are available for an initial license charge of $1,200 and annual fee of $2,400. Xmenu/E has an initial charge of $1,000 and an annual fee of $2,000.

Kolinar, 3064 Scott Blvd., Santa Clara, Calif. 95054.

INTERACTIVE SOLUTIONS, INC.
Help

Interactive Solutions, Inc. has announced an on-line Help documentation package for IBM CICS applications under IBM's OS or DOS operating systems.

No program or system modifications are required to install the Help package, the vendor said. Updating is available on-line.

Reportedly, when a question arises about the use of a field or when an entry is rejected, the user places the cursor under the field in question and depresses a predefined Help key. The application screen is then replaced by a display describing that field. The Enter key restores the original screen.

A permanent license for an OS or DOS environment is $9,995 for a single CPU.

Interactive Solutions, 140 Rt. 17 N., Paramus, N.J. 07652.

WANG LABORATORIES, INC.
Burroughs Terminal Emulation

Wang Laboratories, Inc. has announced its Burroughs Terminal Emulation package, which allows the Wang Professional Computer to emulate Burroughs Corp. TD832, TD834 and MT983 display terminals.

Functions supported in the software include a 1,920-char. screen, a 25th line for document status, local printer support and asynchronous and synchronous communications.

With the package, a Wang personal computer can communicate simultaneously with up to three Burroughs hosts and run up to 16 concurrent communications sessions. Background printing can be sent to a host-addressable personal computer printer concurrent with Burroughs terminal emulation.

Price of the Burroughs Terminal Emulation software license is $500.

Wang, One Industrial Ave., Lowell, Mass. 01851.

PRODUCTIVITY AIDS

CORTEX CORP.
Cortex Action Diagrammer

Cortex Corp. has released an action diagrammer, a visual programming aid that automatically displays the logical flow of a program. The package is a module of Cortex's other development tools for the Digital Equipment Corp. VAX-11 computer running under DEC's VMS. It can be targeted to run on other DEC minicomputers and small business machines, the vendor said.

The Cortex Action Diagrammer is a graphics language editor that provides a visual representation of very high-level program code that facilitates the addition of program logic to generated code, the vendor said. The editor also checks the syntax and consistency of code while it is being entered online.

The Cortex Action Diagrammer will be available in January and will be priced at $15,000, according to the vendor.

Cortex, 55 William St., Wellesley, Mass. 02181.

INFORMATION BUILDERS, INC.
Documentor

Information Builders, Inc. has released a relational methodology tool said to provide a framework for the design and documentation of an information system.

Documentor reportedly uses a menu-driven, screen-oriented approach that is said to enable systems designers and end users to automate definitions of system data and components and then track the components and their interrelationships as the design evolves.

According to the company, Documentor is built in the company's Focus language. The system reportedly includes a one-time data entry system, as well as built-in data entry forms and complete systems reporting. The software is available for Focus users running IBM's VM/CMS or MVS/TSO operating systems. Permanent license

for the product is $12,000. It can be leased for $400/mo with a one-year lease.

Information Builders, 1250 Broadway, New York, N.Y. 10001.

APPLICATION PACKAGES

MAGNATRON, INC.
Distributron

Magnatron, Inc. has introduced an integrated business software package for the IBM System/38 under IBM's CPF operating system.

Distributron reportedly allows multiuser processes and decreases auxiliary storage requirements, the company said. The series modules consist of accounts payable, accounts receivable, general ledger, inventory control, order processing/sales analysis and purchasing.

Each module reportedly contains on-line menu construction with screen and field-level Help, externally defined data and display files and multicompany processing.

All maintenance and entry-type programs are interactively edited, according to the vendor. IBM System/38 [illegible] source code is included.

Distributron sells for [illegible]

Magnatron, P.O. Box 90393, Knoxville, Tenn. [illegible]

DIGITAL EQUIPMENT CORP.
VAX Decalc Version 2.1

An updated electronic spreadsheet program that is said to integrate data base, graphics and communications functions was introduced recently by Digital Equipment Corp.

VAX Decalc Version 2.1 reportedly features financial, statistical, logical and trigonometric functions for VAX/VMS and Microvax systems. Supporting VT100 and VT200 series terminals, it reportedly integrates with the company's Datatrieve data base management program, Decgraph for presentations and with electronic mail and network support for information acquisition and distribution.

According to the company, VAX Decalc Version 2.1. includes financial functions such as Interrupt Return Register and discounted payback. The program is said to perform linear regression and calendar arithmetic and is said to allow multiple users to share data and graphics.

Base price of the VAX Decalc is $680 and increases with configuration.

Digital Equipment, 2 Iron Way, Marlboro, Mass. 01752.

UNICALC CORP.
Unicalc/DB Release 1.5

Unicalc Corp. has announced a release of its mainframe spreadsheet package for systems running under IBM's MVS and DOS.

Unicalc/DB Release 1.5 is said to offer multisheet or multidimensional processing. It also features a user command to provide access to data from any file structure on IBM mainframe computers.

Other features of the latest release are said to include a user-definable formula capability in which mathematical or business functions may be defined by a user one time, saved under an appropriate name and reinvoked at will in other spreadsheet operations. This feature enables users to expand the library of functions in Unicalc/DB without programming, the vendor said.

Another feature is an optional data management facility said to allow users to optimize the disk space assigned to them through archiving, space compression or deletion of their worksheets.

Unicalc/DB is supported under IBM's MVS/TSO, DOS/CICS and MVS/CICS, as well as Cullinet Software, Inc.'s Integrated Database Management System-DC in IBM MVS and DOS environments.

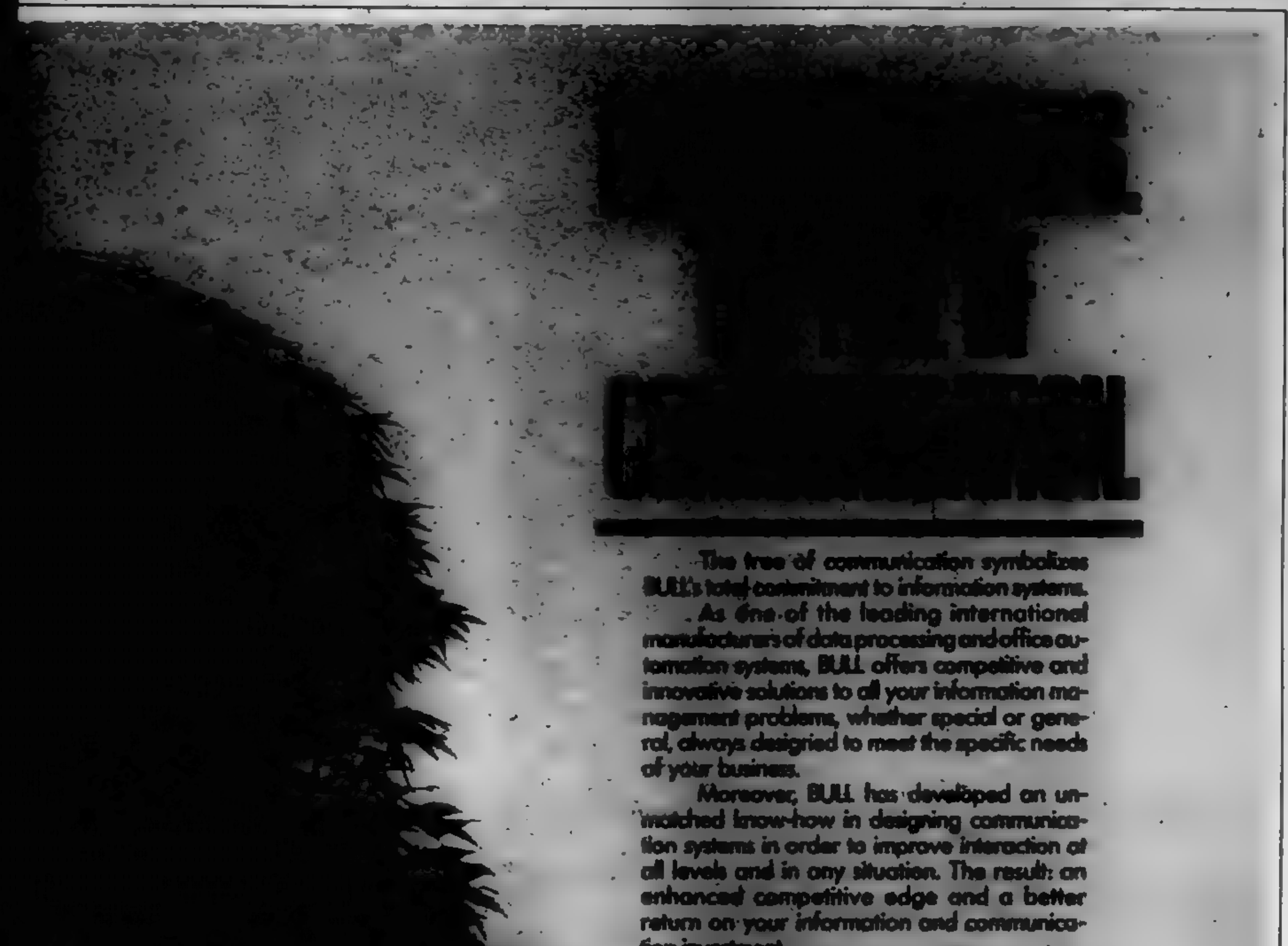
A site license is available at $16,500 for the MVS version and at $13,200 for the DOS version.

Unicalc, 2 Academy Lane, Wayne, Pa. 19087.

DATACOPY CORP.
Character Image Recognition

Datacopy Corp. has introduced an optional Character Image Recognition (CIR) system for its Word Image Processing System (Wips) software. Wips software runs with all Datacopy electronic imaging systems on IBM Personal Computers, Personal Computer XTs and Personal

Continued on page 64



The tree of communication symbolizes BULL's total commitment to information systems.

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Continued from page 63

Computer ATs, running under IBM's PC-DOS 2.0 or 3.0.

CIR reportedly processes image files of documents that have been scanned by Datacopy scanners. The software converts the text of these documents to standard Ascii code, which then can be processed using any standard WP software.

CIR comes in two versions: CIR-1 is preprogrammed for 10-point Courier and 12-point Prestige Elite fonts; CIR-2 is preprogrammed for the same fonts but adds an interactive learning capability, allowing the user to train the software to recognize fonts, letter patterns and handwriting.

The systems will be available in January. CIR-1 is priced at $695, and CIR-2 is priced at $1,995.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

COFFMAN SYSTEMS, INC.
Edge

Coffman Systems, Inc. has announced Edge, an on-line telemarketing package that runs under Pick & Associates, Inc.'s Pick operating system.

Edge monitors inbound and outbound calls and can handle from one to 250 users, according to the vendor. Edge reportedly allows a user to record and track a telephone call at an incremental cost of 50 cents per call.

The product is also said to store product descriptions, pricing and competitive comparisons. When an order is taken, the program generates invoices and shipping labels. Other features include data analysis and telephone utilization tracking capabilities and callback reminders.

Edge is priced between $5,000 and $60,000.

Coffman Systems, 13140 Midway Place, Cerritos, Calif. 90701

PARAGON TECHNOLOGY CORP.
Artwork Input Module

Paragon Technology Corp. has introduced its Artwork Input Module (AIM) software module for all computer-aided design and manufacturing (CAD/CAM) systems that generate industry-standard photoplotter output.

AIM reportedly allows the conversion, merging and manipulation of printed-circuit board and hybrid artwork from one file to another, regardless of the CAD system on which it was created. It is said to be able to read artwork data from tape and convert it into a Paragon-compatible data base.

AIM can update a data base of wiring and parts lists and conduct design rule checking of the data base.

AIM is priced at $5,000 and requires a 7-in. or 10-in. magnetic tape drive. It can be paired with any Paragon workstation.

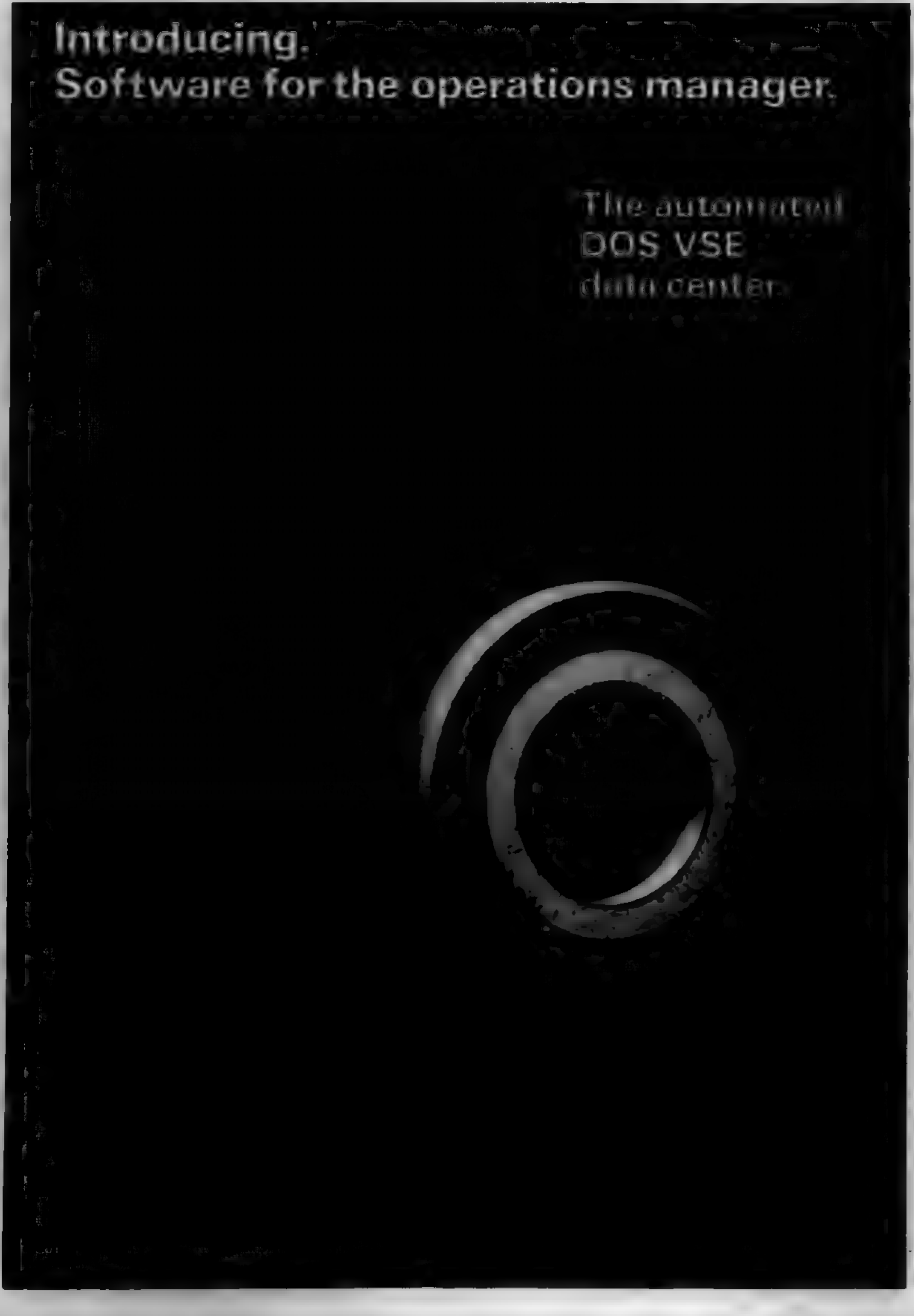
Paragon Technology, 2199 Norse Drive, Pleasant Hill, Calif. 94523.

IBM
A Manufacturing Language/Entry Version 4

IBM has introduced a version of its programming language for high-function robotic systems.

A Manufacturing Language/Entry (AML/E) Version 4 was reportedly designed to program the IBM 7545 and IBM 7547 manufacturing systems, provide enhanced function in

Continued on page 66



Introducing.
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The automated DOS VSE data center.

SURVEY

from page 57

said. A one- to two-day installation time was recommended to Guardian users, however; the average site spent 25 man-hours in 18 days to complete the installation. IBM suggested RACF would take three to four days to install, but users found the process took an average of 40 hours in 26 days, survey results showed.

Top Secret's reputation for ease of installation apparently held true for users. According to the survey, CGA recommended half an hour to install the package, and users spent an average of 2.5 days and nine man-hours implementing the system.

Of all the products represented in about 25 sites, Guardian gave users the most intallation problems, the survey said. According to the survey, six Guardian sites had problems when moving to the latest version of IBM's CICS.

Documentation was said to be the most common problem of access control packages. "Although many users recommend others to read the manuals carefully before implementation, the documentation provided with all the packages (with the exception of ACF2) is rated poorly," the survey said.

Rating security features

Users rated security features of their packages in six major areas:

- The range or resources protected.
- The range of actions that can be monitored.
- The range of users that can be monitored.
- The ease of specifying security rules.
- The ease of modifying security rules.
- The reporting of violations.

According to the survey, ACF2 came out on top in the security category, followed by Top Secret, Guardian, RACF, Secure/CICS, SAC and Secure.

RACF placed sixth in the categories of ease of modification and specifying rules. "This might be explained by some of the inherent limitations of RACF," the survey said. "For example, it is not possible to specify protection to individual jobs or programs."

"Access Control Packages: Comparative Analysis" is available for $130 from Xephon's U.S. distributor, Publishers Business Services, P.O. Box 643, Cambridge, Mass. 02139.

SOFTWARE & SERVICES

USE OF DBMS SOFTWARE AT IBM SITES
BY SENIOR SYSTEM 1981-1984
IBM 360/370/4300/30 series

Vendor	DBMS Package	% DBMS Use 1981	% DBMS Use 1982	% DBMS Use 1983	% 1984 DBMS Acquisitions*
IBM	IMS	17.2	18.5	20.8	10.4
	DL/1	40.7	39.7	42.0	18.7
	DB2	—	—	—	15.6
Cullinet Software, Inc.	IDMS	11.0	11.5	10.3	18.7
Cincom Systems, Inc.	Total/TIS	13.4	12.9	7.7	6.3
Software AG of North America, Inc.	Adabas	5.3	6.5	7.5	7.3
Applied Data Research, Inc.	Datacom/DB	2.4	2.6	4.9	18.7
Computer Corp. of America	Model 204	—	1.2	0.4	—
Intel Corp.	System 2000	1.2	1.5	1.3	—

* The 1983 sample planning to acquire DBMS software.

IDC CHART

DBMS

from page 57

stalled data base systems at the end of 1983 among the sites surveyed.

IBM's DL/1 — 18.7%. This represents a similar potential decline for a DBMS product that was in use at 42% of the sites surveyed at the end of 1983.

IBM's new DB 2 — 15.6%. Added together, IMS, DL/1 and DB 2 amount to 44.7% of the likely DBMS purchases, compared with IBM's 62.8% data base market share at the end of 1983.

■ Cullinet's IDMS and IDMS/R — 18.7%. Cullinet's IDMS was in use at 10.3% of the sites surveyed at the end of 1983.

> *'The independents have obviously been effective in targeting the idea of the information center data base and dual data base strategy.'*
>
> — Ann L. Morley, senior software consultant, International Data Corp.

■ ADR's Datacom/DB — 18.7%. At the end of 1983, Datacom/DB was in use at 4.9% of the sites surveyed, according to IDC.

■ Software AG of North America, Inc.'s Adabas — 7.3%. At the end of 1983, Adabas accounted for 7.5% of the packages in use at the sites surveyed, the study said.

■ Cincom Systems, Inc.'s Total and TIS — 6.3%. Cincom data base products were in use at 7.7% of the sites surveyed at the end of 1983.

■ Computer Corp. of America's (CCA) Model 204 did not appear in the survey results because the sites sampled were predominantly commercial users. CCA has succeeded in penetrating the government market, which is underrepresented in the survey, Morley explained. CCA accounted for 0.4% of the data base systems in use at the sites surveyed at the end of 1983.

■ Intel Corp.'s System 2000 was not mentioned in responses from sites that planned to purchase a data base system by the end of 1984. System 2000 accounted for 1.3% of the products in use at the end of 1983, according to the survey.

Uptime

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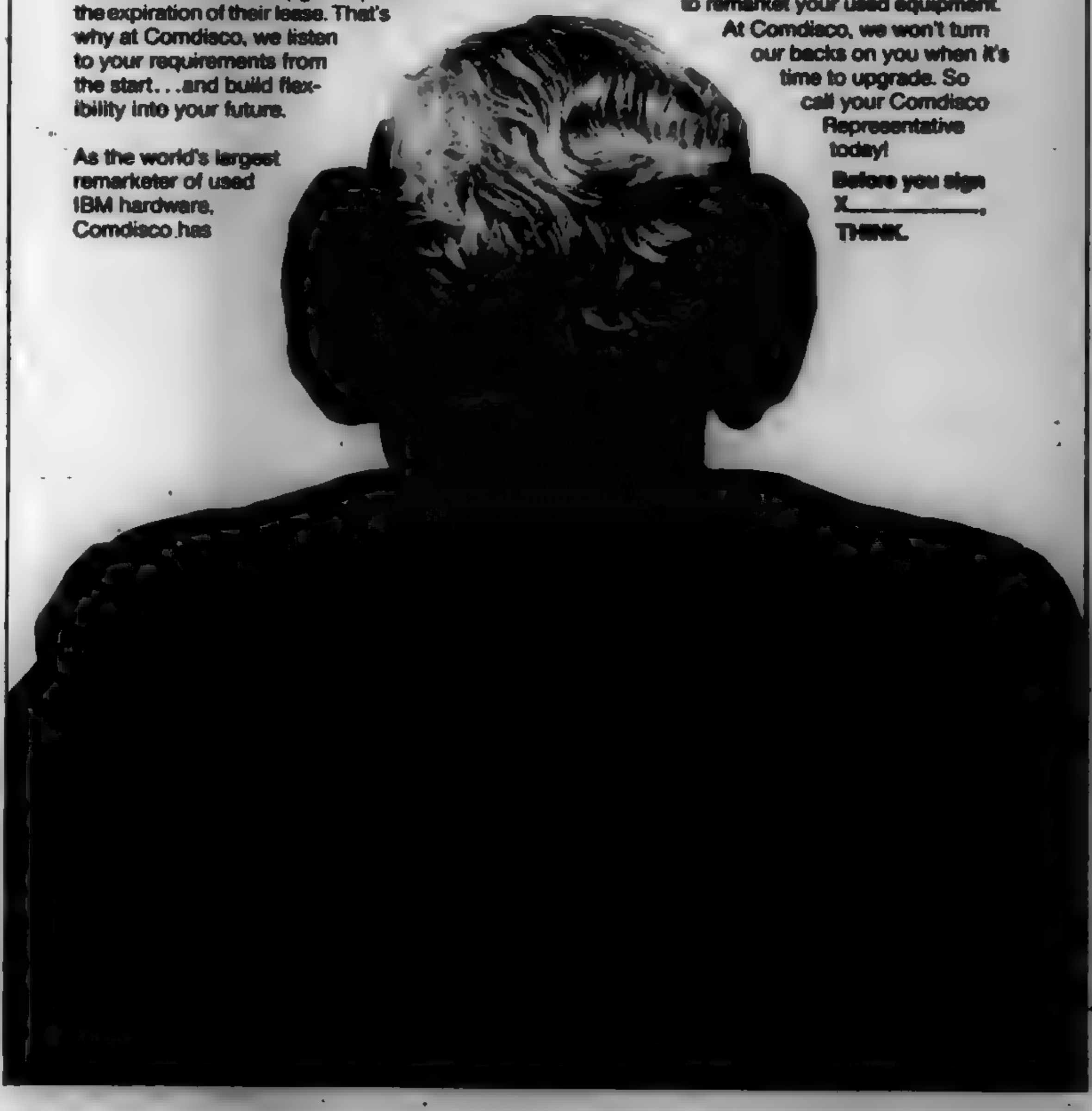

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X__________,
THINK.

SOFTWARE & SERVICES

Continued from page 64

communications and in edit, teach and compile processes.

A major feature of the software is said to be its ability to address computer-aided design and manufacturing requirements in communications and data-driven situations by providing host- and controller-initiated communications capabilities. A controller can request information from a host for the performance of a continuous operation, the vendor said.

To make full use of the enhancements in Version 4, a microcode change is required for IBM 7545 and 7547 manufacturing systems, which will be shipped to customers at no charge beginning Dec. 1, the vendor said. Machines shipped after that date will contain the necessary microcode. The new version is said to be upwardly compatible with Version 3.2 and can be used with IBM Personal Computers and the 5531 Industrial Computer with IBM DOS 2.1 and DOS 3.0. The software is priced at $3,250 per license.

IBM, Box 3025, Mail Stop 4006, Boca Raton, Fla. 33432.

MCBA
Release 2 HP Payroll

MCBA has announced a new release of its payroll package for Hewlett-Packard Co.'s HP 3090 series of computers, including the HP 3000 Series 37 under HP's MPE3 operating system.

The payroll package enhancements include an improved users manual format, interactive state and local tax tables, expanded workman's compensation capabilities, a direct deposit feature and a variety of methods for handling vacation and sick hours.

Source code licenses for MCBA's Release 2 HP Payroll range from $2,500 to $6,000, depending upon the hardware model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

NBI, INC.
Oasys Mail

NBI, Inc. has introduced an electronic mail program designed for use with the vendor's Oasys 64 cluster controller.

Oasys Mail is available on the vendor's Oasys 2000 and 4100 series personal computers and Oasys 4000 word processors. It is said to offer full-function text preparation tools and personal computing capabilities in creating messages. Up to five documents, including Microsoft Corp.'s MS-DOS volumes with up to 10M bytes of information, can be attached to each message, the vendor spokesman said.

To send mail, users address messages by providing the recipient's name or initials. Mail can also be addressed using job titles or a system code with a logon identification, the vendor said. Messages can be sent to individuals or to standard distribution lists.

Other features are said to include the capability for messages to be viewed, edited and forwarded as many times as needed. Mail can be delivered even when the recipient's workstation is powered off, the vendor said.

Oasys mail is priced at $7,500 on one Oasys 64 and $3,500 for each additional interconnected Oasys 64, according to the vendor.

NBI, P.O. Box 9001, Boulder, Colo. 80301.

DATA 3 SYSTEMS, INC.
MRPS 38-S Lot Control

Data 3 Systems, Inc. has announced a complete lot control and traceability feature for its MRPS 38-S manufacturing resource planning (MRP II) package for IBM's System/38 computer running under IBM's CPF operating system.

Lot Control can trace material lots from the time the material arrives at the receiving dock, through each process and into the final assembly of the finished product.

The price of MRPS 38-S Lot Control is $94,000.

Data 3 Systems, P.O. Box 441, Santa Rosa, Calif. 95402.

VERSATEC, INC.
Expert Illustrator

Versatec, Inc. has announced the Expert Illustrator graphics software for technical publication applications, running on the Versatec Expert engineering workstations under Xerox Corp.'s Pilot operating system.

With Expert Illustrator, graphics, engineering drawings and technical illustrations produced with the Expert Drafting package can be merged with documents produced with Xerox's Star software on the same workstation or be transmitted to other Expert workstations via Xerox's Ethernet local-area network, the company said.

A gateway to Digital Equipment Corp.'s VAX-11 superminicomputers is available via the Ethernet network for $16,000 per VAX-11 CPU, the company said. The price for Expert Illustrator is $4,500, the company said. Versatec workstations cost $15,895, and Star word processing software costs $1,200.

Versatec, Engineering Information Systems, 2710 Walsh Ave., Santa Clara, Calif. 95051.

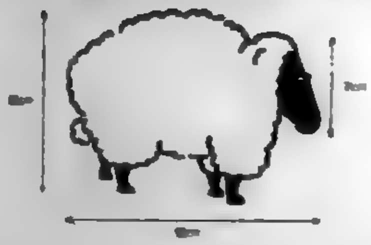
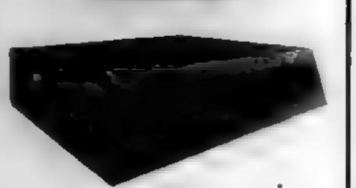
FLOATING POINT SYSTEMS, INC.
NAG Library for FPS-164 Scientific Computer

Floating Point Systems, Inc. (FPS) and the Numerical Algorithms Group, Ltd. (NAG) have announced that the NAG Fortran Mark 10 Library of numerical analysis and statistics has been converted to run on the FPS-164 Scientific Computer.

The NAG Library contains over 500 user-callable Fortran routines for a wide range of numerical analyses and statistical algorithms. The library is arranged into chapters covering topics such as eigenvalues and eigenvectors, simultaneous linear equations, inner products and time series analyses.

The price of the NAG Fortran Mark 10 Library for the FPS-164 is $1,200/year.

Floating Point Systems, P.O. Box 23489, Portland, Ore. 97223.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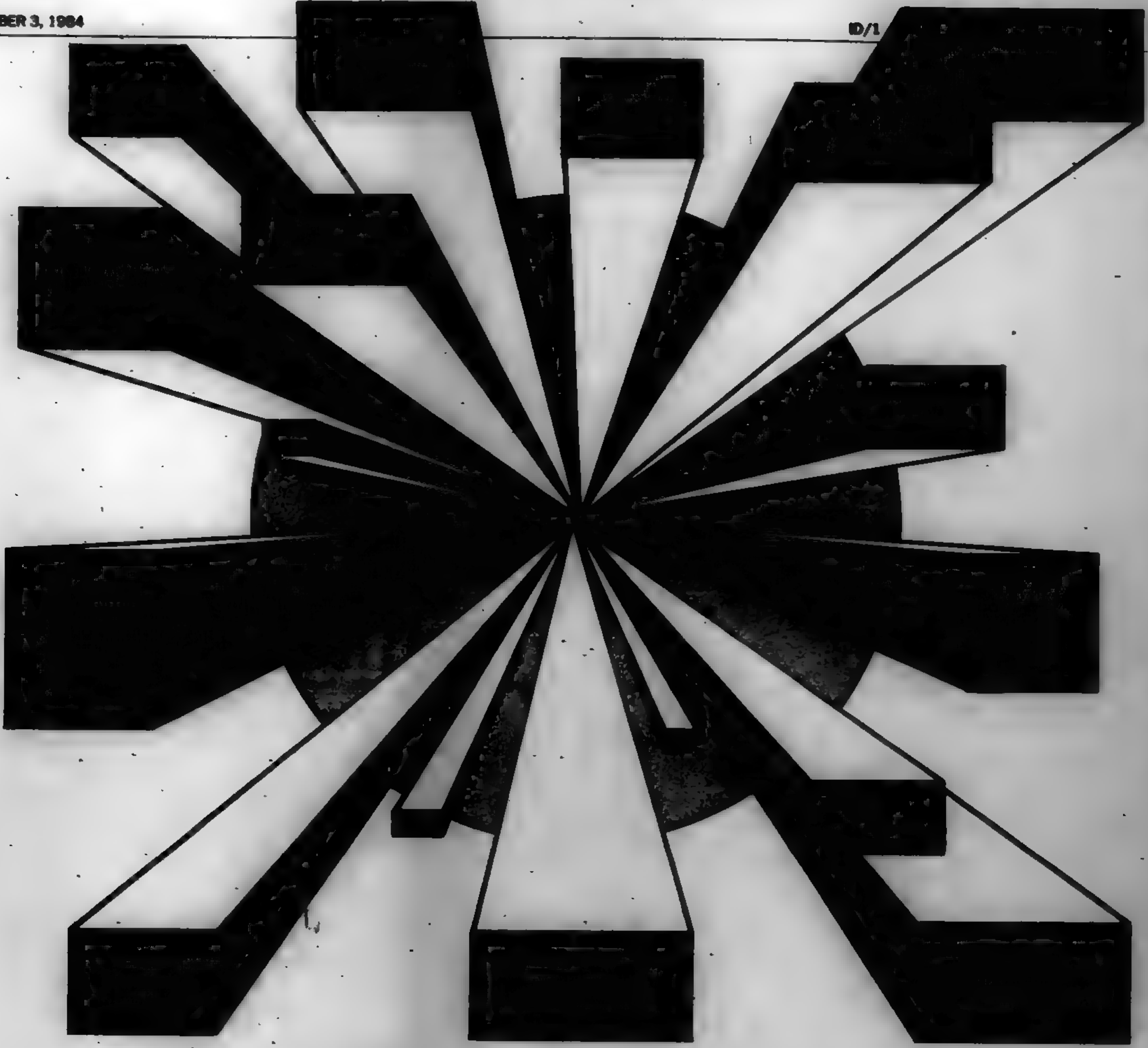

Getting control of data base systems

Four critical factors

By Michael Gorman

The data base approach, when fully developed, offers these organizational and technological benefits:

- Systems reflect organizational quality because they are founded on organizational analysis rather than on process analysis.
- Data base design preserves the natural contexts of business events.
- Data bases last a long time: Changes are minimal and have almost no impact on the programs that use data.
- Data base systems offer a wide selection of canned software tools for manipulation of data. Each tool was designed to minimize human effort and maximize overall integrity.
- Data base systems force

Excerpted from the book Managing Data Base: Four Critical Factors *by Michael M. Gorman. Published by QED Information Sciences, Inc., QED Plaza, 170 Linden St., Wellesley, Mass. 02181.*

IN DEPTH

the ownership of data to be escalated from the programmer to the organization.

- Data base systems permit common, multiple-user data processing, with the data base management system (DBMS) protecting the data base from conflicting operations.

The data base approach consists of four components: the logical data base, the physical data base, interrogation and system control.

The logical data base component represents the logical organization of the data base and the activities required to specify, implement and maintain it. The physical data base component represents the physical structure of the data base and the activities that bring it into existence and maintain it. The interrogation component represents the various data base management system (DBMS) data access languages and the activities required to choose the appropriate one for a task. Finally, the system control component represents the types of protections necessary to implement and maintain a data base application.

Each of these parts needs to be understood from four viewpoints: technology, the DBMS, staffing and the data base project.

Data base technology

The technical aspects of data base relate to four major data base components: logical data base, physical data base, interrogation and system control. The organization of a data base is represented by the data definition language (DDL). This same language communicates the data base's organization to the DBMS.

Since every DBMS' logical data base is controlled by a certain set of rules, the totality of the rules that allow network or hierarchical relationships and that bind records through either value-based or information-bearing relationships is called the DBMS' data model.

In general, there are only four major data models. The network data model often is able to define complex records and allows a member record to be owned by multiple records. The hierarchical data model generally defines only simple records and allows a member to be owned by only one owner. For both data models, the relationships that bind records together are information-bearing.

The third data model, the independent logical file, stores complex records, but its mechanism of interrecord relationships is value-based. The fourth data model, relational, stores only simple records and relates them through value-based relationships.

Static and dynamic DBMS

The main reason for distinguishing between information-bearing and value-based relationships is that DBMS, which are the predominant software tool for implementing data bases, are grouped into two major categories: those that are essentially founded on information-bearing relationships and those that are founded on value-based relationships.

Information-bearing relationship DBMS create data bases that are rigorously structured and that allow records to be retrieved and updated only in terms of these relationships. These information-bearing relationship DBMS create a static environment because the locations of the related records are already known.

The value-based relationship DBMS create data bases that allow the specification of relationships at retrieval time. The DBMS decodes the relationship specification and then proceeds to discover whether records exist that participate in this user-specified relationship. These value-based relationship DBMS create a dynamic environment, as the locations of the related records are to be discovered during retrieval.

Because both the network and hierarchical data models are based on information-bearing relationships that create static environments, these two models are generically referred to as static. Further, the DBMS that represent these data models are called static DBMS.

Because the independent logical file and the relational data models are based on value-based relationships that create dynamic environments, these two models are generically referred to as dynamic. The DBMS that represent these data models are called dynamic DBMS.

Knowledge of a DBMS data model is important, but not as important as knowing whether the DBMS creates static or dynamic relationships. If the DBMS relationships are static and the application is dynamic, application failure is almost always the outcome. If, however, the DBMS relationships are dynamic and the application is static, then the application usually is implemented, but the production rates normally fall far below expectations.

Because a data base project is different in important respects from a traditional data processing project, the staffing required to undertake it is also different. Five different types of skilled persons should be represented in a data base administration group.

Data base specialist

A great deal of functional knowledge is required to design a correct and useful data base. Therefore, the data base specialist's expertise would be primarily in the functional area of the data base. For example, if the data base was about contracts accounting and administration, the data base specialist would be expected to be completely knowledgeable in that area. The data base specialist does not design the data base; he remains with and assists the various functional users in designing it.

After the data base is designed, the data base specialist helps develop a complete implementation plan that is realistically founded on a complete conceptual specification.

Toward Clearer Communications: InteCom discus

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   - 40 Wholesale/Retail Trade
   - 50 Business Service (except DP)
   - 60 Government—State/Federal/Local
   - 65 Public Utility/Communication Systems/Transportation
   - 70 Mining/Construction/Petroleum/Refining
   - 75 Other User ______

   Vendors
   - 80 Manufacturer of Computers, Computer-related Systems or Peripherals
   - 85 Computer Service Bureau/Software/Planning/Consulting
   - 90 Computer/Peripheral Dealer/Distributor/Retailer
   - 95 Other Vendor ______
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   - 12 VP/Assistant VP
   - 13 Treasurer/Controller/Financial Officer
   - 21 Director/Manager/Supervisor DP/MIS Services
   - 22 Director/Manager of Operations/Planning/Administrative Services
   - 23 Systems Manager/Systems Analyst
   - 31 Manager/Supervisor Programming
   - 32 Programmer/Methods Analyst
   - 35 OA/WP Director/Manager/Supervisor
   - 38 Data Comm Network/Systems Mgmt
   - 41 Engr/Scientific/R&D/Tech Mgmt
   - 51 Mfg Sales Reps/Sales/Marketing Mgmt
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   - 70 Medical/Legal/Accounting Mgmt
   - 80 Educator/Journalist/Librarian/Student
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3. **COMPUTER INVOLVEMENT (Circle all that apply)**
   Types of equipment with which you are personally involved either as user, vendor or consultant
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems

CW-138

The conceptual specification consists of a complete data base design (the logical base) and a preliminary analysis of the other three components — the physical data base, interrogation and system control."

During implementation, the data base specialist finalizes any data base design details that may not have been addressed during the conceptual design process. Each changed detail that affects policy must be cleared with the functional users.

An important step in the implementation plan is the transformation of the generalized data base design to a specialized design required by the DBMS. The data base derived during the conceptual specification stage is very often a network, so an analysis is required to determine whether the relationships that bind the network of record types together are mainly static or mainly dynamic before the appropriate DBMS that is to be used for data base implementation can be chosen.

Regardless of whether the DBMS is static or dynamic, if the DBMS employed is a hierarchy, an ILF or relational, additional policies regarding integrity must be developed to permit construction of the DBMS version of the data base. These additional constraints need to be formally documented as thoroughly as any of the other data base policies.

If the DBMS relationships are static and the application is dynamic, application failure is almost always the outcome.

The data base specialist must oversee this transformation process and make absolutely sure that none of the policies established by functional area users are compromised.

Interrogation specialist

The role of the interrogation specialist seems almost traditional. This person can utilize any of the standard methods of design on data base subsystems (the data loading, data update and reporting subsystems).

The most critical aspect of the design of either the data loading or the data update subsystems is that the policies utilized must first be designed during the conceptual specification phase of the data base project.

If a policy flaw is discovered during the design or implementation of any aspect of the data base project, be it an omission or a conflict, the interrogation specialist must not fix it. The flaw must be referred to the data base specialist for resolution.

Once the loading and update subsystems have been constructed for a particular data base project, the interrogation specialist assumes the role of a consultant to various users of the data base as they develop and maintain reporting subsystems that come and go during the lifetime of the project. As a consultant, the interrogation specialist helps users select the most appropriate access language and assists them through design, coding, testing and documentation.

System control specialist

The system control specialist's job is probably the most overlooked of the data base jobs. It is, however, one of the most important. The system control specialist is usually involved half time in the beginning of the project, full time during implementation, quarter time during the first six months of operation and then as a consultant. From time to time, significant effort may be required as major changes in the data base become necessary.

The system control specialist must examine the need for audit trails from both the functional and the legal points of view. The legal requirement for audit trails may come from federal laws or from regulations promulgated by such government agencies as the Securities and Exchange Commission, the Environmental Protection Agency and the Nuclear Regulatory Commission.

Once the requirements are determined, audit trail designs must be constructed that are complete in terms of data content, DBMS integrity and throughput performance. The audit trails then must be implemented, tested, debugged and documented. Finally, audit trails must be put into operation and carefully monitored for some time before they can make the transition to a maintenance [illegible]

Backup and recovery is another critical aspect of the system control job. The system control specialist should develop tests that verify that the data base being backed up is in fact good. It would be unfortunate if a critical part of the data base's dictionary was defective and the defective data base was backed up over the last good backup. There can never be too much testing when it comes to verifying data base backups.

Finally, the system control specialist should construct a fail-safe backup process that unloads the data base data from the data base into a permanent, machine-readable source format, unloads the DDL and [illegible] sufficient computer programs to reconstruct the data base from the resultant source data and the DDL.

This fail-safe backup is needed in case all the normal medium backups are unrecoverable. While the alternative medium and the method of restoring this fail-safe backup may not be very efficient, they are certainly better than having to re-collect the data, which may be nearly

ses voice/data integration.

The manufacturer of the first integrated voice/data switching system considers the issues.

Data is a major factor in office communications today. It's projected that within the next five years, data transmission will increase from the present 2% to 40% of total PBX traffic. That's explosive growth. And it means that companies must accommodate this increase by expanding their present systems or by planning now to replace obsolete systems with ones that can meet those needs.

A look at alternatives.

To keep pace with this change, an organization has two basic choices. First, it can stay with a limited voice-only PBX and create separate data networks. This, however, is a costly, inefficient method, and it becomes increasingly difficult to manage multiple expanding systems.

The second alternative is an integrated voice/data system. By installing one network, a company can have voice and data capabilities at every outlet.

Key benefits are the sharing of resources—devices and software—and consolidated network management. An integrated system is an investment in the future that can pay for itself in the savings of single network administration.

A definition of terms.

Integrated voice/data is sometimes thought of as simply combining voice and data in one switch. But it's really much more. It's the total integration of voice and data through a twisted pair network.

Because a digital system does not distinguish between voice and data, both look the same as they pass through the switch. So it's possible to apply sophisticated voice features to data—least cost routing, conference calls between workstations, callbacks on data terminals and other aids to productivity that are normally associated with voice-only systems.

Major considerations.

Universal Connectivity

One of the greatest challenges facing communications professionals today is the management of changing technology. In an environment where many approaches to office communications call for complete flexibility, only a system designed to be compatible with multi-vendor equipment is a safe choice. Such a system provides the format and protocol conversion capabilities for dissimilar devices to communicate with each other, freeing a company from the need to choose all its equipment from one vendor.

A system should be capable of connecting numerous dissimilar devices to a common network, allowing them to share peripherals, data and functions. This flexibile connectivity also protects your investment in equipment, ensuring its continuing value.

Non-Blocking Traffic

In voice systems, many calls can share one path through the switch because conversations are short and not everyone uses his telephone at the same time. However in data communications each device needs full access through the switch, and the long holding times of data calls place heavy demands on a network. As more data circuits are added to meet growing user needs, a system founded on voice-only design can't handle the traffic and begins to block calls from completion, or to degrade the quality of transmission.

Non-blocking matrix architecture, however, places no restrictions on voice and data access. As the data-to-voice proportions change, the system is reconfigured at the host controller. And there's no new cabling required. In non-blocking systems, savings are soon realized in simplified administration.

Processing Capacity and Speed

Many installed systems operate on 16-bit processors. While this may be adequate power for today's voice-only systems with few data options, it may not be sufficient for tomorrow.

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impossible anyway if the damage occurs long after the data base has been implemented.

Logical and physical data base reorganization is also critically important. It ensures continued high performance in static applications and allows adjustments and evolutions of the data base to occur. Data bases degrade very subtly, and eventually the applications that use them often stop dead in their tracks.

Carefully planned statistics must be collected and examined to detect the warning signals that demark this passage. Shortly before the data base applications become comatose, data base reorganization must be undertaken.

Finally, the system control specialist must be concerned about data base security and privacy, which are often achieved through a combination of DBMS software capabilities, computer operations, procedures and corporate policy about handling violations.

Documentation role

It should be clear by now that documentation and standards play more than a bit part in the data base drama. In fact, the documentation of a data base project plays such a large role that it must be done first. This is because it contains the rules by which all participants are governed. To attempt the data base approach in developing an application without first having a complete and thorough debugged documentation of the system being developed is like trying to establish a lawful society without a constitution and a body of laws.

The documentation and standards specialist becomes the keeper of the data base project implementation method. As the keeper, this person creates, understands and instructs users on all of its aspects. The keeper must also monitor adherence to the standards. Any changes in standards must be made in a carefully controlled manner.

The importance of this position is widely recognized. However, the role is often restricted to being a DBMS guru To make this role complete, the DBMS specialist must be given a budget to perform detailed experiments to determine, for example, the extent to which data bases perform poorly because of structure degradation resulting from extensive updating or inappropriate designs. All this information should be thoroughly documented and classified for easy recall, analysis and refinement.

The DBMS specialist should be directly involved as a consultant in the development and operation of hot lines and as a key member of an in-house DBMS user group. He should also attend regional or national group meetings for DBMS users.

Finally, the DBMS specialist should be thoroughly knowledgeable about any DBMS bugs that may have been discovered. These bugs should be verified through a standard test data base, referred to the DBMS vendor, and categorized as to severity.

Solving problems

A way to solve the bug or a technique to work around it should then be found. Finally, a bug correction date should be negotiated with the DBMS vendor. Once all this has been done, the user should be informed about progress.

The data base approach to system design is different from a traditional data processing project in six ways:

- At the center of the data base approach are data bases, not reports. A data base should be designed to enhance the orderly process of organizational decision making in some well-bounded area. The data base thus becomes a computer-based model of that business area.
- The data base is designed by users within the

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Major changes occur only when the data base has not been correctly designed initially or when there is a fundamental change in the nature of the business.

business. Since they know the organization best, they are uniquely qualified to design the data base. A data base design is not a feat of technology, it is the practice of common sense. In short, if the design does not make common sense, it makes no sense at all.

■ A prototype of the entire data base project should be built during the first phase of the project. With a dynamic DBMS, this task can be accomplished in a few weeks. When this prototype is demonstrated to and employed by the users, necessary design changes become obvious. Since the prototype takes only weeks to create, changes to it take only days. The revised prototype is then demonstrated.

■ Computer-generated reports assume their rightful stature: very low. Only after the data base has been designed and its physical data base and system control components fully implemented is it time to begin work on the interrogation modules (reports).

The traditional system design is today's use of data, whereas the data base approach to system design is focused on the fundamental business policies that dictate data organization and structure. The former is like building a system on a foundation of shifting sands; the latter is like building on time-tested granite.

■ The traditional approach requires the expenditure of about [illegible] of all the money and time allocated for system development before the design can be demonstrated. In contrast, the data base approach enables the creation and validation of a prototype before system implementation.

Thereafter, the system's delivery date can be predicted with confidence for these reasons: The design has already been shown to be correct, and it is left to the user to write all or most of the ongoing interrogation subsystems using any of the DBMS language alternatives.

■ The sixth difference is in system maintenance. The data base is designed from a foundation of organizational knowledge; thus, changes to it are minor. Major changes occur only when the data base has not been correctly designed initially or when there is a fundamental change in the nature of the business. The first can be prevented; the second seldom occurs.

Reports do change, but since they are not a critical part of the data base system, the effect of such changes is not significant. And with the advent of sophisticated natural languages, old reports can be modified easily, and new reports can be constructed in a few hours. In short, maintenance is part of the data base approach to system design; because of this, changes become evolutions of systems, not revolutions.

Static or dynamic relationships usually dominate a

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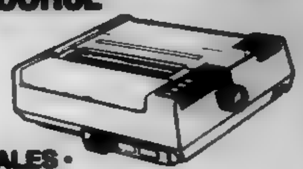

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data base application. Seldom is there an application in which the quantity of relationship types is evenly divided. That simply means that applications, too, are typically termed as either static or dynamic.

If the application is static, then the relationships among record types are normally all well-defined, stable and seldom change. Static applications also tend to be product-oriented, with large volumes and high velocities. The principal access languages for static applications are Cobol and Fortran.

A dynamic application, in contrast, tends to have relationships that change almost as often as the data. The orientation of the application is MIS. These applications often seem to have less data, lower volumes and lower velocities than the static applications. Natural languages dominate the dynamic application.

A dynamic DBMS' DDL usually does not contain formally defined relationship clauses with all the attendant integrity, record storage and retrieval subclauses. Record instances are stored in the record types in the order presented and are maintained in any order or stored and maintained in the order of the record's primary key.

The user of a dynamic data base has sort clauses as a fundamental part of the language. Records are thus selected and sorted before presentation. Once presented, the records should be able to be resorted and presented again. Actually, the records are not sorted; their address pointers are.

The effect of having a dynamically related set of records is the inverse of the effect of having a statically related set of records. Each interrogation has an equal chance of retrieval and update efficiency. There is no bias to the processing. Often, there are no restrictive relationship integrity clauses. That burden is placed on the user simply because it is the nature of the dynamic data base to have the rules for record interrelationships undefined. Thus, it must follow that the integrity clauses governing the interrelationships must also be undefined.

Project phases

The data base project is completed in three main phases. The first phase, conceptual specification, consists of activities in each of the four data base parts: logical, physical, interrogation and system control. In the logical data base component, the rules that define the data base's integrity are developed. This collection of rules is called the data integrity model.

In the physical data base, the rules that define acceptable data transformations are completely specified. This collection of rules is called the data transformation model. Also addressed, but in a minor way, is the remainder of the physical data base, interrogation and system control. At the end of this phase, the data base is designed, and the remainder of the project is in conceptual specification form.

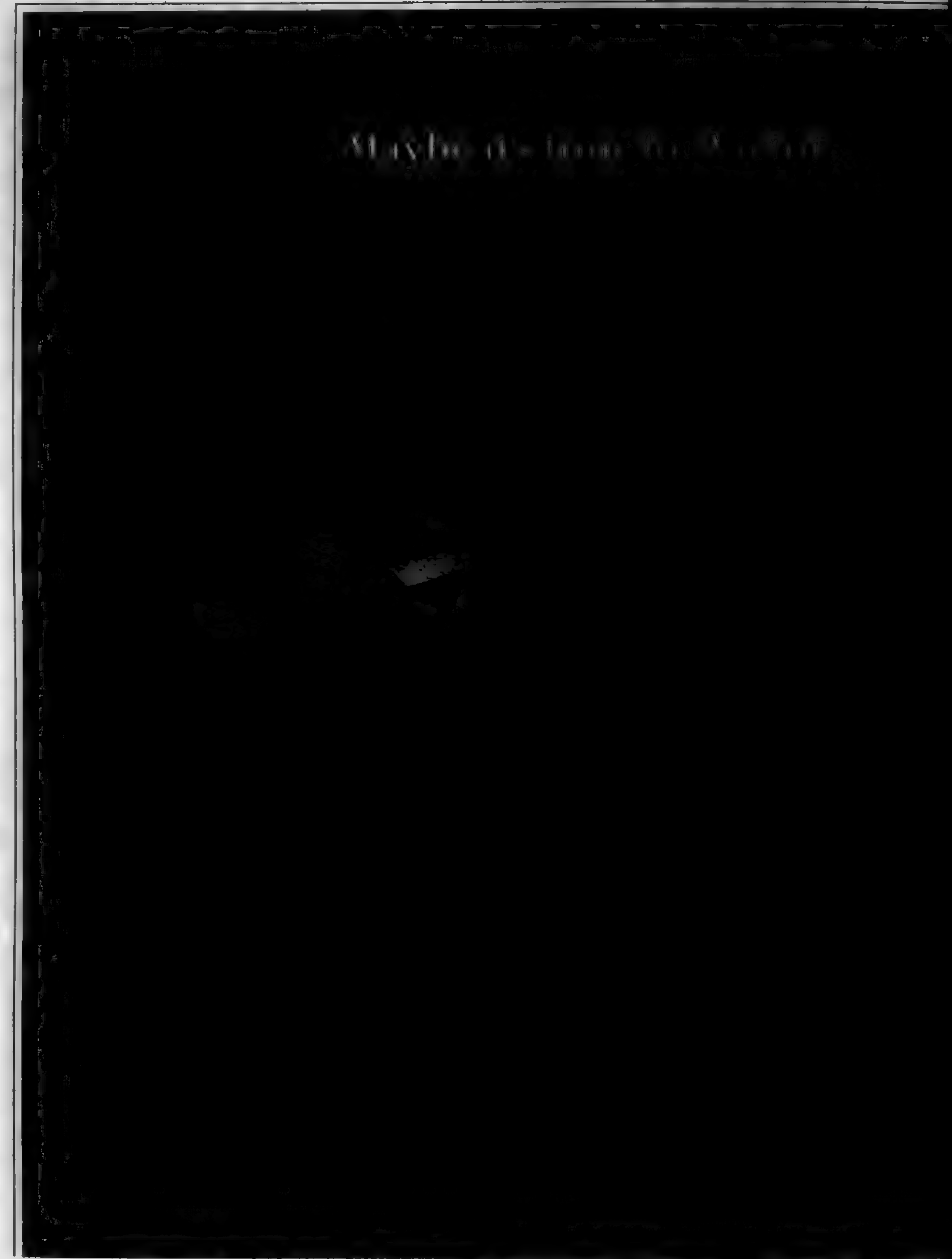
The amount of work required in the conceptual specification phase is considerable. This is true for all data base projects, regardless of the DBMS employed. It should never be supposed that this work is not needed when the project is intending to use a dynamic DBMS rather than a static one, because these activities are even more important with a dynamic DBMS.

Most dynamic DBMS offer interrecord integrity only through user-written programs, rather than centrally through schemata. This means that all the data integrity rules and the data transformation rules must be specified correctly and without variance in all programs. That's a lot of work.

The second major phase, implementation, concentrates on transforming the conceptual specifications into computer code and procedures, both manual and automated, to load and update the data base and to protect it through system control capabilities.

Once completed, the data base becomes operational. Interrogation is purposely downplayed because it is not a critical part of data base. The data integrity model is transformed into the schema DDL and data integrity procedures that reside in the schema or update programs. The data transformation model becomes the major portion of the loading and data update subsystems.

The third major phase,



production and administration, is ongoing — that is, it is concerned with the actual operation and administration of the data base environment. The activities in this phase are first directed to the development of data base interrogation subsystems and then toward performance optimization, design evolution and maintenance of the four data base components.

One thing should be very clear by now: The data base approach is not a computer science — it is a management science. It just so happens that the computer is a good vehicle for implementing data base projects, and that instead of expending hundreds of man-years on specialized software development, organizations can make use of a generalized solution, the DBMS, in conducting a broad range of information management activities.

Not only are data base projects a big effort, they are also performed at considerable risk. This risk can be both managed and minimized, however.

Reducing waste

The data base project methodology presented above describes practical ways to reduce waste or redundancy in the use of project manpower. Selecting the right staff, getting the staff trained and using the right DBMS is also critical.

Six additional factors bear heavily on the accomplishment of the elusive goal, success:

- Application risk.
- Management assistance.
- Documentation.
- Consistency.
- Definable policy.
- Policy coherence.

Knowing when not to do something is important — especially in data base applications. Not all applications are ready for the data base approach. To attempt an implementation prematurely will very likely result in failure.

Management must remember that a data base is in essence a treaty that binds all of its users. An organization must be ready for data base before it can be successfully implemented.

Management must first understand what a data base really is and, second, understand that if the organization is not correctly postured, data base should not be tried. The exercise of creating the conceptual specification produces a valuable result in its own right: It is a statement of just what part of data base is actually possible. The real commitment to data base, that is, the really significant expenditure of money and time, does not come until the implementation phase.

Even if a data base application is not implemented immediately or ever, the conceptual specification reveals the depth and breadth of agreement in corporate traditions and organizations as seen through the harsh realities of operational policies. A concrete expression of that kind of reality is rare — and of incalculable value.

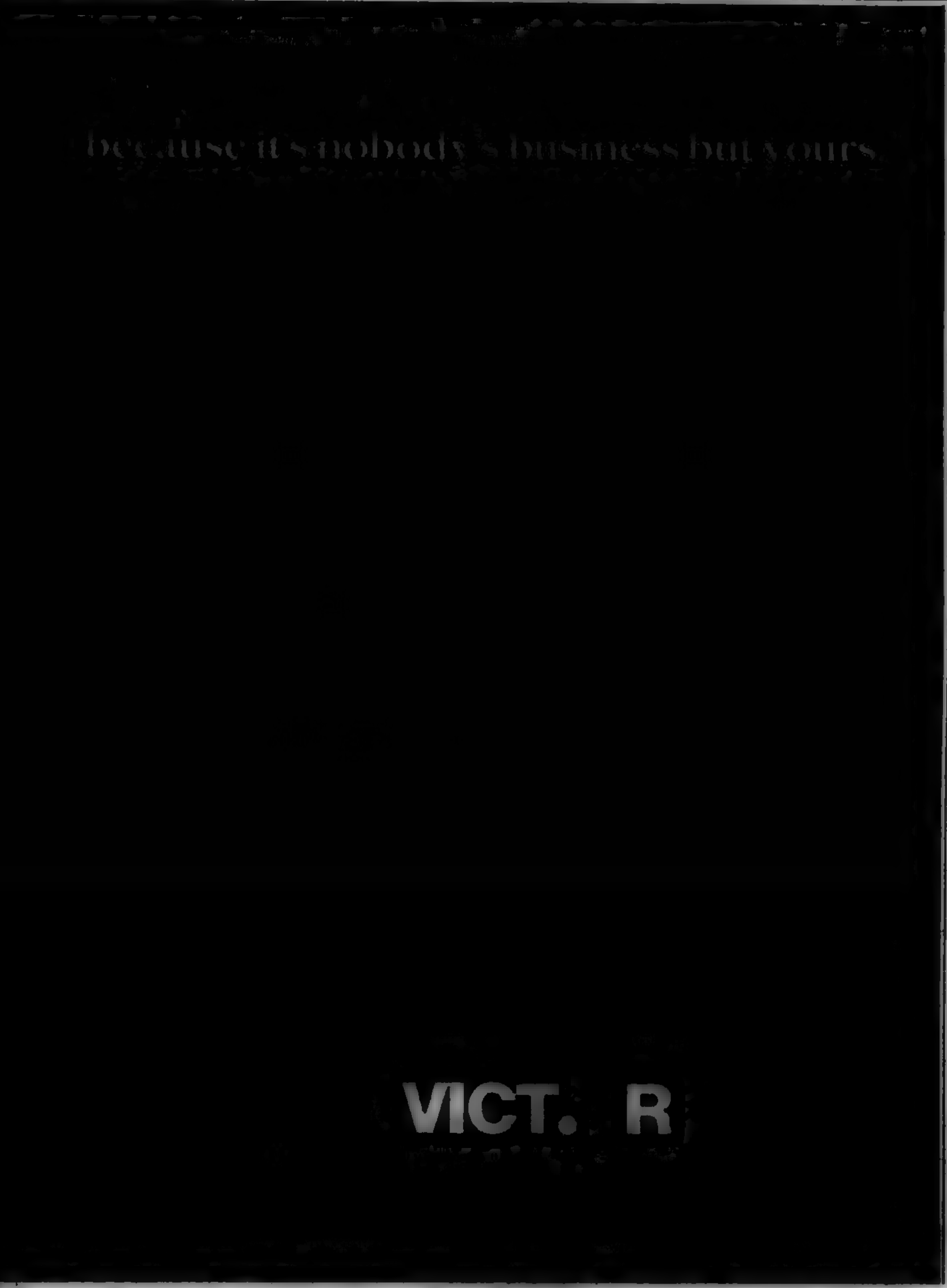
The two ways in which management can really help are to support the establishment of realistic schedules and provide the long-term commitment needed to bring about some measure of success.

It must be remembered that the development of the data base project's conceptual specification is the codification of good management practice — and that could well take several iterations to accomplish, with one or two unexpected discoveries along the way.

Plan for consistency

If there is not a careful plan for consistency, the only thing data base will have accomplished — looking back 10 years from now — will be to have replaced the file (a simple technology data store) with a data base (a complex technology data store) and the program with the nonprocedural language program. There will still be the same lack of conformity and relatability, only this time, the lack of conformity and relatability will be more rampant in the organization; be more damaging to the organization's ability to forecast changes correctly and be more difficult to correct.

Consistency applies to almost every aspect of data base. It must be present during the conceptual specification phase while policy is built, while the prototype is built, and finally, it must be considered when the initial selection of the DBMS is made. In the implementation phase, consistency must apply to the incorporation of policy into each of the data



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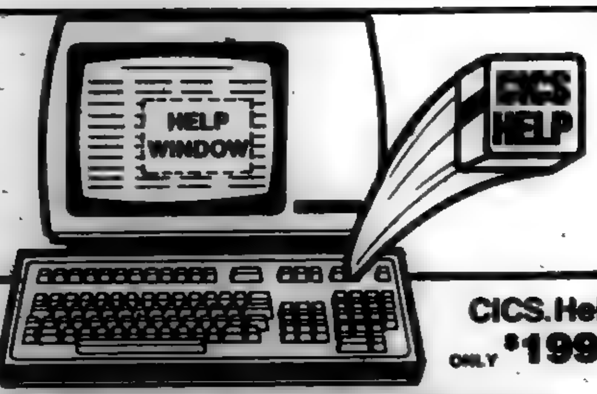

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IN DEPTH/DATA BASE SYSTEMS

> ***Management must remember that a data base is in essence a treaty that binds all of its users. An organization must be ready for data base before it can be successfully implemented.***

update programs or in the automatic DBMS procedures. It must be especially prominent in all the system control components, so that the data base is well protected and preserved.

Finally, in the production and administration phase, consistency must be the keystone of the metabase. It permits the efficient search for, and identification of, just the modules that have to be changed. In short, consistency is essential for effective data base usage.

A policy is a precise statement of what goes on in an organization. Fuzzy policies are the source of many arguments. In the data base approach, there must be policies for everything. They must exist for all record types, all data elements, all data integrity rules and all data transformations. These rules must be defined publicly, reviewed publicly and approved publicly.

Management issue

Defining policy is a management issue, because if management does not initiate consistent policies, maybe the programmers will have to, or the ad hoc users, or the data input clerks. To be sure, all policy decisions will be made. The only question is whether they will be made according to a universally applied corporate policy. If no formal policy has been created and turned into automatically executing computer code, then there will never be any long-lasting data base integrity.

Policy coherence is the effective articulation and coordination of management decisions within an organization. There must be policy agreement within a community of data base users about the boundaries that demark different policy areas.

Determining these limits is critically important, as they are the maximum boundaries of the data base. For example, if agreement is not possible on the data values for the sex element, then it must not be included in the data base, because different users are sure to update and retrieve personnel on the basis of these unreliable element values.

The successful implementation of a data base system requires careful attention to its four aspects: technology, staff, the project and DBMS. In each of these four areas, the same four topics were addressed: logical, physical, interrogation and system control, so that a cross-reference of information can be achieved.

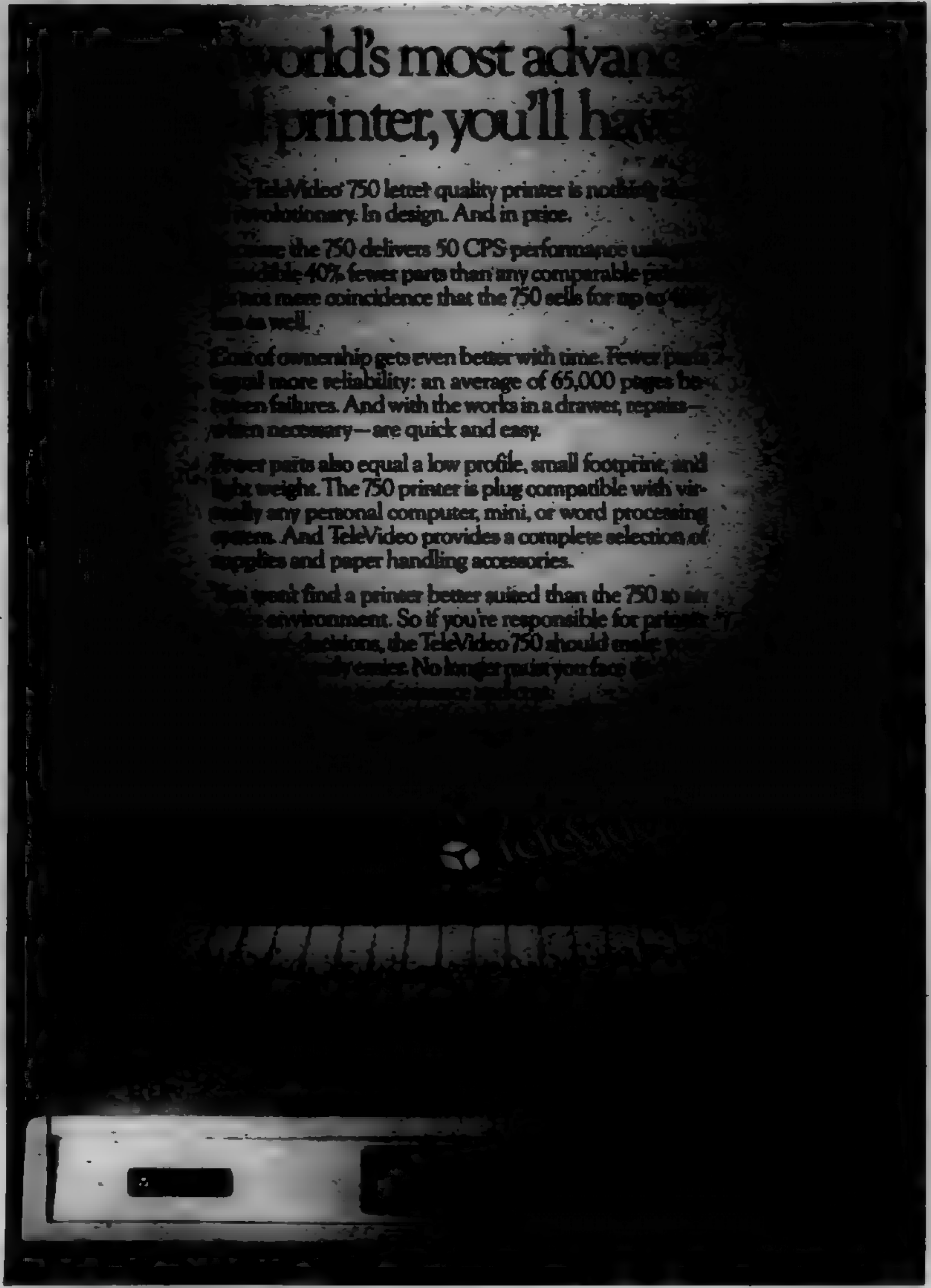
As stated at the outset, the data base approach has been developed to the point that the complicated technology on which it is based does not show any longer — or shouldn't. As a result, data base's real face, that of a management challenge, cannot be avoided.

Careful planning is critical. Do not move too fast. Do use prototypes. Recognize that static and dynamic DBMS are different and that you cannot use one for the other's applications. Finally, remember that since data base can only mirror organizational quality, it cannot be used to effect an organizational cure.

Techniques that enable organizations to operate efficiently must already have been implemented before a data base project is attempted. If a corporation is not efficiently organized, data base is simply not possible. To have data base is to be organized.

About the author

Michael Gorman is president of Whitemarsh Information Systems Corp., a Bowie, Md., company that specializes in data base consulting.



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IN DEPTH

A strategy for success with office systems software

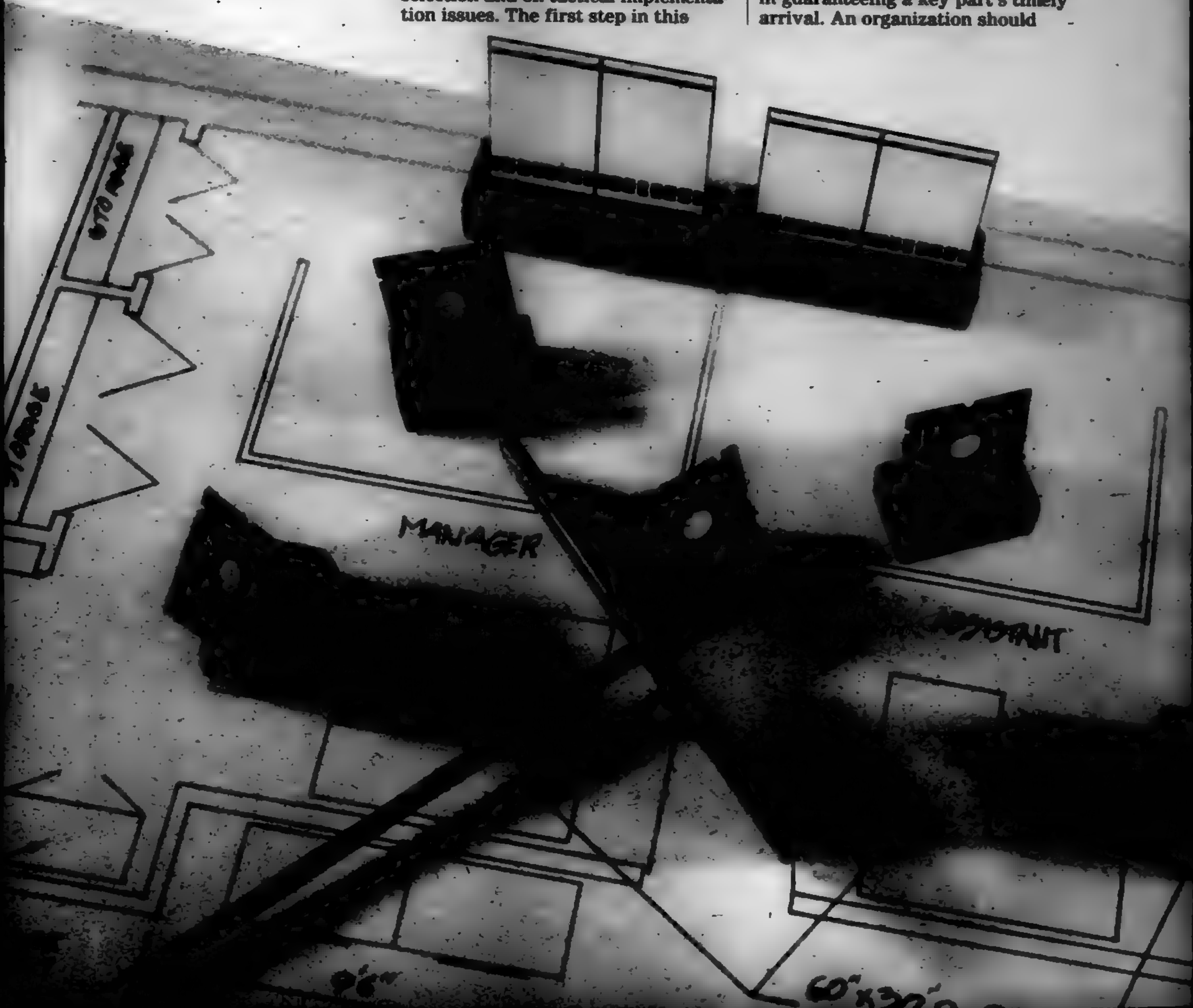
By Thomas Hill

A software strategy should target measurable productivity goals and tie them to specific product features.

The personal computer software industry is growing 50% to 70% a year; for each software house that goes out of business, another two spring up to take its place. These software firms are introducing thousands of software packages each year and creating real problems for users purchasing software for the office.

To make the odds work in its favor, a company should focus its software strategy both on criteria for software selection and on tactical implementation issues. The first step in this strategy is to identify the critical business factors in the organization, because the software a company buys must meet its goals and objectives.

Some businesses, by nature, have key sets of critical business factors that must be met if the organizations are to meet their goals. In the distribution business, for example, having goods arrive at a manufacturer's site on time is crucial for optimal production. In this instance, a system of electronic mail between the supplier and the manufacturer may be helpful in guaranteeing a key part's timely arrival. An organization should



Active	Passive
Hard-driving (control) — analytical	Expressive or amiable (may be analytical)
First with new technology	Wants security first
High need to control	Control is secondary
Technologically competent	Low level of technological literacy
Technical degree	Nontechnical degree
25 to 40 years old	35 to 55 years old
College computer experience	Little or no college computer experience
Uses personal computer constantly	Uses personal computer infrequently, at best
Results through constant learning	Results without a lot of training
Creative — technology	Standards — key
Integration not crucial	Integration is key

Figure 1. Active, passive users of personal computers compared

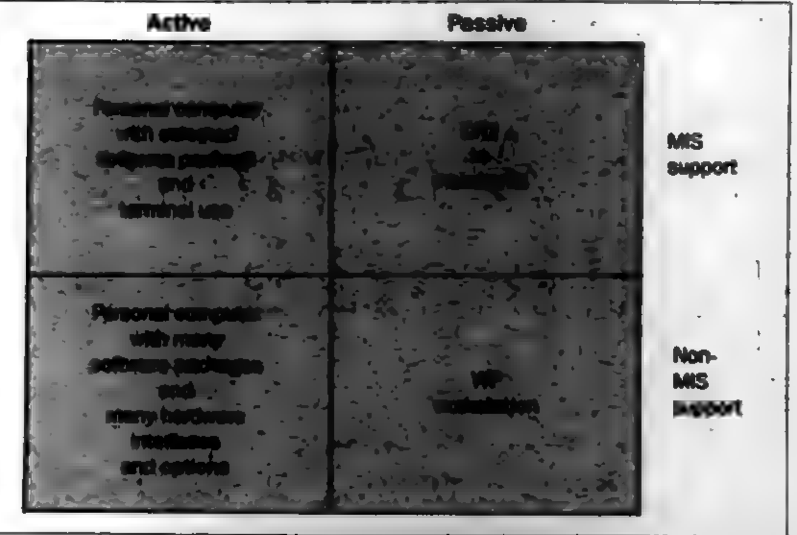

Active
Passive
Personal computer with selected software packages and terminal use
MIS support
Personal computer with many software packages and many hardware interfaces and options
WP workstation
Non-MIS support

Figure 2. OA technology applications by user

carefully examine the critical business factors for success in its business. It should then establish a set of corporate objectives with these factors in mind.

After a corporation matches its objectives to critical business factors, it should then link those corporate objectives to its office automation objectives. In this phase, an organization should be asking two important questions: How can the corporation use its information assets to meet corporate goals? Can information be used to competitive advantage?

> *"Active" users are primarily interested in being creative with the technology.*

In the period when OA objectives are being established, users should be brought into the process. This provides feedback on the real problems the corporation faces in optimizing its information systems — after all, the users are the people who will make the system succeed. It is also important at this point to set a measurable objective, so that after the system is installed, it will be clear whether that objective was met.

Users in the office

Distinct user types emerge in the office environment. Often, in the literature, users are sorted into categories according to their titles. It is more useful to take a different perspective — grouping them according to the extent to which they are comfortable with the technology and the extent of MIS support in the organization.

The introduction of technology into the office has resulted in two basic responses, active and passive, with variations in between the two extremes (see Figure 1).

The active user is one who probably has had experience with computers in college, has a technical degree and is between 25 and 40 years old. The majority of this group are men. Their primary interest is not in the data but in being creative with the technology.

The active user would like to try the latest personal computer-software package available; he would

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like to have an interface card that keeps track of the number of microseconds on the terminal and any other piece of technology available. This type of user achieves results through constant learning of a new technology. Standards are not crucial to this user.

Passive user

The passive user is generally older than the active user and is not nearly so comfortable with the technology. This user probably did not have exposure to computer technology in college and does not have a technical degree.

The passive user is interested in obtaining the same results as the active user but does not want to be a technological genius to get the results. Data security is important to these users, and their approach to working with the system is to be creative with the data. They would like to do "what if" projections, ad hoc query of the data or put together integrated text and graphics presentations with individual style.

As mentioned above, user types can also be categorized according to the degree of MIS support. Figure 2 outlines the technological applications by user type in regard to MIS support. Note that the MIS-supported user can be either active or passive.

The MIS-supported active user follows the guidelines of the MIS organization. This user purchases his personal computer from an approved vendor list and may be connected to the MIS system via a modem or direct-connect line.

He is still using the system to the ultimate and can be expected to drive MIS to add new packages or interface cards that offer enhanced functionality. He may be using his personal computer in a terminal-emulation mode to the mainframe or departmental system. He could be on a local-area network to a data base server or network server.

This user's needs for OA software are far different from those of other users. Possible requirements are the integration of applications software with electronic mail functions and sophisticated integration of communications functions with departmental systems and peripherals in the work group.

MIS-supported passive users are very secure using a terminal connected to the mainframe or division system. They do not want to be concerned with file management or backup of diskettes. They need to have the mainframe data, but they do not want to become the technological gurus of the company to figure out how to get it down to their personal computers.

Suggested software requirements for these users are more sophisticated user interfaces to use the mainframe data (Software Arts' Visicalc on a mainframe) and easier links between graphics programs and data base programs.

Technology gurus

Active users not supported by MIS are the technology gurus of the office. They have the latest in software packages, but the software is poorly integrated. They may be able to create compound documents (integrated graphics, text, data and maybe even voice), but they cannot send them to anyone else. Their energy is focused almost entirely on the technology, not on getting results in the most effective and inexpensive way.

> ***Active users not supported by MIS are the technology gurus of the office. They have the latest in software packages, but the software is poorly integrated.***

Their possible software needs include access to sophisticated integrated OA packages packed full with functionality and features as well as high-level software for programming on their personal computers — for example, a C language compiler — and programming utility software.

Passive users not supported by MIS are probably using stand-alone systems — for example, word processors. The system is not linked to the MIS mainframe or division system.

This user enjoys the sophisticated interfaces available and yet would like to get to the data on the mainframe and have access to the functions and features of personal computer software.

Software requirements suggested for these users are communications transfer programs to link their WP system to the mainframe system and an ability to send documents created in their work group out to other groups via electronic mail. Also on their list would be access to integrated software packages on the personal computer for sophisticated workstation interfaces and local network capability to use peripherals.

A software strategy should take into account the needs of these different users. An organization may want to identify other types of users in order to integrate their needs into a long-range plan for success. The software and office systems architecture should offer the greatest level of flexibility and connectivity in order to support chosen work styles; a user knows the work style that is optimal for his performance.

Productivity goals

The Omni Group Ltd. of New York developed the Software Productivity Identifier (see Figure 3 on ID/14) to

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Activity	Applicable Software	Quality	Accessibility	Timeliness	Accuracy	Cost-Effectiveness
Text processing	• Word processing • Electronic dictionary	• Letter-quality printing • Integrated text, graphics	• Help • Computer-aided training • Easy-to-use software for short documents	• Draft printing • Laser instruction • Distributed text processing • Stored formats and phrases • Boilerplate	• Spelling check • Dictionary • Easy corrections printing	• Shared printers, peripherals • Compatibility between workstations • Shared files
Data analysis	• Electronic spreadsheet • Graphics	• Programmability • High-resolution graphics display • Multicolored graphics output	• On-line instruction and Help • On-line demos and examples • Menu-driven	• Instant automatic recalculation • Multiple option viewing	• On-screen editing • Variable decimal place display	• Shared resources • Integrated data base and WP
Communications	• Electronic mail • Public data base access • Local-area networking • Telex	• Mail progress tracking • WP integration	• Simple, menu-driven user access • Broad range of compatible terminals	• Auto forward of electronic mail • Auto answer • Instant delivery	• On-screen editing	• Shared resources
Administrative management	• Electronic calendar • Time management • Project management	• File by date • Hard-copy output • Increased span of control	• On-line staff and project schedules • Daily, weekly, and monthly displays	• Recalculate project plans • Label searching	• Appointment clash detection • Free time display	• Shared resources • Integrated electronic mail
Data processing	• Data base management • Accounting software • Inventory management program • Electronic filing	• Large capacity • High throughput • Integrated with office applications	• On-line instruction and Help • On-line demos and examples	• Search • Sort • Interactive capabilities • Report generation on-line	• Multiple field sorting • Layered indexing	• Integrated graphics, WP and electronic mail

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Figure 3. Productivity software identifier

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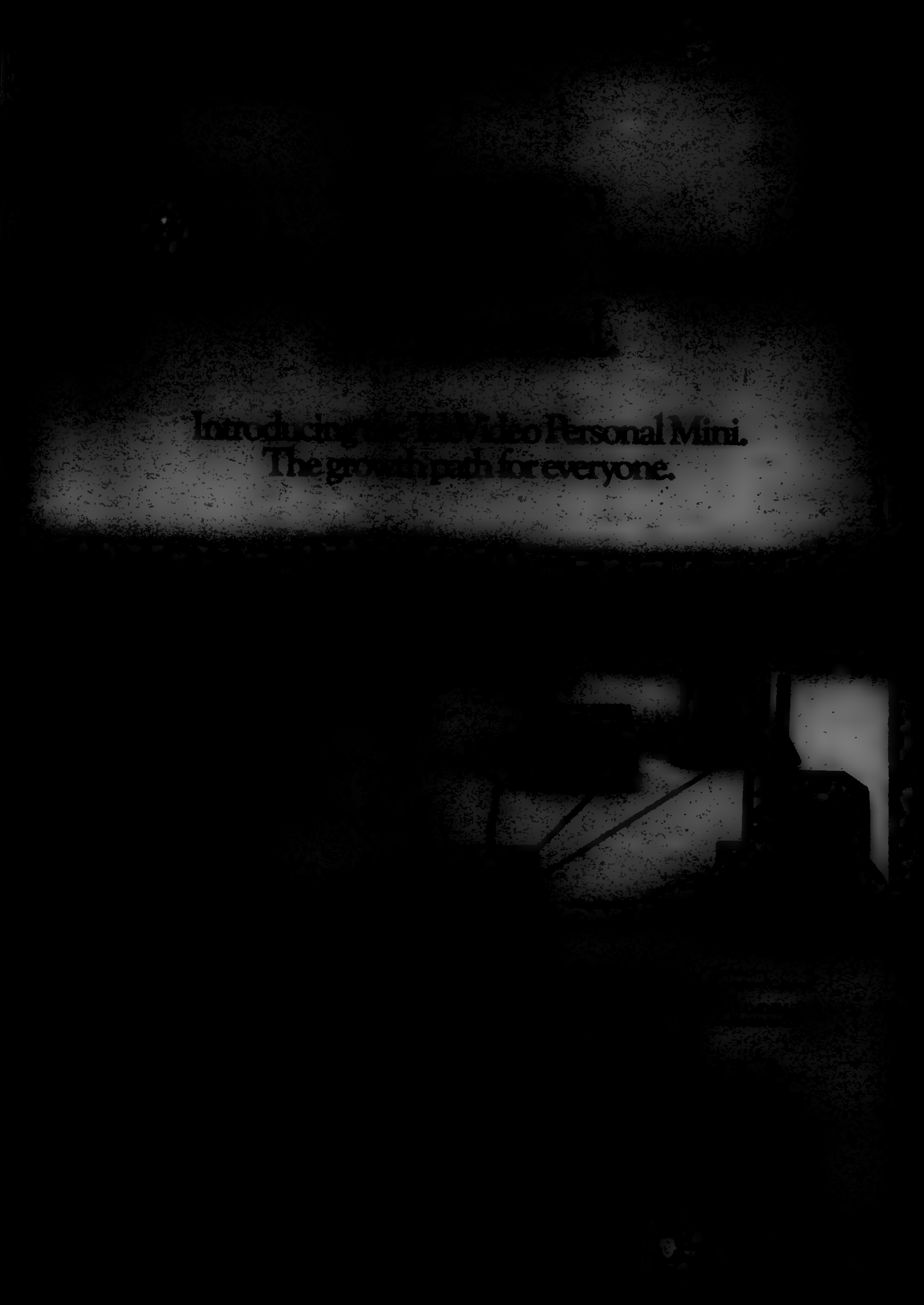
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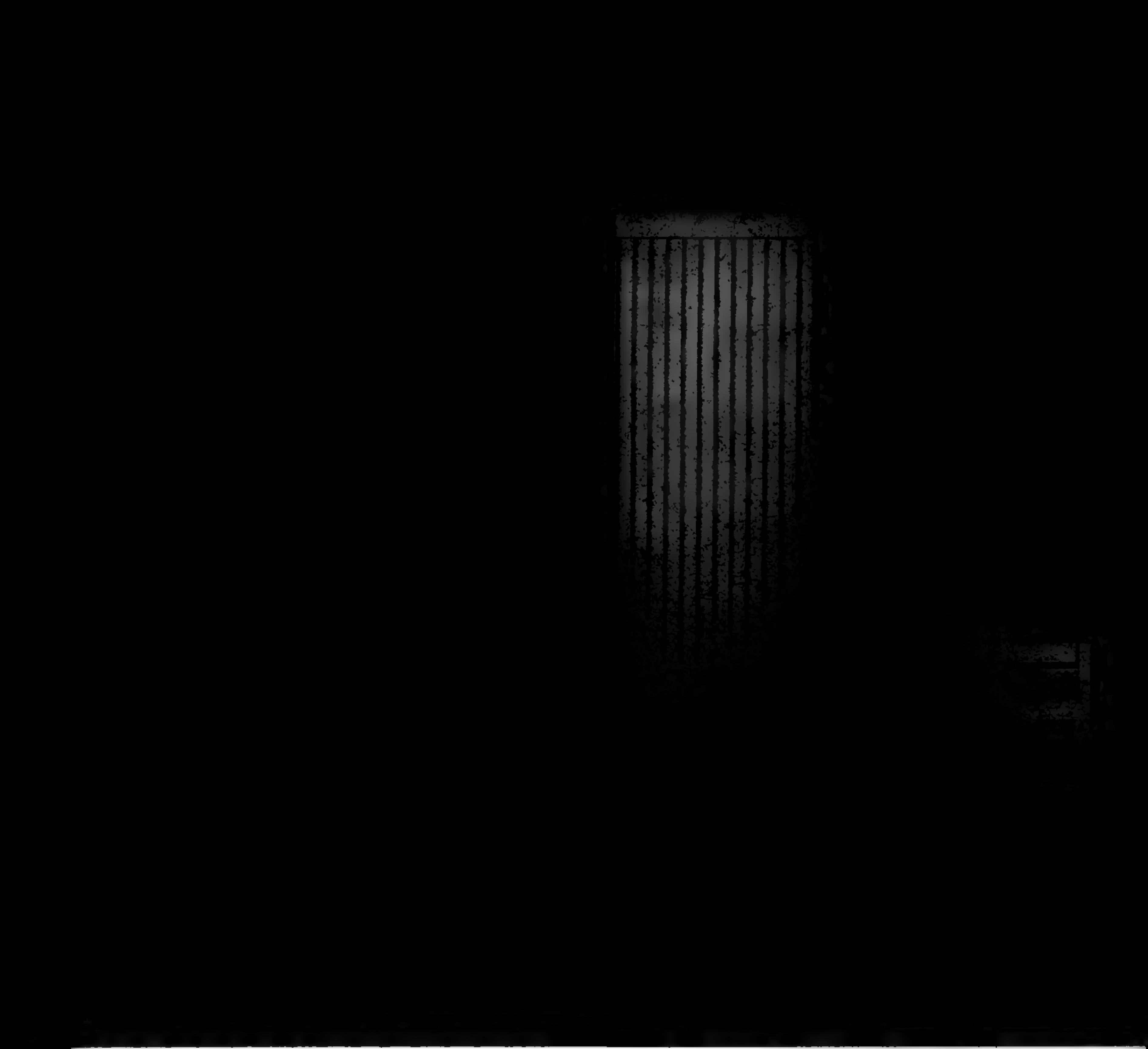

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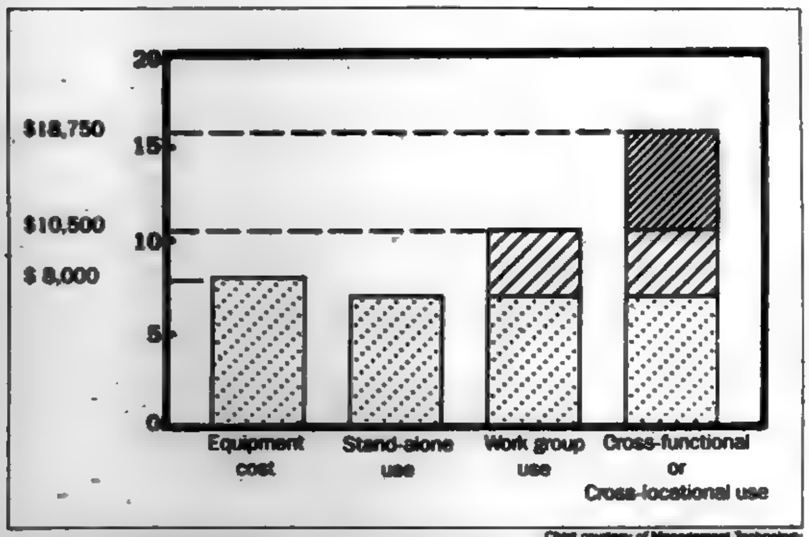

Chart courtesy of Management Technology

Figure 4. Dollar equivalent of professionals' time savings over six months

help users and software purchasers directly relate productivity benefits sought to software features desired.

The first step in this procedure is a careful needs assessment of users' key productivity goals.

The second step is to match those goals to the software features desired to achieve the productivity goals.

The software purchased is directly linked to the productivity goals of users. For example, in text processing activity, a desired goal may be to enhance accessibility. Software package features that will support those goals for accessibility, for example, are Help functions and computer-aided training (tutorial diskettes).

The software strategy should define the desired productivity benefits both for users and for the organization. After that, a set of features can be specified to offer a direct link to the productivity goals.

If the strategy specifies "enhanced access to data," this goal should be linked directly with a feature to be implemented. The link to the feature will indicate if the organization is on target when it purchases and installs the system.

Communications capabilities

Software should also be evaluated for its communications capabilities. Research by Lodahl (Figure 4) shows that executives who use their personal computers across work groups or across locations obtain the real benefits from an office system. The payback is almost double that from a stand-alone system.

Among the desirable communications features are the following:

- **Data analysis.** The spreadsheet may be fine, but can one user send it to another?
- **Word processor.** The software may create a single-user document, but can one user transfer that document to another in the work group? If so, how?
- **Electronic mail.** Can a user attach documents to a message and forward it? How does he do this from his workstation?
- **File exchange.** Can a file that has been created — text, graph or program — be transferred to another user? Is the file transfer in a standard format? Which format?
- **Multiple users.** Can multiple users access this program at the same time from a work group computer?

What happens if one user updates a record on a data base? Are other users locked out? Can users access files on other workstations? Is it possible to set multiple levels of security access?

- **Integrated personal computer packages.** These packages are well integrated within their own environments, but can a graph or spreadsheet be transferred from them to the company minicomputer or mainframe?

Level of integration

Figure 5 (on ID/20) outlines the trend in office systems over the next five years, starting at Level 4. Note that in selecting integrated software, it is important to evaluate the system, the peripherals and their level of integration. If hardware is not integrated at Level 5 — a full work-group system with fully integrated peripherals — the purchase of stand-alone personal computer software integrated only on one personal computer may not work.

Look for the open architecture of the software to allow a long-range capability to integrate the software into a corporate office systems network.

After examining the trends in integration, an organization should check to make sure the user interface is well integrated. Key features to look for are the following:

- Same command set through the entire environment for the equivalent action.
- Transparency between functions. To move between functions, a user does not need to know the technology, just what he wants to do.
- A user knows where he has been, where he is and where he is going in the environment.
- Service functions — such as file

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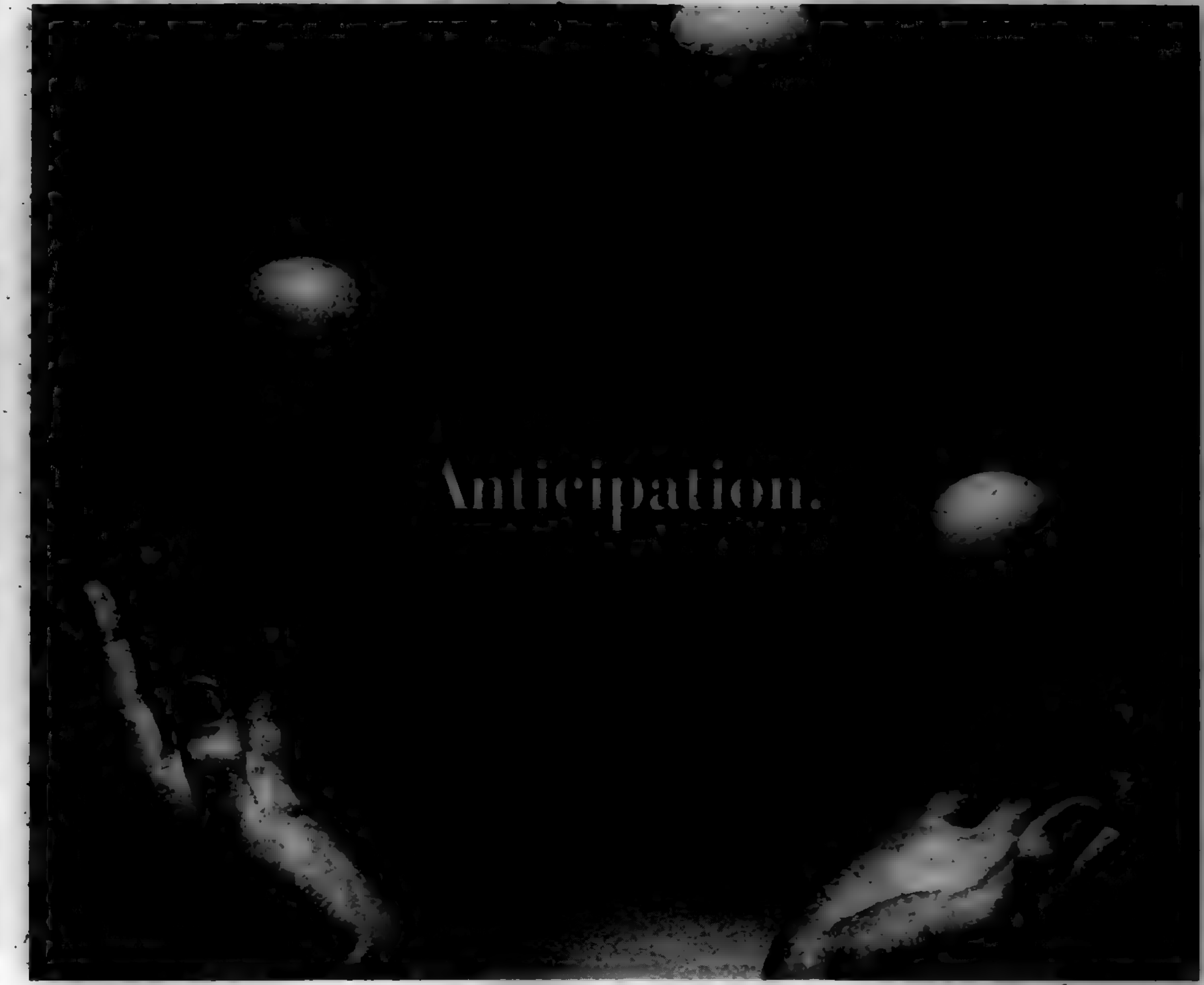

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Level 2 **Personal computer — includes all Level 1 attributes**
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Upload, download data commands

Level 3 **Personal computer — includes all Level 2 attributes**
Built-in modem
Built-in printer
Some applications management
No local network connect
Portable personal computer link

Network-oriented

Level 4 **Personal computer — local-area network connect**
Phone integration with personal computer, not network
Shared disk
Shared printer
Possible built-in modem
Transparent file storage

Level 5 **Personal computer/diskless personal computer — includes all Level 4 attributes**
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Bit-mapped display
Boot off net
Modular design
Standards for user interface and communications
Communications to host/services
Portable personal computer link
High-level security

Level 6 **Personal computer/diskless personal computer — includes all Level 5 attributes**
Voice mail
Voice annotation
Voice fully integrated
"Objects" for files
Built-in scanner
Communications to local-area net/host transparent
PBX/Local-area net integration

Low price per user

Figure 5. Office systems integration levels

management, printing or peripheral devices — are easily accessed without convoluted techniques to make them function with the present activity.

- Recognizable commands (in contrast to memorized commands) are available.
- Users can easily move from a learning mode (with screens) to a quick access method, such as a mouse or one-letter commands.

To ensure compatibility and flexibility in the future, evaluate two areas: first, the integration level of the organization's software compared with the integration level of its hardware and, second, the organization's long-range plans.

Demonstration/pilot

Be sure to get a thorough demonstration of the software doing exactly the kinds of functions the organization plans to be doing. Visit customer sites and ask users how they would rate the software, the vendor and his support and the growth path and upgradability of the software.

Check to see if a "fly before you buy" program is offered; these programs allow the software to be used on a time-sharing bureau prior to actual purchase. If a complex system is being considered, a good idea might be to have a pilot installed at the organization's site and evaluate the results after a trial run.

Check the built-in learning systems of the software package first. Can a user understand how to use the package without using the manual?

Most users will probably not take the time to read the manual and thereby will get only 10% to 20% of the functionality the product offers.

After the initial stages of learning have been completed, are classes available? In addition, are phone-in lines available? Can the vendor provide implementation planning support? If a bug turns up, ask the vendor how long it will take to fix and what the procedure is for fixing it.

Finally, evaluate the company, based on an investigation of whether it can be expected to be around to help later. Check on the company's background.

Asking a few support and training questions up front could save thousands of dollars and headaches in implementation later.

Strategy for success

"If you don't know where you're going, any road will get you there" is as relevant to the state of many OA software purchases made today as it was for Alice's journey. However, defining goals that will link directly to critical business factors and then taking into account the users, productivity goals, communications, integration and implementation issues can ensure an organization's successful software purchases.

Using the right software strategy to purchase OA software can enable a company to hit the productivity jackpot. A strategy for software and implementation of office systems will enhance a company's productivity, reduce costs and give it the leverage it needs to have a competitive edge.

About the author

Hill is a market manager for Hewlett-Packard Co. in Cupertino, Calif.

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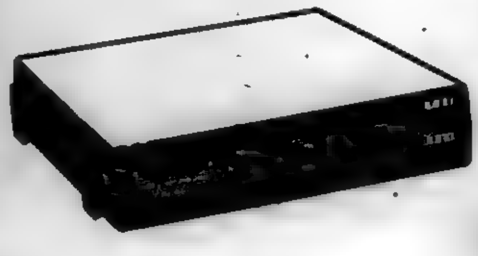

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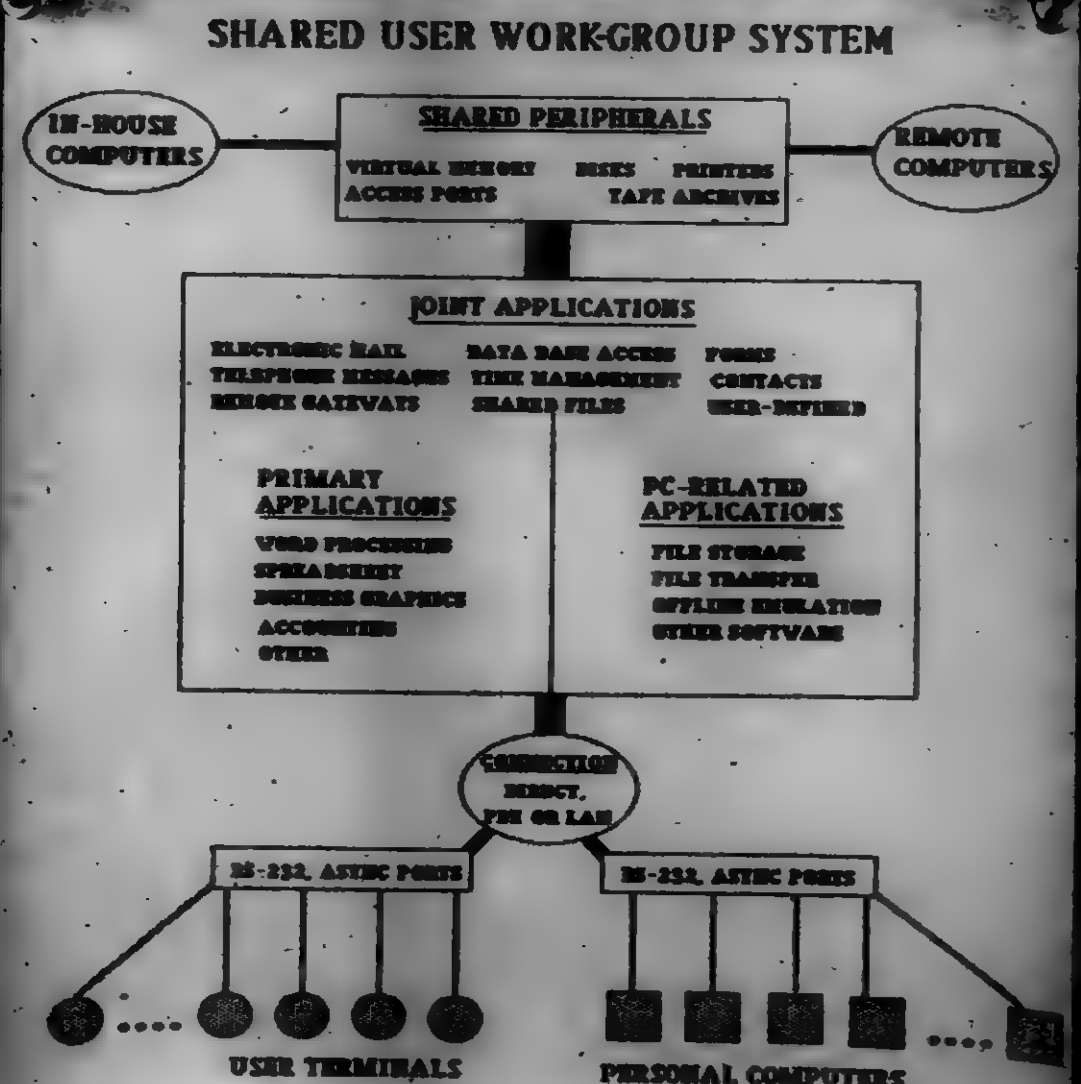
Work-group systems share the load

By Stephen Caswell

A funny thing happened to both [redacted] data processing three years ago. As MIS departments began planning their move to the integrated office, the IBM Personal Computer hit the market and caught a wave. The wave demonstrated beyond a shadow of a [redacted] have computing power at their fingertips.

At first, MIS departments laughed at the prospect of personal computers being useful. Before long, however, the flood of machines could not be ignored. With processing power in the hands of inexperienced users, MIS departments were deluged with requests for help. Noncomputer types rushed to tap into the power unleashed by microcomputer software, which has four main driving forces — the spreadsheet calculator, micro data base packages, word processing and accounting.

Today, MIS departments are saying that although it's been a tough battle, the proliferation of personal computers is under control. Most companies now have procurement policies, rules


SHARED USER WORK-GROUP SYSTEM

Source: Trigon Systems Group

Figure. Terminal and PC users can access a workgroup system either directly or via a PBX or LAN. Both have access to shared peripherals and joint applications. PC users will run primary applications offline, while terminal users will run them online.

and regulations, recommendations and so on. There's only one small problem: If the personal computer is seen as an accident, it's possible to argue that it's controllable. But what happens if, instead, the personal computer is really an indication of an enormous, pent-up demand for processing power — a demand that literally permeates environments traditionally untouched by computers."

Broad-based changes

From this perspective, the personal computer is only the first of a series of waves of technology that will sweep into business organizations. Furthermore, the movement is by nature uncontrollable because the waves are broad-based. They don't just wash into the MIS department's doors, where they could easily be controlled by a few purchasing agents.

In short, it's quite possible that we have a classic revelution that permeates from the bottom of society upward. Instead of technology being owned and controlled solely from the top down — as it was by MIS departments in the 1960s and 1970s — technology will now sweep into organizations from the bottom upward as well. If this thesis is true, there is a second wave coming that will be just as challenging as the personal computer wave.

Recent research by James H. Bair, manager of advanced functions in Hewlett-Packard Co.'s Office Systems Group and formerly of the SRI-Xerox Palo Alto Research Center group, describes the results of an interview program conducted with 691 "knowledge workers," otherwise known as common folk who inhabit offices.

The study's findings, which were similar to those of dozens of other studies conducted over the years, included the following:

- Office workers spend an average of 65% of their time in interpersonal communications. The variant is individual style, not position in the organization.
- Most face-to-face communication is with the immediate work group (48%); the remaining 52% is divided across the same building (17%), at different locations within the company (13%) and external (22%).
- The majority of written communication is within the same work group (38%); the remaining 62% is divided across the same building, at different locations within the company and external to the company.
- Most paper is stored within the person's office and work group.

Bair's findings should not surprise anybody. They are the equivalent of proving that friends send Christmas cards to friends rather than to enemies. But the findings do confirm what has been an unsettling statistic from the Yankee Group and Future Computing — that personal computers are used, on average, only 30 to 60 minutes a day.

Personal computers are used, on average, only 30 to 60 minutes a day.

Although many have concluded that the low usage of personal computers shows they really have not been needed and have been purchased improperly, a very different interpretation results if the personal computer is viewed as an indication of a bottom-up revolution.

The next technology wave is going to attack interaction among work groups. The problems that will be addressed are keeping in close touch with colleagues, accessing common sets of information and spreading computing power from those who have personal computers inside a work group to those who do not.

Two models

The catch phrase for the wave will be something like "work-group systems." Two models are now coming into focus. The first is based on a local-area network with one or two personal computers designated as file servers and gateways. The second is based upon a supermicrocomputer that serves as a file server for those with personal computers, as both a server and primary source of computing power for those with only terminals and as a gateway to remote computers for both groups (see figure on ID/21).

The personal computer focuses on individual applications — for example, a spreadsheet or word processing document. In contrast, the work-group system will offer these applications but will also attack the problem of interaction. The new applications will be electronic mail, time management, data base access, remote computing access and sharing of common files.

Although many people still look at electronic mail as a remote phenomenon, those who use it recognize it is more important to the work group than to remote communications. It is simply far more efficient to communicate electronically with colleagues, even those who sit on the same floor. Electronic mail won't replace all face-to-face interaction, but it will enhance the process of keeping in touch with fellow workers, especially when more than one must be contacted at the same time.

An equally important application is sharing data bases — simple ones as well as complex. A work-group system will, for example, allow a common data base of names, addresses and phone numbers. It will allow telephone messages to be stored so that phone message slips don't get lost.

Such a system will also allow storage of company information, such as

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price lists, products, company policies, reports and financial data. In addition, it will allow common business forms to be put on-line, which will speed their production and movement throughout the work group. In short, the work-group system will make life easier for people who work in offices.

The two final benefits of work-group systems are access to remote computing facilities and shared files. Although a work-group system isn't necessary for remote access capability, it will be very cost-efficient by eliminating the need for costly modems and interface cards at each personal computer. Instead, a gateway can be built to allow a group of users to share a few outside access ports based upon overall need.

Work-group systems will also allow common reports and planning models to be shared among all those who must contribute to their development. Today, this sharing is accomplished through the "Adidas Net" approach — you put on your sneakers and run the floppy disk down to the person who needs to share the file and hope that person can run the same software package properly.

Work-group systems are just now hitting the market. Software for local-area networks is starting to mature. More important, software for Unix-based supermicros is becoming available. NCR Corp., for example, has introduced work-group software for its Tower supermicro that runs Century Analysis Corp.'s (Pacheco, Calif.) Officeware. For $58,000, a firm can buy eight microcomputers plus a Tower-based work-group system.

By early next year, at least four other strong contenders should also be offering Unix-based software for work-group systems. The four firms are Applix, Inc. (Southboro, Mass.) with its Alis system; Emerald City, Inc. (Toronto, Ont.) with its Emerald One; Handle (Tahoe City, Calif.) with its Interactive Office Series; and Syntactics Corp. (Santa Clara, Calif.) with its Crystal Focus. At least 20 other companies are developing such software, but haven't made formal announcements.

IBM's blessing

IBM has blessed the work-group system market with two products. The first, its Personal Computer AT, can support multiple users running Microsoft Corp.'s PC Xenix. The second is the System/36 small business computer, which is being positioned as a departmental work-group system within IBM's network architecture. The System/36 is expected to act as a middleman between PC-based workstations and mainframes.

Prices for work-group systems will be wide-ranging: $2,000 to $3,000 per user on personal computers and from $2,000 to as high as $7,500 for users operating terminals, depending on the system.

Those who think this is expensive should consider that the work-group system is likely to double or triple the amount of time the user will find the personal computer useful. At the same time, it will typically cost considerably less than giving each user a Personal Computer/XT or equivalent. It will also open the door to shared peripherals — such as laser printers — which will improve the quality of output.

Work-group systems are coming. As was the case for the original personal computer, the movement will be sparked by user demand. MIS departments that ignore the new wave will get caught just as they did before — regardless of all the rhetoric of policies and control.

To put it another way, the technology is an ocean and all we've been able to do is figure out how to ride the waves.

About the author

Caswell is a principal of Trigon Systems Group, a Toronto-based consulting firm in integrated office systems. He is the editor of the newsletter "Electronic Mail & Micro Systems."

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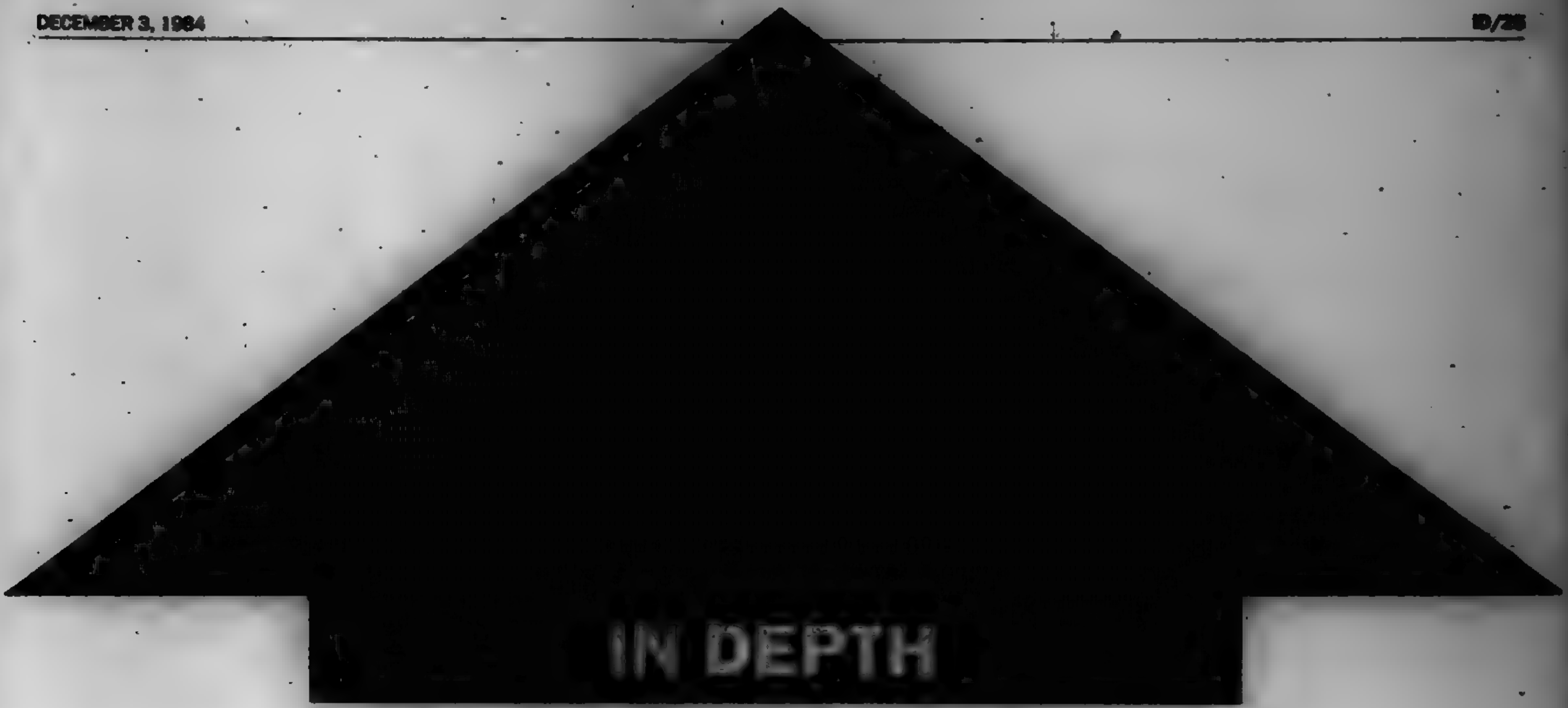


IN DEPTH

THE UPS AND DOWNS OF BUBBLE MEMORY

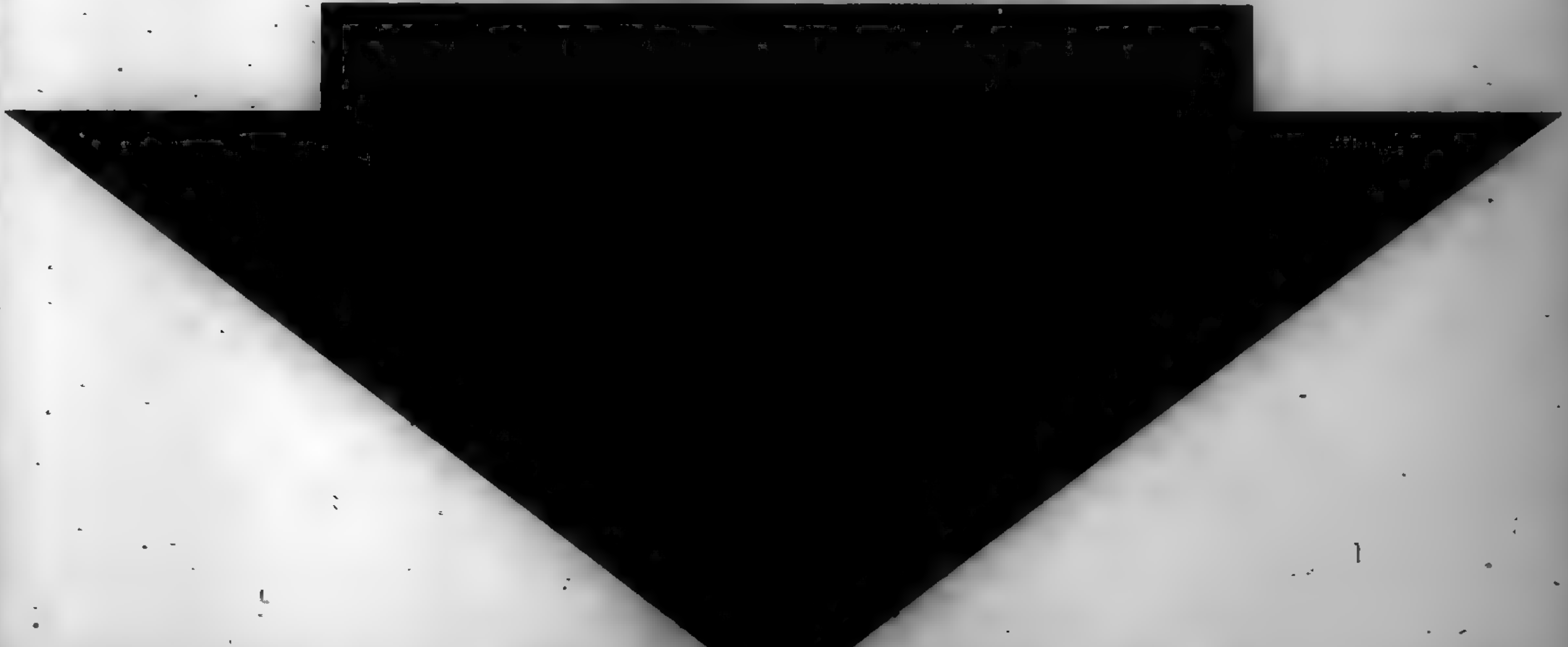
By Robert Luhn

In use, bubble memory has little to do with delicacy and even less to do with liquid or physical movement. Bubble memory is a second cousin of contemporary chip and disk memory. Its history stretches back to the era of James Clerk Maxwell's 19th-century studies of magnetism.

Like the floppy disk, bubble memory stores information magnetically with microscopically magnetized areas representing a 1 to the computer and unmagnetized areas representing a 0. Similar to random-access memory (RAM), bubble memory is found on a chip (of garnet instead of silicon) and thus is solid-state, with no moving parts.

Unlike disk memory and RAM, however, bubble memory does not lose data when the power goes off. In addition to this nonvolatility — an outstanding advantage in most applications — bubble memory is faster than floppy or hard disk memory, although it is considerably slower than RAM.

The bubble that gives its name to this type of memory is not a physical bulge raised in the garnet wafer, but comprises small cylinders of magnetism. Each cylinder, or domain, is positive on one end and



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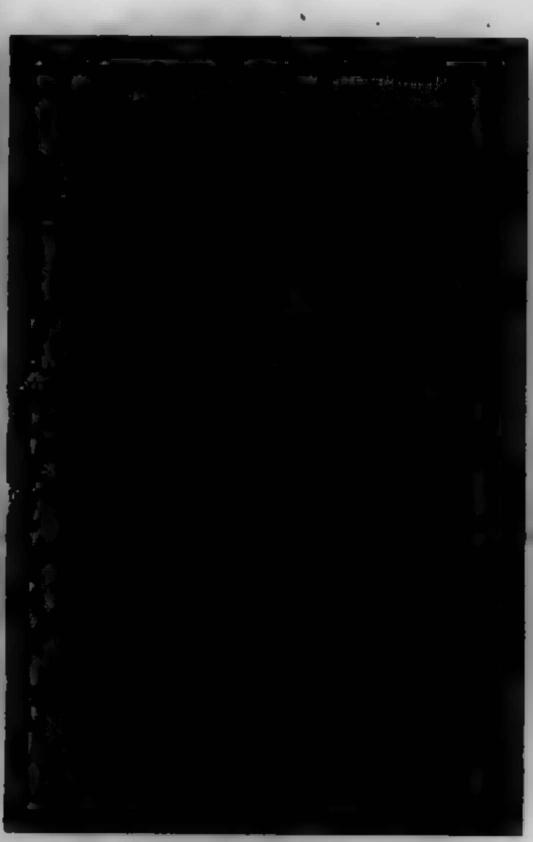

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IN DEPTH/BUBBLE MEMORY

negative on the other and is formed by a group of atoms in the garnet whose magnetic poles are aligned.

These domains normally point in random directions within a garnet crystal. When the garnet has been properly cut into a thin, flat wafer, the domains jut perpendicularly through the plane of the chip, with their positive ends pointing either up or down.

The old axiom about opposites attracting comes into play in bubble memory technology. The more "up" domains you have, the more strongly they interact with those pointing "down," causing the bubble to grow larger. An opposite force to this ballooning effect occurs at the wall of the bubble, where domains are in various stages of pointing down, crosswise and up. This area of transition bounding the bubble tends to widen and slow the bubble's growth (see Figure 1).

As nature will have it, one force always overcomes the other. The bubble either continues to expand or it collapses upon itself.

Making bubbles stable (and useful) is accomplished by pointing an external magnetic field down over the entire chip (see Figure 2). In bubble memory devices, the field is supplied by a fixed, permanent magnet. The domains shrink considerably until they are about .0001 in. wide; when viewed from above through a microscope, they appear round — hence the bubble designation.

The garnet is magnetized in a down direction, and those domains whose positive poles point up against the field are the bubbles in their useful form. Because like charges repel, spacing between bubbles is more or less uniform. As long as the external field is kept constant, the bubbles neither collapse nor expand and are held to an acceptable size.

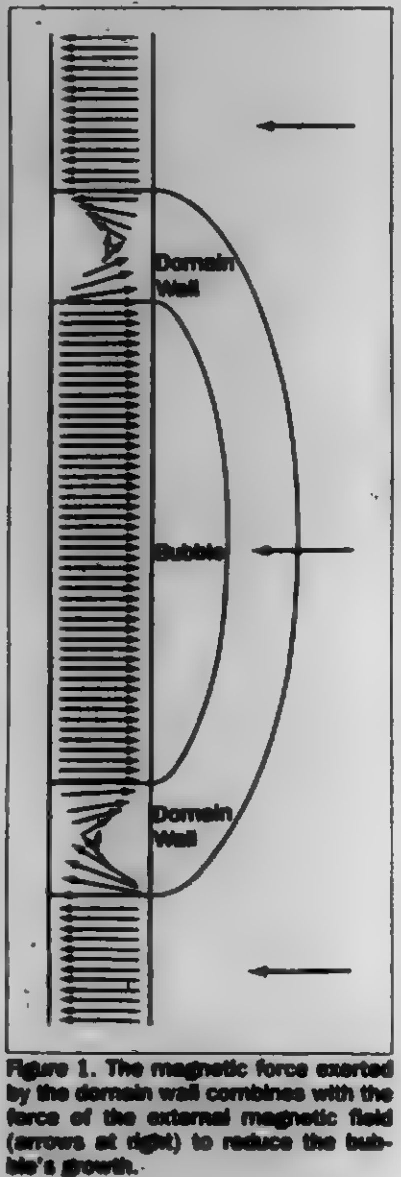

Figure 1. The magnetic force exerted by the domain wall combines with the force of the external magnetic field (arrows at right) to reduce the bubble's growth.

> *The problem with bubble memory is that access to the stored information is sequential. Data on a RAM chip can be accessed randomly because each bit has it own addressable location. But bubbles move like links in a chain.*

Difference from disk

The presence of a bubble indicates a 1, its absence a 0. Bubble memory employs the same binary method of representing information magnetically as is commonly used in disk storage. However, getting the information to the computer is where the analogy breaks down.

With disk storage, the information is magnetically embedded in the disk and a mechanical head moves out to read it. With bubble memory, the magnetic domains (bubbles) are moved through the chip to a location where they can be read. The sequence of bubbles and no bubbles makes up the stored data.

Moving bubbles requires setting up a rotating magnetic field within the plane of the chip. This is accomplished by wrapping the chip with two crossed wire coils and running the appropriate current through them. The bubbles are then shuttled down metal pathways that have been deposited on the chip. These paths are not grooves but rather thousands of inlaid, miniature V-shaped steps arranged in certain patterns. One arm of each V is thicker than the other, and when the rotating field is on, it acts like a magnet, drawing the bubble up one side of the V and down the other. In this manner, each bubble travels from

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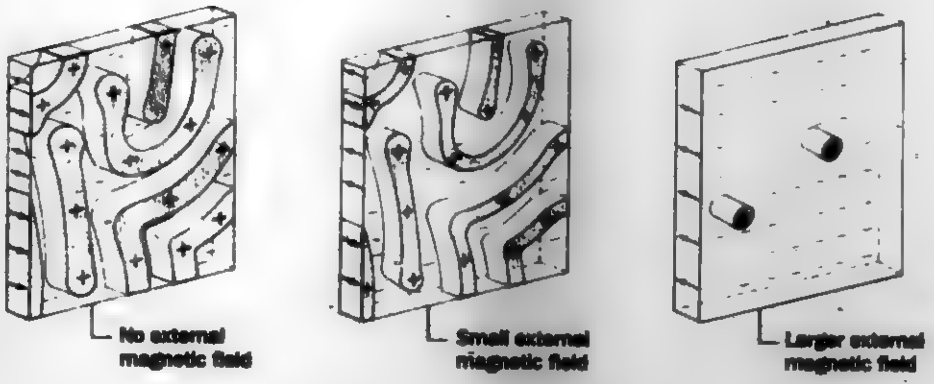
No external magnetic field
Small external magnetic field
Larger external magnetic field

Figure 2. Domains in garnet wafer under influence of external magnetic fields

step to step on its way to a desired location.

Sequential access

The problem with bubble memory is that access to the stored information is sequential. Data on a RAM chip can be accessed randomly because each bit has it own addressable location. But bubbles move like links in a chain.

If you have one million bits stored on a bubble chip and the information you need is halfway down the chain, all the bubbles must move half the length of the chain, in this case 500,000 steps. A typical rate of movement for a bubble is about 200,000 steps a second. In the preceding example, it would take a little more than two seconds to get the information you wanted. While this may seem relatively quick, it is far too slow for a computer.

Getting around this limitation means redesigning the pathways on the chip. Approaches vary in minor respects, but most modern bubble chips use a system of major and minor looped pathways. The minor loops, which are thin and elongated, are laid next to each other and constantly circulate corresponding bits of stored information.

Surrounding the minor loops is a larger, major loop whose straight sides contact both ends of each minor loop. One side of the major loop is the input track; the other is the output track.

The advantage of this configuration is that blocks of data are separated from one, long continuous chain. To read data from a minor loop, the circulating bubbles are duplicated and sent down the output track of the major loop to be read and then collapsed. Meanwhile, the original data remains intact in the minor loop. Bubbles can be exchanged (on the input side) and replicated (on the output side) between the major loop and all of the minor loops simultaneously.

As a result, instead of taking 500,000 steps to read a record, an average of only 1,500 steps is needed. This reduces access time from two seconds to 40 milliseconds. While this is 1,000 times slower than RAM memory, it is two to four times faster than either hard or floppy disk drive systems.

Staying power

The real appeal of bubble memory is the amount of data that can be stored and how well it remains intact. The error rate for a bubble memory device (say the 128K-byte bubble memory board made by Intel Corp.) is exceedingly low; chances of a user receiving an incorrect bit are one in 10^{25}. In a real use, this translates roughly to one error in 100 years of normal bubble operation. This reliability is further supported by a storage environment that is free from the ravages of power failure. The reason lies in the design of the bubble memory device.

The external magnetic field that lets the bubbles exist is created by permanent magnets. They are not subject to the whims of a downed power pole or a computer power plug that is accidentally kicked out.

If the current in a bubble device is suddenly cut off, the rotating field that drives the bubbles stops and so do the bubbles.

Bubble memory's nonvolatility makes it useful for almost any

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situation in which data that is being stored or worked on must be maintained. Nonvolatility also makes bubble memory portable, so a user can remove a bubble device from a computer, transport it across country and then plug it into another computer and find all the data intact.

Most important is the amount of data that can be packed onto the bubble chip. A typical chip with its attendant magnets and shielding occupies about 2 sq in. and offers 128K bytes of storage.

Comparable erasable programmable read-only memory (Eprom) and RAM chips hold a maximum of 32K bytes. A floppy or hard disk system certainly holds as much, if not more, information than a bubble, but the size, or volume, of the system can be an important factor when you consider portability, storage space and ease of use.

David Airel, manager for advanced development at Teleram Communication Corp., a maker of portable computers and terminals using Intel bubbles, has come up with a memory cost-efficiency table comparing bubble memory with disk memory (see Figure 3 on ID/32). While Airel admits that the table is not strictly scientific, it reflects the relative value of each approach.

As the table indicates, bubble memory often outperforms a floppy disk system and manages to float along nicely in the wake of a hard disk. The bubble provides compact, cost-efficient storage, two factors that are crucial in certain applications.

When the price of systems is compared, though, bubble memory does not take first place. A typical floppy disk system is $135 cheaper and offers removable storage in the form of inexpensive disks; a hard disk drive, though bulky and delicate, offers true mass storage at a reasonable price.

Cheaper bubbles

Why is bubble memory still playing catch-up in the marketplace? The answer is tangled within 15 years of production problems, mistimed marketing moves and a dearth of research money. The irony is that in the late 1960s, bubble memory was seen as the answer to unwieldy mainframe magnetic core memories and slow disk systems.

Bell Laboratories, ever in pursuit of cheaper ways to store telephone numbers, gave bubble research its first big push. Contemporary mainframe computers used at Bell to handle telephone data were slow, power hungry and not terribly efficient in their use of storage. The cost of storing a bit was about one cent.

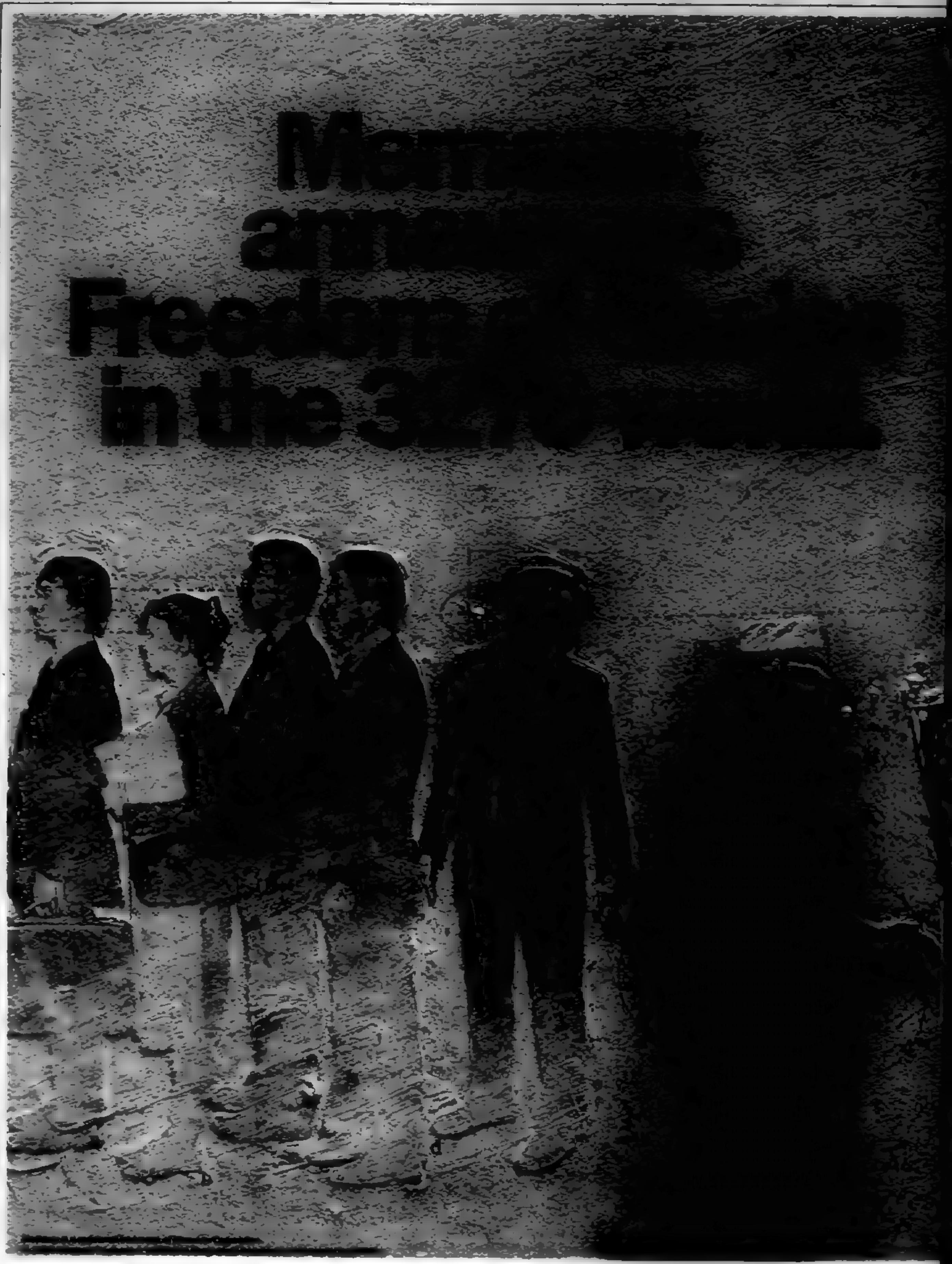
This may seem a small amount, but as applications grew larger and more complex, storage requiring 1M byte of memory became a substantial expense. Bell scientists quickly realized that bubble memory could offer much lower power consumption, coupled with speed and greater data density.

Research continued at Bell Labs and at a number of other companies including IBM, National Semiconductor Corp., Motorola, Inc. and Texas Instruments, Inc., all of which eventually began to produce or use bubble memory. The problem was that the technology supporting it was untested and expensive.

The promise could not begin to beat the cost of production. Sales of bubble memory products faltered, and one by one, companies cut back or dropped bubble production and research. With the advent of RAM and ROM chip memories, bubble memory languished.

The lull was finally broken in 1979 when Intel

Why is bubble memory still playing catch-up in the marketplace? The answer is tangled within 15 years of production problems, mistimed marketing moves and a dearth of research money.



introduced a 128K-byte bubble device. Although a later entrant in bubble memory production, Intel made a decision to develop a commercial bubble and support it in the marketplace.

The price was a stiff $2,500, but the increased use of specialized and industrial computers encouraged production. Technology thereafter advanced sufficiently to allow a better bubble to be fabricated in less time and at a lower cost. Today the same 128K-byte component sells for $300.

Cost is still a problem, though. As one former IBM bubble engineer noted, "It's the old Catch-22. The cost of bubbles will depend on how many are sold. As production goes up, the cost drops.

"The technology will receive more resources if more bubbles are sold. The barriers for a new technology are very high. In the U.S., there are probably 200 engineers working on bubble memory and on silicon memories maybe 50,000. Those are long odds for any new technology to overcome; it has to offer a big payoff to be accepted."

In the marketplace

Attitudes toward bubble memory have gone from grudging acceptance to something almost resembling enthusiasm in the past year. A few industry insiders scoff at the notion of bubble memory being anything but a specialty item. But the predominant question being debated is not whether bubble memory will be a force, but where.

By its very design, bubble memory is something of a fence sitter, and this is both its weakness and its strength. It can work inside a computer like RAM or externally like a disk storage system. Right now, bubble memory doesn't completely satisfy either need.

Nonetheless, bubble memory has found its way into a variety of computers. Its nonvolatility and durability make it a natural for factory computers, where dust, vapor and vibration would give any disk drive a nervous breakdown. It is also tailor-made for more exotic locales such as robots on an assembly line or test equipment stationed atop a mountain.

While overcoming obstacles of harsh environments, the bubble has managed to slip off its overalls and don a three-piece suit. From the factory floor, the bubble now finds itself inside every sleek Grid Systems Corp. Compass computer.

This executive portable computer combines Fortune 500 pizzazz with number crunching and color graphics. The unit is little bigger than a textbook, in large part [redacted] ry.

Those who watch and report on the Fortune 500 (or the Indianapolis 500, for that matter) can use the Teleram Communications Corp. [redacted] portable computer with bubble memory. A reporter can take the 3000 on location, write up the story and send it back to the office over a telephone using a modem built into the unit.

Competition has reared its nasty head as well. Until recently, Intel was the lone [redacted] bubble memory in the U.S. Now Fujitsu has appeared on the scene and is tentatively marketing its own 128K-byte bubble device to hardware and peripheral companies. Hitachi Ltd., a long-time bubble leader in Japan, is said to be eyeing the U.S. market.

But most significant is Motorola's reentry into the field under an agreement with Intel. This move alone is expected to boost bubble production (and lower costs) enough to encourage independent companies to take a chance on bubble memory.

Eminent domain

Use of the bubble is already rising. Portable computers will no doubt continue to use bubbles as the demand for such machines grows. Bubble memory is also seen as a logical element in telecommunications and networking, processes that require data to be sent and received quickly and reliably.

With the coming of Intel's 512K-byte bubble memory module next year (and a 2M-byte version by 1986), it's likely that bubble memory will find wider acceptance in the personal computer market. How it will be implemented, however, is a subject of sometimes heated discussion. As a replacement for RAM? For floppy disk? For both?

To paraphrase an old saying, a computer is only as reliable as its weakest link.

	Shugart SA465 5¼-in. floppy disk	Computer Memories CM5000 5¼-in. hard disk	Intel 7110 bubble memory board
Capacity	320K bytes	12.7M bytes	256K bytes
Cost*	$315	$1,250	$450
Cost per kilobyte stored	$.98	$.10	$1.76
Volume**	100 cu. in.	190 cu. in.	18 cu. in.
Volume density (capacity/volume)	3.2K/cu. in.	66.8K/cu. in.	14.2K/cu. in.
Cost efficiency: cost ($) per volume density (K/cu. in.)	98	19	32

* Includes manufacturer's quantity (500 units) at manufacturer's prices, plus estimated cost for controller and associated electronics.

** Typical disk-based storage system includes disk drive volume and estimates for controller circuit boards.

Figures for capacity, cost and volume are based on typical storage systems.

Figure 3. Cost efficiency comparison of bubble and disk memory

The computer's relationship with any mechanical device (such as a disk drive) is bound to be difficult on occasion.

"Disk drives always crash at the most inopportune times," says Intel's Mike Eisele, head of marketing for bubble memory. "Not every day — but they are mechanical and they wear out.

"We see the bubble as a complement, the ideal second drive. You get the benefits of both worlds: cheap archival storage with the floppy and performance and reliability with the bubble."

This notion has met with resistance in some quarters. David Airel of Teleram feels that bubble memory is not a disk drive replacement, if only from a cost performance basis.

But he admits that drives are nearing the end of their innovative period: "Drives have been around for nearly 15 years. It's a mature technology, and a lot of major breakthroughs have been made. I don't know how many are left to be made. Bubble memory is young. How far it can go is still unknown."

For Rick Ostrow, chief engineer and developer of a bubble memory board for the IBM Personal Computer for MPC Peripherals, it's a matter of bubble memory finding its own niche. "The real question," he says, "is whether the floppy market is going to be there in the future. The hard disk is quickly replacing it.

"There's a 5M-byte cartridge system that costs $600 for the drive and $30 for the cartridge. That's going to replace the floppy if anything does."

Whatever the issues, bubble memory is apparently here to stay. How it will reach the personal computer user is still not clear. This is attributable in part to IBM's shifting commitments to bubble memory.

IBM was one of the first computer manufacturers to show an interest in bubble memory. Until last year, the company maintained a number of research labs dedicated to this technology.

There is talk of removable bubble cartridge systems and 125M-byte bubble devices.

But in the words of a former IBM engineer, the company is "rather schizophrenic." Technical innovation has given way in the past decade to marketing innovation.

"They take a flinty-eyed look at what you do," says the same engineer. "It can be rather frustrating. You can go to them and say, 'Look at what we have. It's much better than what we're using.' And they will ask if it will work for five years and meet a maintenance schedule, and so on. IBM is not on the leading edge. They don't like their customers to do their product testing."

A survey of IBM marketers, product managers and researchers indicates that something is going on behind the usual "no comment." Bubble research is apparently continuing at some company labs.

Despite some unresolved cost questions, the future of bubble memory looks promising. No one is yet ready to proclaim that it will replace floppy disks or RAM.

There is talk of removable bubble cartridge systems, 125M-byte bubble devices and other developments. One thing is certain: There will always be a need for fast, reliable memory, especially as computers become more gregarious devices for communications as well as information management.

Of course, one never knows in exactly what direction all of this will lead us. But in the volatile world of computers, it's always nice to have something nonvolatile to hold on to.

About the author

Robert Luhn is a freelance writer based in San Francisco.

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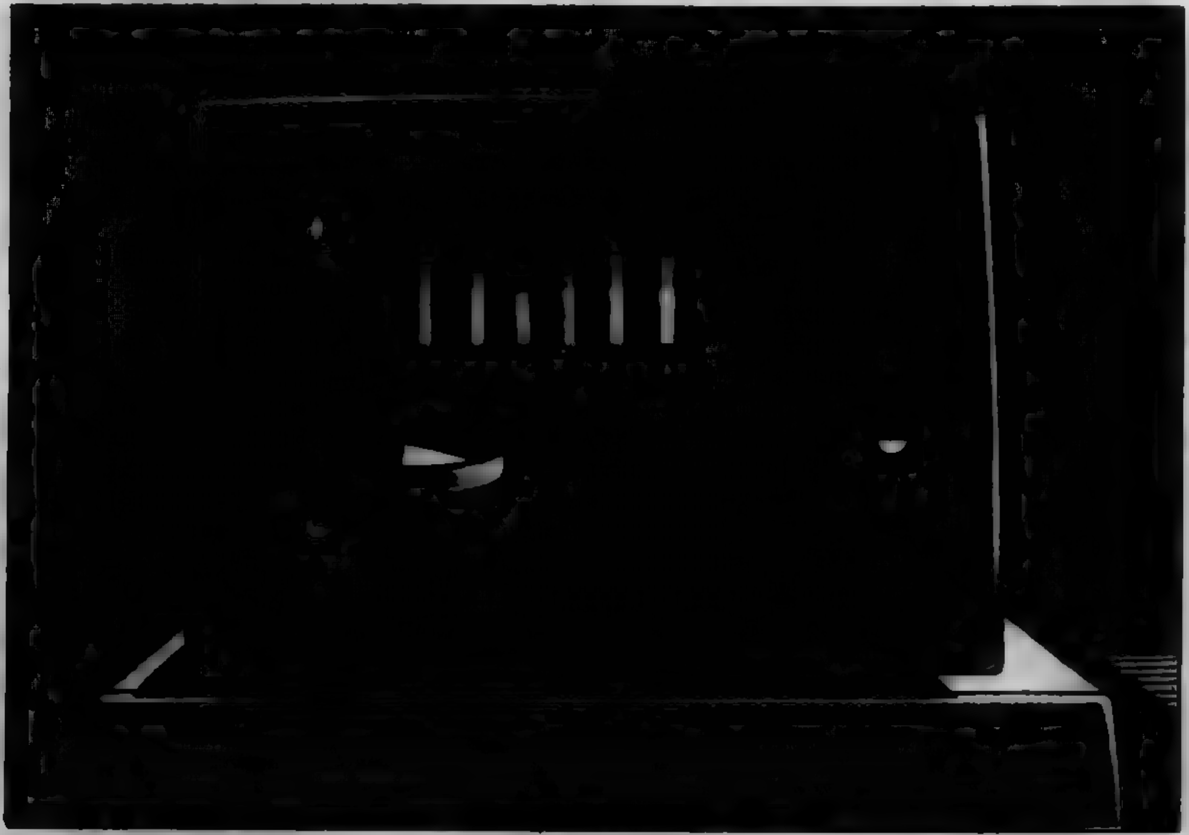

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COMMUNICATIONS

Kodak to sell net

New division to market service

By John Dix
CW Staff

ROCHESTER, N.Y. — Eastman Kodak Co. announced here recently its intent to resell capacity on its nationwide internal network to the top 5,000 U.S. businesses.

The primary thrust of Eastman Communications, a new corporate division, will be to market enhanced data communications services, although voice support will also be available, according to Lester G. Miller, general manager of the division. Kodak will tap the excess capacity in its network to offer the new services and add network capacity when and where demand warrants, Miller said.

Kodak is one of 23 corporations using AT&T's Enhanced Private Switched Communications Service, which is a specially tariffed service that enables corporations with the traffic requirements to share AT&T network switches and trunks. With its new services, Kodak essentially will be allowing users to access this network in its name.

To access the 17-city Kodak network, customers will use separately procured local private lines and, for data services, the necessary communications hardware, such as modems.

Initially, the service is aimed at users with point-to-point remote job entry (RJE) needs. More than simply a transmission service, the Kodak service includes communications software that, in this application, reduces the number of host sessions required, removes operator intervention and ensures low data-error rates.

Software will be made available for all major IBM computers — from its Personal Computer to its mainframes —

See KODAK page 72

Bypass threatens health of local phone companies

By James Connolly
CW Staff

WASHINGTON, D.C. — More than 35% of local telephone company revenues are vulnerable to bypass, which poses a significant threat to the local companies' economic viability, according to the U.S. Telephone Association (USTA).

The USTA, in a recent filing with the Federal Communications Commission, cited a survey of local telephone exchange companies that indicated $850 million, or 35.9% of their $2.36 billion monthly access revenues, are vulnerable to bypass.

The USTA, which represents the local companies, said the business customer base is particularly endangered, with a 40.5% vulnerability rate, compared with a 21.2% rate for residential customers.

The study said that under current pricing, long-distance customers with more than 20 hours of toll usage per month could generally save money by directly accessing interexchange carriers. It noted that when a customer reaches 1,200 minutes of toll use per month, or roughly $420 of toll charges, the tariffed price of switched access begins to exceed that of dedicated facilities.

"Additionally, as resellers and [private branch exchange] suppliers begin to aggregate smaller individual users into larger user groups, one must expand the analysis to consider residential and business customers with toll bills greater than $25 per month but less than $420. Furthermore, one must be aware that other bypass alternatives provided by nonregulated vendors are available for less money than tariffed dedicated facilities," the report said.

The report was compiled using questionnaires mailed to all U.S. local telephone exchange companies in order to estimate the potential magnitude of access revenue losses resulting from the uneconomic recovery of non-traffic-sensitive costs. The USTA said usable responses came from companies representing 77% of all U.S. access lines.

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- AT&T Information Systems and Hewlett-Packard Co. have announced the compatibility certification between HP devices and AT&T's System 75/70
- Raymond G. Lorber, Inc. has announced a front-end system designed to enhance the IBM System/34, 36 and 38 communications environment/70
- Innovative Electronics, Inc. has announced a converter that is said to enable Digital Equipment Corp. VT100 or compatible terminals to be used as IBM 3277 or IBM 3278 terminals/70

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Concord Data Systems adds IEEE token bus net starter

WALTHAM, Mass. — Concord Data Systems, Inc., one of the participants in the General Motors Corp. manufacturing automation protocol demonstration at the National Computer Conference '84 this year, has announced a local-area network starter system for evaluating an IEEE 802.4 standard broadband token bus network.

Token/Net, according to Concord Data Systems, is the only network available that implements the IEEE 802.4 standard on broadband cable. It reportedly gives users hands-on experience with the network implementation that GM selected for the manufacturing automation protocol used in the NCC demonstration.

The Token/Net starter system includes four Token/Net Interface Modules (TIM), a translator head end and a broadband cable kit. Each TIM is said to contain a radio frequency modem operating at 5M bit/sec, a media access unit implementing the IEEE 802.4 token-passing access method and a control unit providing TIM management functions and the user interface port.

Each node includes from four to 12 ports. A four-node starter system is $12,000 to $18,000, depending on the number of ports.

Concord Data Systems is located at 303 Bear Hill Road, Waltham, Mass. 02154.

Micom Systems launches 3270-emulating converter

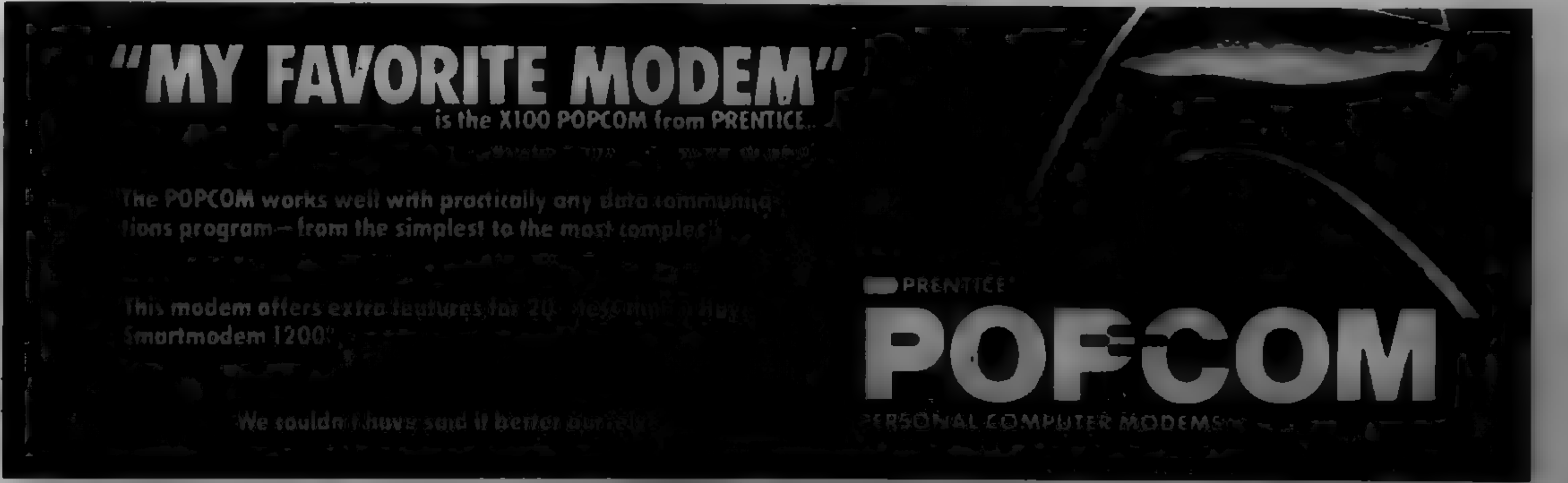
CHATSWORTH, Calif. — Micom Systems, Inc. has introduced a 16-channel protocol converter that is said to emulate all standard IBM 3270 functions, enabling asynchronous Ascii terminals and personal computers to access IBM mainframes as IBM 3270-type devices.

The 16-channel Micro7400 is said to appear to the host as an IBM 3274 Model 61C Cluster Controller communicating in either bisynchronous or Systems Network Architecture/Synchronous Data Link Control protocols. Attached devices reportedly act as IBM 3278 display stations, IBM 3279 color display stations or IBM 3287 printers.

The product also features automatic logon, inbound priority levels, banner and broadcast messages and security features, according to the company.

The 16-channel Micro7400 also is said to allow switching between two IBM hosts or between an IBM host and up to eight asynchronous computer ports. Like smaller Micro7400s, the 16-channel version is available with matched integral modems operating at 2,400, 4,800 and 9,600 bit/sec. It costs $5,650.

Micom Systems is located at 20151 Nordhoff St., Chatsworth, Calif. 91311.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CONTROLLERS

RAYMOND G. LORBER, INC.
Systems 34/36/38
Communications Controller

Raymond G. Lorber, Inc. has announced its Systems 34/36/38 Communications Controller, a front-end system designed to enhance the IBM System/34, 36 and 38 communications environment.

The product, consisting of a specially configured IBM Series 1 minicomputer and a CWA 525X Data Concentrator from CWA Communications, Inc., reportedly adds 25 lines to host systems and reduces polling overhead for the host, allowing different devices in a cluster to access different hosts. The CWA 525X concentrator is said to support nonreturn-to-zero line coding, 25 IBM Synchronous Data Link Control lines per concentrator, attachment of 200 control units, line speeds up to 11K bit/sec and RS-232 and V.35 interfaces.

A typical 20-line configuration costs about $110,000, according to the vendor.

Raymond G. Lorber, 101 California St., San Francisco, Calif. 94111.

VOICE/DATA COMMUNICATIONS

VMX, INC.
Voice Message Exchange enhancements

VMX, Inc. has enhanced its Voice Message Exchange voice store-and-forward systems.

The features include the ability to code messages for delivery up to 31 days after the message is recorded; autoscan, which lets recipients listen to just the names of their callers; an old/new message queue feature that identifies the messages received after the last check of the mailbox; and autoplay, the company said.

The enhancements will reportedly be standard in new systems and will require hardware modifications costing about $7,500 in some existing systems. Typical VMX systems cost from $102,000 for 400 users to $535,000 for 8,000 users.

VMX, 1241 Columbia Drive, Richardson, Texas 75081.

PROTOCOL CONVERTERS

INNOVATIVE ELECTRONICS, INC.
MC-80/600-1

Innovative Electronics, Inc. has announced a communications processor that is said to convert a Digital Equipment Corp. VT100 or compatible terminal into a full-function IBM 3277 or IBM 3278 terminal.

The MC-80/600-1 reportedly emulates an IBM 3274-51C running Support Level A and lets the terminal communicate with the IBM host using the IBM Binary Synchronous Communications protocol. According to the company, the processor allows full screen mapping and virtual screen sizes of 480,

Continued on page 71

HP machines get AT&T PBX use

AT&T Information Systems and Hewlett-Packard Co. have announced the joint certification of HP computers and data terminals for use with the AT&T System 75 private branch exchange.

The companies said that as a result of joint testing, current HP 3000 business computers, HP Touchscreen personal computers and HP data workstations have been certified for use with the System 75. A similar certification was issued for the AT&T System 85 last January.

The certification was intended to assure customers that HP equipment will connect over AT&T Information Systems' twisted-pair wiring to be switched by the System 75. It is said to provide end-to-end connectivity for integrated voice and data applications and to support asynchronous protocols at up to 19.2K bit/sec.

More information on the joint certification is available from AT&T Information Systems, 100 Southgate Pkwy., Morristown, N.J. 07960.

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Continued from page 70

960 and 1,920 characters; it supports all screen formatting capabilities.

The unit provides up to 16K bits of read-only memory, 16K bytes of random-access memory and two serial communications ports.

The basic unit costs $1,295, while an additional port costs $200, according to [redacted]

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

SOFTWARE

COMMUNIQUE CORP.
CQ-3780; CQ-3770-SNA

Communique Corp. has introduced two software products designed to let microcomputers communicate with host computers using IBM's 2780/3780 bisynchronous protocol and to emulate IBM's 3770 communications terminals using Systems Network Architecture (SNA)/Synchronous Data Link Control.

CQ-3780 and CQ-3770-SNA reportedly permit full error-checked data file transfer at speeds ranging from 1,200 bit/sec to 56K bit/sec.

They feature a built-in text editor; local disk operation; simultaneous redirection of incoming data to disk, console, card punch or printer; adaptation to host or remote status; and built-in password security for public sites.

CQ-3780 is priced at $500, and CQ-3770-SNA costs $750, the vendor said.

Communique, 1535 Killearn Center Blvd., Tallahassee, Fla. 32308.

MULTIPLEXERS/ MODEMS

GANDALF DATA, INC.
SMLDS 349 enhancement

Gandalf Data, Inc. has announced that its synchro[redacted] been enhanced for multipoint operation and that it has lowered the modem's price.

SMLDS 349 reportedly is an autoequalized unit with an operating range from three miles at 19.2K bit/sec up to six miles at 2,400 bit/sec. It is powered from an RS-232C, CCITT V.24/V.28 interface via data and control signals and plugs directly [redacted]

It is said to be compatible [redacted] synchronous, point-to-point and multipoint, full-duplex operation and operates at switch-selectable synchronous speeds of 2,400, 4,800, 9,600 and 19.2K bit/sec in [redacted]

The company said the list price has been lowered from [redacted]

Gandalf Data, 1019 S. Noel Ave., Wheeling, Ill. [redacted]

GANDALF DATA, INC.
LDM 408, LDM 418

Gandalf Data, Inc. has announced two 4,800 bit/sec leased-line modems designed for transmissions between telephone exchanges within a 200-mile range.

The synchronous LDM 408 and the asynchronous/synchronous LDM 418 are said to provide binary serial, point-to-point or digital multipoint data transmissions over four-wire, voice-grade [redacted]

The modems reportedly feature autoequalization, signal processor implementation, diagnostic loopbacks, a test pattern generator and error detection. In stand-alone configurations, a dual-channel capability is said to allow greater applications flexibility. Users can opt for a single channel at 4,800 bit/sec or two channels at 2,400 bit/sec, according to Gandalf.

The stand-alone versions, the LDM 408 and the LDM 418, cost $795 and $895. Rack-mount units, the RM 3408 and the RM 3418, cost $725 and $825.

Gandalf Data, 1019 S. Noel Ave., Wheeling, Ill. [redacted]

See [redacted] page 72

USTA from page 67

The USTA submission also noted, "If the national access revenues vulnerable to bypass must be recovered from end users through a flat monthly charge, local exchange rates rise by $7.63/mo per line. On the other hand, if this revenue shortfall is recovered from the interexchange carriers, the common line charge increases by $0.059 per access minute, further exacerbating the bypass problem."

The USTA is located at 1801 K St. N.W., Washington, D.C. 20036.

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UNIX™ System [illegible]

MODEM

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NOKIA-KINEX CORP.
48/208AB Model 1

Nokia-Kinex Corp. has introduced an AT&T 208AB-compatible modem intended for use in synchronous networks and by personal computers using a synchronous protocol.

The 48/208AB Model 1 offers full- or half-duplex synchronous operation at 4,800 bit/sec on leased or dial-up lines, respectively, according to the vendor.

Users reportedly select between the AT&T 208A and AT&T 208B modes through two front-panel switches.

Features reportedly include unattended autoanswer, autodisconnect, autodialer compatibility, front panel access to configuration strapping, low power consumption, small size and light weight.

The modem's diagnostics amount to a small net management system, the vendor said, including features such as a line-quality display, display of all connector leads, analog, local and digital loopbacks for problem isolation, self-test, built-in test pattern generator and integral bit error-rate test.

Price for the modem starts at $1,700, according to the vendor spokesman.

Nokia-Kinex, 6950 Bryan Dairy Road, Largo, Fla. 33543.

GENERAL DATACOMM INDUSTRIES, INC.
GDC Station Clock Facility

General Datacomm Industries, Inc. has announced its GDC Station Clock Facility, which reportedly locks all stations that are in a synchronous network into a central clock.

The facility reportedly can serve as master clock itself or lock onto an external timing source, such as that used in AT&T's Dataphone Digital Service.

It provides a timing reference for the entire multiplex network, a vendor spokesman said.

The GDC Station Clock Facility was designed for use in networks using General Datacomm's Megamux multiplexer, according to the vendor spokesman.

A 16-port facility is priced at $5,940, the spokesman said.

General Datacomm, Middlebury, Conn. 06762.

KODAK

from page 67

and Digital Equipment Corp.'s family of PDP-11 and VAX products, Miller said. The RJE service includes the following features:

- The normal RJE limit of seven attempts to establish a session between devices is extended to 49, increasing the number of connections achieved in a given time, Miller said.
- A single session can be used to transmit and receive, alleviating the need to take down and reestablish a conversation to turn around the direction of transmission.
- RJE record lengths can be any size, rather than the usual record size limit of 80 to 132 bytes.
- Sessions can be established automatically, eliminating the need for operators to create and monitor sessions, Miller said.

All communications will be done synchronously, typically at 4,800 or 9,600 bit/sec, through either IBM's Binary Synchronous Communications (BSC) or Synchronous Data Link Control protocols, with conversion from one to another handled automatically by the host software. To use the service with DEC equipment, a separate licensed software product would have to be procured from DEC that would provide compatibility with the BSC protocol.

While the particulars of service pricing are still uncertain, Miller outlined the rate structure, which will include an installation charge after the first two sites, and carry a charge per kilopacket transmitted. Any installation charges will be structured in such a way as to enable users to recover this cost through service use.

Eastman Communications will offer voice support in much the same way as it offers data — using a leased line to connect a private branch exchange into the network — and will charge users on a per-minute basis. However, this support will also require users to update their least-cost routing software. This would enable users to call over the Kodak network to a city close to the call's destination, where it would be bumped into the public-switched network.

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SYSTEMS & PERIPHERALS

CDS Data Center tools link CAE, business tasks

SANTA CLARA, Calif. — A five-year-old firm here recently announced a family of printers and terminals that reportedly allows computer-aided engineering (CAE) capabilities to be merged with spreadsheet, word processing and graphics applications running under any IBM microcomputer, including the Personal Computer AT.

Corporate Data Sciences, Inc. (CDS) reportedly is aiming its Data Center product line primarily at mechanical design engineers in large businesses, such as aerospace and automotive firms.

For CAE purposes, Data Center comes with a 17-in.-high monochrome video terminal that provides 1,024- by 1,024-pixel resolution and displays both text and schematics, according to Don Pate, CDS' marketing vice-president.

The terminal is also compatible with IBM's Personal Computer family and is supplemented by an assortment of application software packages that take advantage of the personal computers' ability to do spreadsheets, word processing and other standard office functions, the company said.

This union of an engineering-like display screen with a business-oriented personal computer allows designers to create technical drawings, draft reports, manage budgets and do all of their other major computing tasks from the same system, according to CDS.

Hard-copy output options

In addition to incorporating a video display monitor, CDS said the Data Center design system provides two options for creating hard-copy output — a 240 dot/in. matrix printer and a 300 dot/in. laser printer.

Prices for the Data Center, which its developer plans to sell directly to large end-user organizations, will typically range from $8,000 to $10,000 per configuration, Pate said.

CDS is headquartered at 2560 Mission College Blvd., Santa Clara, Calif. 95050.

Board boosts 3080 memory

WALTHAM, Mass. — Cambex Corp. has announced an add-on board that uses 64K-bit or 256K-bit memory chips to expand the storage capacity of the IBM 3080 X models by 8M or 16M bytes.

IBM does not yet offer 256K-bit chips for its 3080 series processors, but analysts expect an announcement to that effect soon. A Cambex spokesman said the 256K-bit chip is supplied by a Japanese firm, which he declined to name.

The Cambex product, Stor/8000, is intended either to replace or to expand main memory for the newer X models of IBM's 3081, 3083 and 3084 processors, the firm said. Stor/8000 is available in either 8M-byte or 16M-byte versions. The product plugs into a Cambex backplane with its own power supply and uses IBM circuitry and signals. No external devices or external interconnect cables are required because the memory is located within the mainframe.

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■ Growing industry trend toward use of superminis for vertical applications seen/74

■ Macrolink, Inc. announces 8M-byte memory module for Perkin-Elmer Corp. 32-bit superminis/80

INSIDE

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McAuto launches CAD-engineering systems

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has announced two turnkey systems said to tie computer-aided design (CAD) to civil and structural analysis software for engineers with Digital Equipment Corp.'s Microvax-1 CPUs.

The Microvax-1 configuration includes 2M bytes of main memory, 140M bytes of fixed disk storage, 100M bytes of cartridge tape, floppy diskettes, a local printer, 13-in. color graphics workstation and asynchronous communications.

Hardware options include a second workstation, higher resolution 19-in. color and monochrome raster workstations, plotters, hard-copy units and an interface to an Ethernet local-area network.

Map drawn with McAuto CAD software

The price of the civil package, including the Microvax configuration, McAuto's General Drafting System (GDS), Basic language programming capability, McAuto's Coordinate Geometry/Roadway Analysis and Design (Cogo/Roads) program and integration software, is $115,000. The price for the integrated structural package, including the Microvax configuration, GDS, Basic, Cogo/Roads and integration software, is $120,000.

A communications package is available to support Prime Computer, Inc.'s Asynchronous Network for the DEC Microvax-1, VAX-11/750 and VAX-11/780 for $2,000, the company said.

McAuto is also offering an interface between GDS and Department of Energy-2 Loads, an energy analysis system said to enable mechanical engineers to analyze the thermal performance of buildings and heating, ventilating and air conditioning installations. The interface is provided at no charge to GDS buyers, the vendor said.

More information is available from McAuto, P.O. Box 516, St. Louis, Mo. 63166.

SHOP TALK/GALE AGUILAR and LEN HALIO

Terminal holds its own in office mart

The majority of computer applications today not only begin at a terminal, they depend on one from start to finish. Terminals will continue to play a leading role in the office of the future despite the seeming encroachment of workstations and microcomputers.

Although devices such as the bar-code reader and the automatic teller machine are classified as terminals, the word usually means a VDT — specifically an interactive VDT.

A VDT's interactivity is its most important attribute. Today's VDTs were not designed for the computer system , but for the human being using the system. That trend will continue as time goes on. In fact, thanks to the developing field of artificial intelligence, tomorrow's VDT may be able to observe how each of us works and then adapt itself to our individual styles. The day may even come when we will direct the VDT to do our bidding not with our typing fingers, but with our eyes.

The VDT began as a hybrid of the teletype, with its typewriter-like keyboard, and the television set. Early dumb terminals could not process the information being entered; data had to be sent to and from the host processor. The inclusion of the microprocessor started the dumb terminal on the road to oblivion. Once VDTs were endowed with some intelligence, they could perform vari-

See VDT page 84

Aguilar is vice-president of corporate business strategies and Halio is vice-president of video products for Prime Computer, Inc., located in Natick, Mass.

IBM user concerns cover wide range of systems issues

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — IBM users trying to plot their future systems strategies appeared to be concerned with IBM over a number of issues ranging from what some perceived as ambiguous IBM solutions to a lack of integration among IBM product families.

So claimed Robert T. Fertig, president of Enterprise Information Systems, Inc., during a seminar at the sixth annual Enterprise Information Systems Forum held here recently

Using results gleaned from his annual survey of over 200 IBM mainframe users, Fertig said other frequently voiced concerns included IBM's nebulous operating system strategy, plans for

See FERTIG page 80

Superminis take on traditional CPU jobs

By Kenneth Ross
Special to CW

There is a growing industry trend toward the use of superminicomputers dedicated to vertical applications or functional areas in medium- to large-size companies.

The best known examples of this are manufacturing, engineering and office automation, but the increased capabilities of these machines now make them suitable for applications such as financial accounting and planning — applications that formerly were run only on mainframes.

As this trend accelerates, the office of the future will most probably consist of personal computers used for individual processing functions, superminis running applications that involve information that needs to be shared interactively and mainframe computers for batch- and operations-oriented, large-scale applications. Today's data communications techniques make it easy to interconnect all of these kinds of computers so that the information that they process can be shared.

Superminis, as opposed to regular minis, can be defined as 32-bit, multiuser systems that use sophisticated operating systems. Since the introduction in 1977 of the first of these machines, Digital Equipment Corp.'s VAX-11, they have evolved from dedicated scientific processors to full-scale commercial computers. Today's supermini has the flexibility and power of traditional mainframes and the ease of use and interactivity of traditional minicomputers.

Some of the characteristics of superminis today include:

- Power. The processing speeds, disk storage capability and I/O throughput make today's superminis more powerful than yesterday's mainframes.
- Flexibility. Most superminis offer clustering capabilities for sharing disks and processors, advanced networking so that information can be easily transferred between processors both locally and remotely and a compatible product line that ranges from a micro- to mainframe-size machine so that customers can choose how much processing power and data storage is needed for each function.
- Interactivity. The single most important advantage of interactive computers is their ability to give the user immediate feedback in response to an event.

Until recently, commercial software was not available that reflected the true power of mainframes but which also offered the interactivity of minis. Within the last couple of years software that has been designed from the ground up for the supermini environment has become available. Some of the characteristics of this software include:

- Interactivity. Software designed for superminis should be interactive for all functions, including data entry, updating and reporting.
- Extensive features. Supermini software designed for medium- to large-size companies must still contain the extensive features found on successful mainframe software products. These features include large file capacities and flexible reporting capabilities.
- Ability to provide the total solution. Until recently, traditional transaction-oriented applications (such as accounts payable) were done on mainframes, while interactive applications like financial modeling were done on time-sharing services or on micros. The supermini provides a technical environment in which both financial accounting and planning solutions can together be implemented and integrated, providing the user with a single information processing capability, common data bases and a consistent user interface.
- Micro-to-supermini links. Today, micros are used extensively in all areas of financial management, and a micro-to-supermini link is a necessary part of any software package, as the micro-to-mainframe link is in its environment.

Automating functions

An example of how superminicomputers can be used to automate an entire function can be found in the financial management area. Today's financial manager in a medium- to large-size company needs traditional transaction-oriented systems such as general ledger, financial reporting, accounts payable and accounts receivable.

These applications have tended to be batch mainframe applications, and the software was either developed in-house or purchased from one of the three or four top mainframe financial software vendors.

These same financial managers have also needed interactive decision support software capabilities for performing tasks such as modeling, forecasting and budgeting. This interactive computing was first done on time-sharing computers but has recently moved onto microcomputers.

Ross is president and founder of Ross Systems, Inc. in Palo Alto, Calif., a supplier of financial management software for Digital Equipment Corp. VAX superminis.

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SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

DAISY SYSTEMS CORP.
Personal Logician AT

Daisy Systems Corp. has announced the Personal Logician AT computer-aided engineering (CAE) system, based on the IBM Personal Computer AT and featuring Daisy Systems' graphics subsystem.

The system includes design entry capabilities and the Personal Daisy Logic Simulator for design verification. The system is said to offer twice the mass storage capability of the firm's system based on the IBM Personal Computer XT.

The Personal Logician AT features Intel Corp.'s 80286 microprocessor, a 20M-byte hard disk drive and compatibility with Xerox Corp.'s Ethernet local-area network. Daisy Systems' graphics controller and monitor offer 1,022- by 840-pixel resolution.

The price for Personal Logician AT with 640K bytes of random-access memory, Daisy Systems' graphics subsystem, a 20M-byte hard disk drive and 1.2M-byte floppy disk drive is $25,000, the company said. The price for an add-on package for Personal Computer ATs is $20,000, the company said. A color version of the system will be available in the first quarter of 1985 for $10,000, the company said. The Ethernet compatibility is optional for $2,500 per workstation, the company said.

Daisy Systems, 700 Middlefield Road, Mountain View, Calif. 94043.

PARAGON TECHNOLOGY CORP.
100AR

Paragon Technology Corp. has announced the 100AR, a computer-aided design system for printed circuit board design applications. The unit is based on a Digital Equipment Corp. PDP-11/23+ minicomputer with four serial ports.

The 100AR 16-bit stand-alone workstation is an enhanced version of the 100A, which adds an autorouting capability and hard disk storage. The product has the capacity to design boards of up to 20- by 20-in. with up to 200 16-pin equivalent integrated circuits with 64 colors and layers. Screen resolution is 512 by 512 pixels, the vendor said.

Hardware includes the system console, keyboard and DEC VT100-type terminal, with a 14-in. color monitor, line printer, proprietary graphics board and digitizer tablet. Options include a 20M-byte Winchester disk drive, modem, magnetic tape unit, paper tape punch, digitizer table, pen plotter, uninterruptible power supply and workstation furniture, the company said.

The price for the 100A is $45,000, the vendor said.

Paragon, 2199 Norse Drive, Pleasant Hill, Calif. 94523.

PROCESSORS

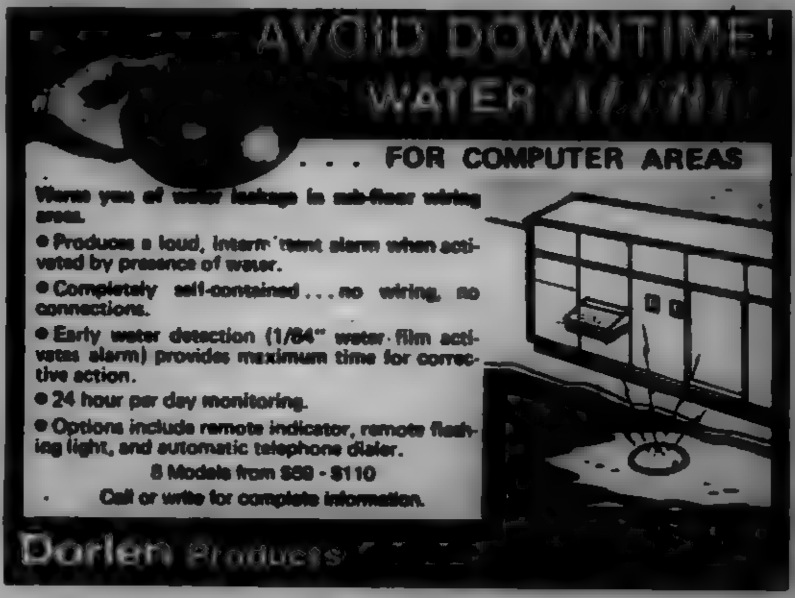
SIGNAL PROCESSING SYSTEMS, INC.
SPS 1000 With Dot Product Processor

Signal Processing Systems, Inc. has announced a dataflow multiprocessor system designed to provide continuous, integrated power and cross-spectral density processing at more than 1-MHz complex sample rates. The SPS 1000 With Dot Product Processor is said to provide integration processing of results without delaying fast Fourier transform operations. It reportedly features array multiplications, integrations, dot product and filter operations invoked by Fortran subroutine calls and is said to perform single, double and quadruple precision operations.

According to the vendor, the product interfaces multiple processors and I/O devices through smart memory and provides real-time system computation rates of up to 1.5 billion operations per second. Supported by a block diagram compiler, the byte-sliced system comes in 8-, 16-, 24- and 32-bit configurations.

It is priced from $65,000.

Signal Processing Systems, 223 Crescent St., Waltham, Mass. 02154.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TERMINALS

ITT TELECOM PRODUCTS CORP.
Infostation

ITT Telecom Products Corp. has introduced an integrated voice/data workstation said to enable users to access both voice and data simultaneously.

The Infostation consists of an executive telephone, full-duplex speakerphone, 9-in. CRT display, 300 bit/sec modem, typewriter-style keyboard and what the vendor calls a dashboard of 13 programmable keys. The programmable keys are said to offer users access to numbers dialed frequently or private branch exchange functions, the vendor said.

The workstation is said to offer a telephone directory and a log, calendar, scratch pad, electronic messaging and data communications.

Available in January, the unit will be priced between $1,100 and $1,200, the vendor said.

ITT, 3100 Highwoods Blvd., Raleigh, N.C. 27604.

TANDEM COMPUTERS, INC.
Integrated Bar Code/Magnetic Stripe Reader

Tandem Computers, Inc. has announced the Integrated Bar Code/Magnetic Stripe Reader option for its 653X terminals. The feature is said to allow users of Tandem Nonstop systems to enter machine-readable information directly from bar code labels and/or magnetically striped cards without having to use the terminal keyboard.

Three versions are available: the Model 6AIB integrated bar code reader, the Model 6AIM integrated magnetic stripe reader and Model 6AIC integrated bar code/magnetic stripe combination. The bar code options are said to support all standard codes, while the magnetic stripe options support Track 1 International Airport Transportation Association or Track 2 American Bankers Association standard codes.

Bar code and magnetic stripe readers transmit data to the terminal at 4,800 bit/sec, according to the vendor.

Prices are $1,295 for the integrated bar code reader option, $1,095 for the magnetic stripe option and $1,995 for the bar code/magnetic stripe combination, the company said.

Tandem, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

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PRINTERS/PLOTTERS

VERSATEC, INC.
Model 430

Versatec, Inc. has announced an off-line plotting workstation, the Model 430, which supports electrostatic color and high-resolution plotting (200 and 400 point/in.) on Versatec plotters from California Computer Products, Inc. 921/925 tapes. The workstation performs all vector sorting and vector-to-raster conversion.

The Model 430 accepts seven Versatec data standard formats and supports all Versatec plotters. The workstation includes a microprocessor, 64K bytes of memory, video display, 24M-byte Winchester disk, magnetic tape drive and bipolar algorithmic processor designed for vector sorting and raster generation. An optional synchronous communications interface enables remote plotting.

The price of the Model 430 is $46,000, and the communications option is $3,000 when ordered with a workstation, the vendor said.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

IMAGEN CORP.
Imagen 12/300

Imagen Corp. has introduced a desktop laser printer said to be able to merge text and graphics on one page.

The Imagen 12/300 includes features such as page collation, page reversal, multiple copies facility and portrait or landscape printing, the vendor said. Interfaces supported include serial, parallel and the Ethernet local-area network. The 12/300 reportedly can print 12 page/min at a resolution of 90,000 dot/sq in. using dry toner and plain paper.

The printer is said to support a number of host computers, including those running AT&T's Unix operating system. It also supports document composition systems such as Bell Laboratories' Troff, the American Mathematical Society's Tex and Unilogic Ltd.'s Scribe, the vendor said. It also comes standard with emulators for daisywheel, line printer and Tektronix, Inc.'s Tektronix 4014, enabling the user to output file previously configured for those devices.

The price for the 12/300, including 20 fonts and the vendor's Impres language, is $19,950, the vendor said.

Imagen, 2650 San Tomas Expwy., Santa Clara, Calif. 95052.

GENICOM CORP.
Printer enhancements

Genicom Corp. has announced a series of enhancements for its 3000 and 4400 series of printers.

For the 3000 series of personal and small business dot matrix printers, the company made software changes intended to make the printers compatible with all IBM Personal Computer systems. The changes include adding IBM Personal Computer graphics capabilities to the Models 3014 and 3024 and Epson America, Inc. Epson MX Graftrax Plus emulation to the Models 3304 and 3404.

Now available, the printers cost $1,199 for the 3014, $1,499 for the 3024, $2,490 for the 3304 and $2,650 for the 3404.

Costs are $4,065 for the 3184,

Continued on page 78

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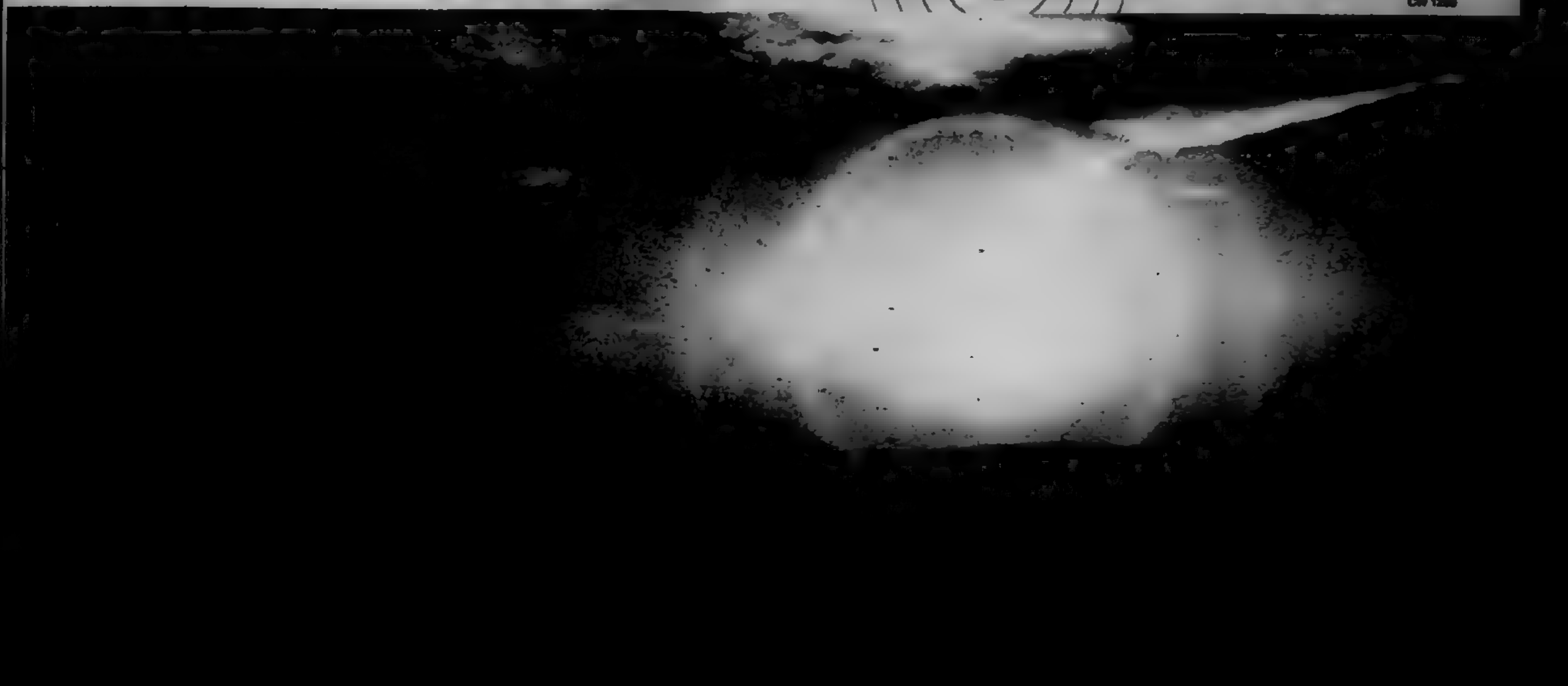

Continued from page 76

$4,965 for the 3304 and $5,165 for the 3404, all scheduled for January delivery.

For the 4400 series of shuttle matrix line printers, the company announced optional character sets, including near-letter-quality Courier and italic fonts. The printers already had data processing and Gothic NLQ character sets and graphics, Greek and math symbols.

The Model 4410 prints 300 line/min and costs $5,300. The Model 4440 prints 600 line/min and costs $7,200. The optional character sets cost $45 to $90, depending on the set size.

Genicomm, One General Electric Drive, Waynesboro, Va., 22980.

PRIMAGES, INC.
Primage 90 print systems

Primages, Inc. has announced three 90 char./sec daisywheel printers, each with a Primage 90 printer and Pagemate sheet feeder.

The Primage 90 prints at 10-, 12-, and 15-pitch bidirectionally and features horizontal spacing in increments of 1/120 in. The unit also offers vertical spacing of 1/96 in., the company said. The daisywheel is said to have a 300,000-char. life with 100 petals that print in 10 European languages without changing a wheel. The printer's print-in-flight feature is said to increase speed, cut noise and reduce wear.

The Pagemate sheet feeders, available in two- or three-bin models, are said to hold 150 to 200 sheets of 8.5- by 11-in. paper, and the envelope bin holds 30 envelopes. The two- and three-bin sheet feeders can be fitted to the Primage I printer and the two-bin is convertible to a three-bin feeder for a charge of $250, the vendor said.

The printers are said to be compatible with equipment from Wang Laboratories, Inc., IBM and IBM compatibles, Burroughs Corp. and Digital Equipment Corp. via RS-232 and Centronics Data Computer Corp.-type interfaces, the company said.

The price for Primage 90 with a Pagemate I single-sheet feeder is $1,895; the price for Primage 90 with a Pagemate II two-sheet feeder is $2,095, and the price for Primage 90 with a Pagemate III two-sheet plus envelope feeder is $2,295, the company said.

Primages, 620 Johnson Ave., Bohemia, N.Y. 11716.

ANADEX, INC.
DP9632B

Anadex, Inc. has announced the DP9632B dot matrix printer for use with IBM 3270 terminals. The unit is said to operate at up to 240 char./sec.

Standard features of the DP9632B include tractor feed, double-width characters, horizontal and vertical tabbing, superscripts and subscripts, justification and a 3.5K-byte buffer, the company said.

Dot-addressable graphics are said to provide either 72 dot/in. or 144 dot/in., horizontal and vertical. Options include alternate character sets and 2K bytes of additional buffering.

The price for the DP9632B is $3,395, and delivery is scheduled for the first quarter of 1985, the company said.

Anadex, 1001 Flynn Road, Camarillo, Calif. 93010.

GRAPHICS SYSTEMS

AVL
Starburst; AVL Genesis

AVL has introduced a graphics presentation system that offers a color palette, three-dimensional business chart software, text formatting with the AVL Artgraphics free-form art capabilities and National Television Standard Code video output for videotape synchronization.

The Starburst computer graphics presentation system includes a 512K-byte CPU with a 10M-byte Winchester hard disk drive and a 5¼-in. floppy disk drive, a puck and digitizing tablet, a keyboard and a 12-in. monochrome programming monitor.

Users may select either a 12-in. or 19-in. color display monitor and either of two 4,000-line film recorder options, according to the vendor.

System prices — including the film recorder and all system software — begin at $14,995.

AVL has also announced the AVL Genesis multiimage programming computer that runs under Microsoft Corp.'s

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MS-DOS operating system and incorporates the Society of Motion Picture and Television Engineers (SMPTE) code.

The SMPTE time code is reportedly used to mark and drive videotape decks, audio decks and other electronic devices designed to interface with video devices.

The AVL Genesis CPU uses Intel Corp.'s 8088 and Zilog, Inc.'s Z80B dual processors at 4.77 MHz and 6 MHz, respectively, for instruction processing. It contains 256K bytes of random-access memory with two 5¼-in. double-density disk drives.

Outputs include two RS-232 serial ports for printer and modem connections and a Centronics Data Computer Corp.-compatible parallel printer port, the vendor said.

Price of the AVL Genesis is $5,495, according to the vendor.

AVL, 56 Park Road, Tinton Falls, N.J. 07724.

POWER SUPPLIES

AMERICAN POWER CONVERSION CORP.

300 PC+, 750XT+

American Power Conversion Corp. has announced the 300 PC+ uninterruptible power supply (UPS) for the IBM Personal Computer or microcomputers equipped with hard disks and the 750XT+ UPS for larger business configurations such as multiple IBM Personal Computer XTs.

The 300PC+ has four ac power receptacles and is engineered to power computer loads with a regulated output that provides both the correct peak ac voltage and the proper RMS voltage. For an extended utility outage, a typical IBM Personal Computer can operate for up to 15 minutes.

The price of the 300PC+ is $595, the vendor spokesman said.

The 750XT+ is said to protect against brownouts or momentary dips in the commercial ac supply. It can power up to four fully configured Personal Computer XTs for periods ranging from seven minutes to one hour, depending upon the load. The UPS provides low-distortion sinewave power.

The 750XT+ protects against surges, spikes and electromagnetic interference originating in the utility system. Included is an internal self-test feature and a current-limited battery charger with a preset float voltage.

The price of the 750XT+ is $1,995, according to the vendor.

American Power Conversion, 89 Cambridge St., Burlington, Mass. 01803.

GENERAL POWER SYSTEMS

Memorygard II

General Power Systems (GPS) has released a standby uninterruptible power supply series, Memorygard II, said to have a transition time of 2 msec.

The Memorygard II series comprises 24 models ranging from a 100W unit with a 9-min internal battery time to a 1 kVA unit with a 15-min internal battery time. All models employ pulse width modulation to achieve regulation of power.

Prices range from $495 for the 100W system to $1,295 for the 1 kVA system, the vendor said.

General Power Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

NOVA ELECTRIC MANUFACTURING CO.

Supernova 400

Nova Electric Manufacturing Co. has announced Supernova 400, an off-line uninterruptible power supply.

Supernova 400 reportedly isolates users from spikes and noise found on an ac power line. In the event of a brownout or power failure, a relay system transfers the load to a battery inverter system and maintains power, according to the vendor. When power returns, the load is automatically transferred back to the ac line and batteries are recharged, the vendor said.

The product can be used with word processors, micro-

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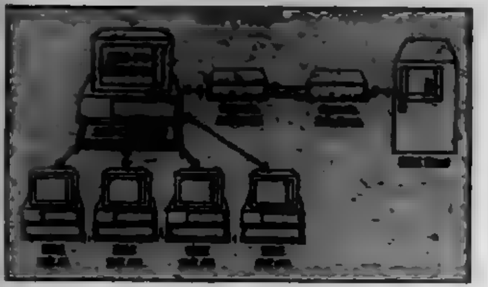

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Using PCs in the field sales offices gives us the flexibility of local PC processing power, and the benefit of concurrent processing, since we can use DOS functions while continuing to maintain the mainframe link. It's certainly a major money-saver—a really smart alternative to dumb terminals.

We expect those new sales offices to grow rapidly. When they do, I'll be adding AST cluster functions so we can use PCs, and VT-100™ or compatible terminals in our configuration. All of them can communicate to headquarters over a shared phone line to reduce our telecommunications costs.

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Continued from page 79

computers, communication equipment, process control systems, security systems and bar code readers, Nova Electric said.

Supernova 400 costs $725.

Nova Electric Manufacturing, 263 Hillside Ave., Nutley, N.J. 07110.

TOPAZ ELECTRONICS
Ultra-Isolator

Topaz Electronics has announced the Ultra-Isolator line of noise suppressors intended to protect CPUs against power line noise. The units can also distribute power to peripherals.

Up to 21 power receptacles are available. Shielding is said to provide up to 146 db of common-mode noise attenuation, and low-pass filters combine with peak-limiting circuits to provide up to 60 db of transverse-mode noise attenuation.

Topaz Ultra-Isolator noise suppressors with power distribution are available in 50-Hz and 60-Hz models, with single-phase power ratings from 10 kVA to 20 kVA. Prices for the Ultra-Isolators start at $2,100, the company said.

Topaz Electronics, 9192 Topaz Way, San Diego, Calif. 92123

INNOVATIVE ELECTRONICS, INC.
AC-10 Uninterruptible Power Supply

Innovative Electronics, Inc. has introduced the AC-10 Uninterruptible Power Supply unit designed to maintain power on a microcomputer system when AC line voltage fails.

The AC-10 enables an AC line connected to the microcomputer to be connected directly to the AC-10. When line voltage drops or fails completely, the battery inverter supplies 200W square AC with nominal recovery management system and peak voltages within 1.5 msecs for at least 15 minutes at full load, the vendor said.

The AC-10 is said to be ideal for situations in which protecting personal computer memory from power failure is vital. In addition, the AC-10 reportedly saves electronic typewriter memories when unplugged, according to the vendor.

The unit can also be used to operate security systems, run retail point-of-sale terminals during a blackout and ensure integrity of factory data collection systems.

The price of the AC-10 is $995.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

Macrolink gives memory boost to superminis

ANAHEIM, Calif — Macrolink, Inc. has announced an 8M-byte memory module for Perkin-Elmer Corp. 32-bit superminicomputers.

According to Macrolink, the module allows users of the PE 3210 to upgrade beyond the 4M-byte limit set by the factory. It uses 256K-bit dynamic random-access memory chips.

The 8M-byte module is priced at $25,000.

Macrolink is located at 1150 E. Stanford Court, Anaheim, Calif. 92805.

CAMBEX

from page 73

The technology for the Stor/8000 is the 64K-bit or 256K-bit MOS random-access memory and IBM-compatible emitter-coupled logic chip, the company said.

According to Cambex, the product is available now. The 8M-byte version is priced at $95,000. The 16M-byte version is priced at $180,000.

Cambex is located at 360 Second Ave., Waltham, Mass. 02154.

FERTIG

from page 73

IBM's VM/CMS environment, questions about IBM's direction in distributed DP and dismay over IBM's rapidly skyrocketing support costs.

Based on the survey, Fertig posited several IBM product/strategy scenarios through 1987:

- Unlike Digital Equipment Corp., IBM will purposely avoid providing a total integrated office automation solution for corporate users. DEC's OA solution lets users move from an entry-level Microvax-1 to a high-end configuration of clustered DEC 8600s without changing operating systems. Given this strategy, Fertig said DEC's products are an obvious target for plug-compatible manufacturers.
- IBM's popular Professional Office Systems Software will merge with what Fertig claims is its poorly performing Distributed Office Support System host-based business system by the second quarter.
- IBM will develop multiple solutions and overlapping products to answer mainframe server needs. The 8100 will be enhanced to act as a file and print server in a local-area network, and the 8100, 4300, System/36 and System/38 will serve distributed processing needs.
- IBM will announce initial models of its next mainframe family, the Sierra series, with capacities of 7.5 million to 30 million instructions per second, perhaps as early as the third quarter of 1985. Prices will begin at $150,000. Offering bulk main storage, the Sierra will adversely impact IBM's existing QX and KX models in the System 3081 line of processors by offering twice as much performance at a comparable price.
- IBM's mid-range System/38 will merge with the 4300 line by 1986 and serve as a key departmental and host system in IBM's OA strategy. In its present state, the product has been adversely impacted by the IBM 4300 and 3080 series products, Fertig said.

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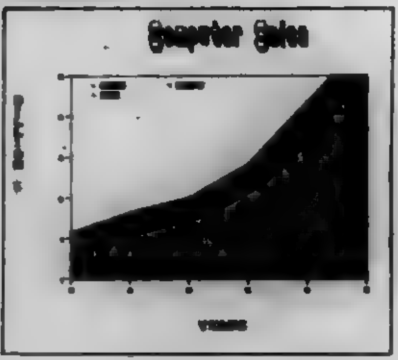

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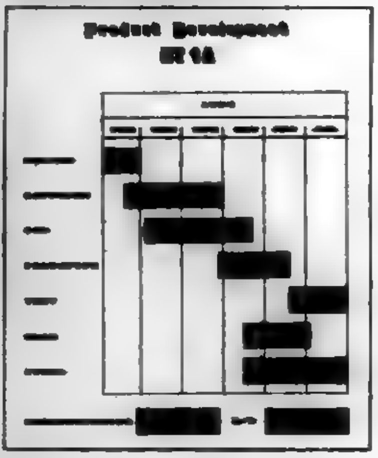

FLOW CHARTS
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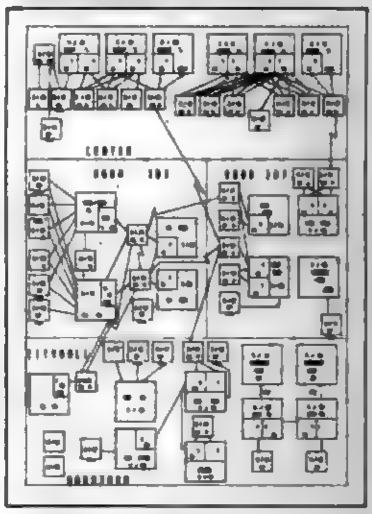

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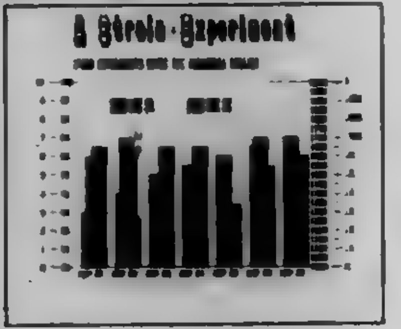

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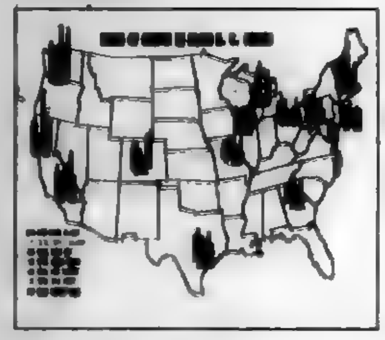

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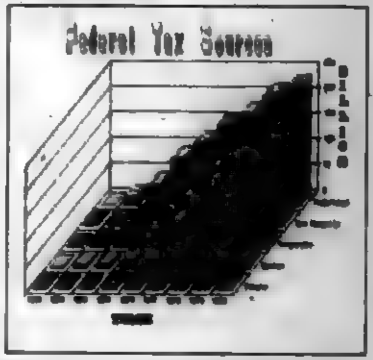

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BOARD-LEVEL DEVICES

CSP, INC.
IOM-1

CSP, Inc. has introduced a peripheral device I/O module for its Mini-Map array processors. The IOM-1 is said to provide the means to transfer data to and from the Mini-Map without passing through the host computer.

The IOM-1 provides data transfer rates to 16M byte/sec while linking peripherals directly to the Mini-Map. It has a 32-bit bidirectional data port, a 24-bit address input and access to the memory control signals.

The IOM-1 is offered as a Mini-Map system option. When purchased separately, it is priced at $2,000, the vendor said.

CSP, 40 Linnell Circle, Billerica, Mass. 01821.

DATARAM CORP.
DR-280 series

Dataram Corp. has released a compatible memory board for Data General Corp. Eclipse MV/4000 and MV/10000 computers that provides up to 2M bytes of data storage.

The DR-280 series are single printed circuit boards providing up to 2M bytes of memory using 64K-bit random-access memory chips. Depopulated versions are available in 1M- and 512K-byte increments.

The DR-280 compatible memory with a 2M-byte capacity costs $6,900 when purchased singly.

Dataram, Princeton Road, Cranbury, N.J. 08512.

ACTION INSTRUMENTS, INC.
Analog, digital I/O cards

Action Instruments, Inc. has announced a line of plug-in, IBM-compatible analog and digital I/O cards for industrial processing and laboratory applications.

The Model AICP-AI04 is said to accept up to four analog inputs, transmit two analog outputs and provide 12 channels of configurable digital I/O, all with 12-bit resolution.

The Model AICP-AI016 can accept up to 16 single-ended or eight fully differential inputs with 12-bit resolution. The Model AICP-AI08 reportedly accepts eight single-ended inputs and provides seven I/O channels.

The AICP-RTD15 and AICP-TC15 cards are said to accept up to 15 channels and to provide 500V input-to-expansion bus signal isolation, the vendor said. The Model AICP-SG4 is a low-level analog card that accepts four fully differential inputs, provides eight outputs and sources its own excitation voltages for direct connection to load cells, strain-gauges and pressure transducers, the vendor said. The AICP-DIM32 and AICP-DOM32 each have 32 output channels and are used for interfacing multiple digital signals to IBM Personal Computers. Prices range from $250 for the AICP-DIM32 to $1,295 for the thermocouple, real-time device and strain-gauge cards.

Action Instruments, 8601 Aero Drive, San Diego, Calif. 92123.

VDT

from page 73

ous tasks on their own, and they became more useful.

Two other factors were important to the VDT's development — multiuser processing (time-sharing) and distributed processing. As many users accessed the same computer at the same time to do different things, terminals were differentiated according to their use; that is, they were specialized. The result of this specialization is that terminals used primarily in the office now look and work quite differently from those used to design submarine hulls or to direct robots on a factory floor.

Definitions have changed, too. The more intelligent and differentiated terminals become, the more closely they approach the status of an independent workstation. The line of demarcation between the two is now blurred.

The differences between a workstation and personal computer have also become blurred. A few years ago, the distinction was clear: The personal computer was self-contained, and the workstation was part of a larger system.

Today, of course, some personal computers can be used in networking environments, and some workstations stand alone.

All three devices — terminal, workstation and personal computer — will continue to coexist for some time to come. The distinctions between them will become even less clear.

In addition to the changes in terminal technology, there have been three major changes in terminal economics:

- Although terminal prices are falling, features that were once optional are now standard. Bold characters, underscoring and certain logical attributes are examples.
- The revenue ratio between the host computer system and its terminal is changing. This is a result of the terminal's increased functionality. Where once the host/terminal cost ratio was 90:10, today it may approach 50:50. In some of the most sophisticated CAD systems, the terminal may even cost more than the host.
- Because both computer and terminal costs have fallen more than the cost of communications, there is continuing pressure on computer systems manufacturers to minimize the need for communications by providing as much local processing capability as possible.

These economic factors are not likely to change significantly any time soon, but nearly everything else about the terminal will. These changes will affect the entire computer marketplace.

Until quite recently, the usefulness of computer systems was limited by what terminals could do. Now, smarter, faster and ever more functional terminals have begun to put pressure on their host systems to process faster and more efficiently. Terminal attributes such as color and graphics require more of the processor. This trend is expected to continue.

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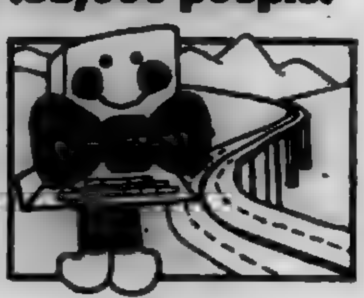


MICROCOMPUTERS

Inventive software to spur net growth

Personal computer network vendors expect 'tremendous growth' next year

By Eric Bender
CW Staff

LAS VEGAS — While most personal computer local-area network buys have been aimed at reducing costs by sharing resources, future network sales will be driven by new software packages that represent "the [Software Arts, Inc.] Visicalcs of distributed data processing," according to Ken Biba, vice-president for personal communications at Sytek, Inc. of Mountain View, Calif.

During a session here last month at Comdex/Fall '84, other suppliers of personal computer local-area networks also emphasized that innovative application software will be critical for network growth.

L. William Krause, president of 3Com Corp. in Mountain View, forecast that a move from computer resource sharing to companywide information access setups will create enormous markets for new network software. Many employees now run applications such as spreadsheets and graphics on stand-alone micros, but networks represent a promising way to handle filing, mail, scheduling and the other tasks facing every employee in a company, he pointed out.

"We're in the same stage as personal computers were before Visicalc — balancing checkbooks," agreed Harry Saal, founder and chief scientist of Nestar Systems, Inc. in Palo Alto, Calif. "There are few, if any, applications that compel [that networks] be installed."

Additionally, many popular applications do not run on a network because they are copy-protected, Saal said, but he added that this approach is under fire from local-area network buyers. One Nestar customer, a General Services Administration regional office in San Francisco, "will not purchase copy-protected software because it won't run on the network," he said.

The announcements of the IBM PC Network and Microsoft Corp.'s Microsoft Networks and MS-DOS 3.1 established stable environment for application software, strongly encouraging the development of network applications and standard licensing policies, vendors said.

But while almost all suppliers intend to be compatible with the Microsoft network software, they still will differentiate themselves with both hardware and software offerings. "By no means does [Microsoft Networks] define the range of

See NETS page 91

- Fortune Systems Corp. launches workstations able to run both IBM's PC-DOS and AT&T's Unix-based programs/86
- IBM offers its Plasma Display as an OEM product for its Personal Computers/87
- Quarterdeck Office Systems enhances its Desq integrating software package to support the IBM Personal Computer AT/88
- General Computer Co. introduces an internal 10M-byte hard disk drive for Apple Computer, Inc.'s Macintosh/88

INSIDE

Software/[illegible]

ITT enhances Xtra micro

Micro-mainframe link, voice features added

PHOENIX — ITT Information Systems has announced options for the ITT Xtra Personal Computer that provide voice communications features, microcomputer-to-mainframe connections, graphics capabilities and 30M bytes of hard-disk storage.

Voice Communications options reportedly provide voice and speech recognition, voice store-and-forward capability, voice synthesis, telephone and management capabilities. In addition to voice control capabilities, digitized voice messages from a telephone or microphone can be stored on disk, the vendor said.

The voice products are designed for industrial inspection, medical facilities, education and telephone management applications. A voice subsystem is capable of recognizing 200 words from one speaker or between 25 to 100 words from a number of speakers, ITT said.

See ITT page 92

Micropro sees Wordstar 2000 turning the tide

By Eric Bender
CW Staff

LAS VEGAS — "We've been through a really difficult year," acknowledged Micropro International Corp. President H. Glen Haney.

As demand softened for Micropro's popular Wordstar microcomputer word processing software, the company's revenue and profits started to slide. A series of layoffs began last spring, and Micropro reported a loss of $756,000 for the quarter ended Aug. 31.

But Micropro's October introduction of the Wordstar 2000 series will turn the tide, Haney insisted at an interview here last month at Comdex/Fall '84. "We are reasserting our claim to be the undisputed leader in word processing," he said.

Early in the product development stage, the San Rafael, Calif.-based Micropro held an internal debate on whether to design

See HANEY page [illegible]

DBMS, utilities out for CP/M

CROTON-ON-HUDSON, N.Y. — Lawrence Information Systems, Inc. has introduced the Workbase data base management system (DBMS) and Data Baskets software that puts popular data bases on microcomputer diskettes.

Workbase, for the IBM Personal Computer or personal computers running under Digital Research, Inc.'s CP/M, reportedly uses a time-series data base structure and integrates data with tables, text, statistical analysis and graphics.

Workbase is priced at $889, plus $380 for color graphics capability.

Lawrence Information Systems also introduced its Data Baskets software, aimed at reducing the cost of accessing large data bases with a microcomputer.

Data Baskets, on diskettes, is priced from $150 annually, for foreign exchange and interest rates, to $850 annually, for industrial employment hours and earnings. Updated on a monthly basis, the two are $610 and $3,030, respectively.

Lawrence Informations Systems is located at 410 Albany Post Road, Croton-On-Hudson, N.Y. 10520.

[illegible]

[illegible] is manager of computer services at North Texas State University, Denton, Texas.

Quadram offers IBM micro add-ons, software

LAS VEGAS — Along with a raft of software from third-party developers, Quadram Corp. introduced several IBM Personal Computer memory boards and I/O boards at Comdex/Fall '84 here last month.

Quadram's Quad 2 Meg Card reportedly increases the internal memory of the IBM Personal Computer or Personal Computer XT to 2M bytes. The expanded memory is said to be especially useful for computer-aided design applications.

The $3,496 Quad 2 Meg Card board reportedly is twice as fast as a hard disk drive and useful for the creation of electronic read-only memory drives, print spoolers or disk caches. Software for those functions is bundled with the board. In addition, the Quad 2 Meg Card is said to feature a Basic I/O Subsystem chip that handles virtual memory functions without software drivers.

Quadram also introduced a similar board for the Personal Computer AT that provides up to 4M bytes of internal storage. The Quadmeg-AT board reportedly offers a 2M-byte increase in the 256K-byte storage of the AT and acts as a motherboard for up to two optional 1M-byte daughtercards.

Quadmeg-AT is priced at $3,995, with each additional daughtercard costing $1,995.

The Quadport-AT, a board that reportedly offers five additional serial ports and one parallel port for the AT, was also introduced.

The Quadport-AT is priced at $145 with one serial and one parallel port and $340 for the four-serial-port expansion kit.

The IBM PCjr also received a series of enhancement boards. Quadjr is an expansion chassis, priced at $695, that snaps onto the top of the machine and reportedly offers an additional 360K-byte drive, a parallel port and a clock calendar.

The $275 128K-byte Quadjr Memory Board for the Quadjr expansion chassis reportedly offers expansion to 384K bytes as well as Quadmaster II software for use in setting up a random-access memory drive, print spooler and disk cache. The Quadmemjr, also priced at $275, snaps onto the side of the microcomputer and reportedly offers 128K bytes of additional memory and Quadmaster II software.

Software offerings

Among the software offerings were Alpha Software Corp.'s $99 Executive Organizer, which includes functions such as an electronic date book and calendar, and $149 Deadline Manager; Select Information Systems, Inc.'s $149 4-1-1 retrieval system for file access in hard-disk storage systems and $50 Guide to Writing a Business Plan; and XQ Software, Inc.'s $295 Tax Strategist and $295 Investment Strategist.

Also introduced were three Select Information Systems word processors: Freestyle, based on the use of outlines, for $295; the Select Write, for $99; and the Bilingual, said to be driven by Spanish or English commands, for $395.

Quadram is located at 4355 International Blvd., Norcross, Ga. 30093.

Fortune 1000 supports Unix, PC-DOS

REDWOOD CITY, Calif. — A group of workstations reportedly able to run both an AT&T Unix-based operating system and IBM's PC-DOS has been introduced by Fortune Systems Corp.

The Fortune 1000 desktop workstation family reportedly consists of a group of 17 options, from which a workstation can be configured based on users' needs.

The workstations reportedly operate in conjunction with Fortune's existing 32:16 CPU and also permit networking between IBM Personal Computers and various Fortune products.

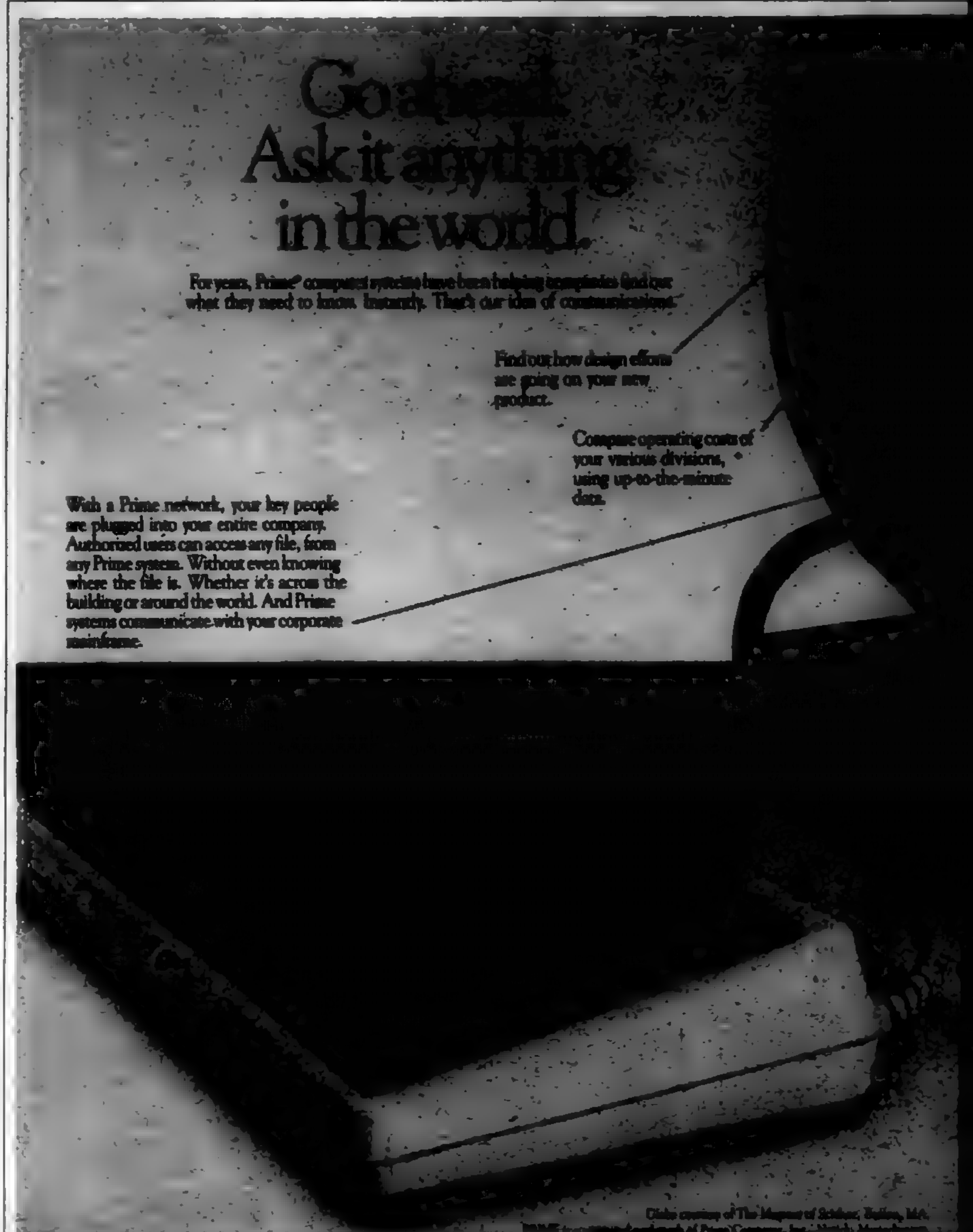
Available options

Among the available options are a color monitor, an upgradable Ascii terminal with a 14-in. monochrome monitor, hard or floppy disks and networking or stand-alone capabilities.

Also available is a high-speed data link that provides intelligent workstation capabilities under PC-DOS, Fortune's Unix-based For:Pro operating system or a configuration combining those operating systems, according to the company.

Workstations in the Fortune 1000 family begin at $795 for an Ascii terminal and extend to about $9,500 for a workstation that includes Unix and PC-DOS capability along with a color monitor, color graphics board, local-area network card and a 10M-byte hard-disk storage unit.

Fortune Systems is located at 101 Twin Dolphin Drive, Redwood City, Calif. 94065.



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Plasma Display offered for IBM Personal Computer

MONTVALE, N.J. — IBM has announced that its Plasma Display, introduced in 1983 as a mainframe terminal, is now available as an OEM product for the IBM Personal Computer and Personal Computer XT.

The IBM 3295 Plasma monitor works with the IBM 3296 Display Adapter and provides 64 160-char. lines.

The plasma monitor reportedly features an undistorted, flicker-free image with a resolution of 960 by 768 lines or 737,280 pixels. The monitor displays alphanumeric, noncoded and graphics information.

The adapter features a 32K-byte display buffer and can store up to eight 25-line, 80-char./line screens, IBM said. It supports six types of programming requests: control processing of lists of orders, control of how the screen displays data, control of when and how emulation operates, light of any picture element on the screen, creation of vectors and display of all-points-addressable alphanumerics.

The monitor costs $2,475, and the display adapter sells for $935.

IBM is located in Rye Brook, N.Y. 10573.

Venix/86, tools available on Personal Computer AT

CAMBRIDGE, Mass. — Unisource Software Corp. has announced that Venix/86 (an implementation of AT&T's Unix System V) and three Venix/86 packages (the Connector, Unify and Fortran 77) now run on the IBM Personal Computer AT.

Venix/86's kernel and driver fit in 50K bytes of random-access memory, Unisource said. Venix reportedly features University of California at Berkeley extensions, real-time capability, record-locking and graphics capabilities.

The Berkeley extensions include VI, Termcap and C Shell and permit flexible data handling, according to the vendor. Real-time capabilities include raw I/O, shared data segments, page addressing and asynchronous I/O. Record locking allows more than one user to access a program while maintaining file integrity, the vendor said. The graphics capabilities support medium- and high-resolution plotting and graphing.

The Connector reportedly enables a user to run programs for IBM's PC-DOS and Venix operating systems concurrently. The product allows a user to run the vast library of PC-DOS programs and to take advantage of Venix/86's multiuser, multitasking capabilities, Unisource said.

Unify features include menu-driven design, a screen-handling package, raw I/O and built-in optimizers, according to the vendor. The data base does not require that a user memorize complicated command sequences, eliminates the need for coding to format screens, allows a user to bypass the Venix/86 file system for faster performance and provides four data access methods, according to the vendor.

Fortran 77 has been widely used for applications that manipulate numerical data and provides easy porting programs from one machine to another, Unisource said.

A one- to two-user version of Venix/86 sells for $875, while an eight-user version costs $1,075. The Connector costs $299, Unify is priced at $1,495, and Fortran 77 sells for $395.

Unisoft is located at 71 Bent St., Cambridge, Mass. 02141.

Tecmar offers Maestro board for IBM micro

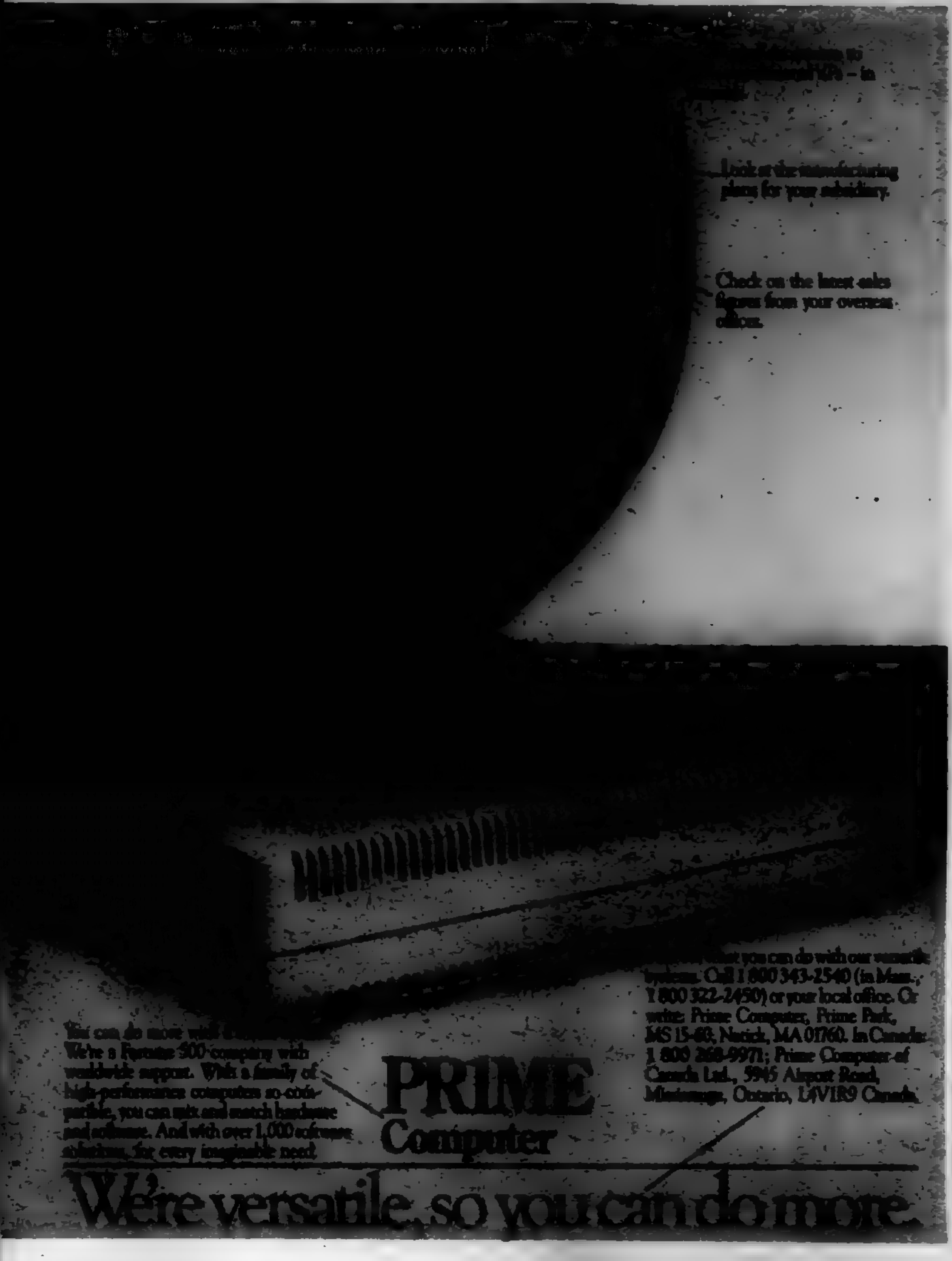
SOLON, Ohio — Tecmar, Inc. has introduced its Maestro multifunction board for the IBM Personal Computer AT.

The board reportedly offers memory expansion in two blocks: one upgrading the Personal Computer AT to a maximum of 640K bytes of internal memory, which is the maximum directly usable by its PC-DOS operating system; the other is said to be upgradable to 2M bytes, in increments of 64K or 256K bytes, a feature said to be useful for multiuser environments.

As a single board, Maestro reportedly avoids problems of heat buildup and connector unreliability found in the use of a daughterboard. Its parallel and serial ports can connect printers, plotters, modems and mice, and its programmable array logic chip can secure software, Tecmar said.

Maestro prices range from $529 for a unit with no internal memory to $3,989 for a board with 128K bytes of random-access memory and 2M bytes of additional storage starting at the 1M-byte address.

Tecmar is located at 6225 Cochran Road, Solon, Ohio 44139.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Dayflo software enhanced

Three options, Macrokey utility available

IRVINE, Calif. — Dayflo, Inc. has announced the enhancement of its Dayflo software to include Macrokey, a utility that allows the creation of push-button applications. Dayflo runs on the IBM Personal Computer, Personal Computer AT and Personal Computer XT.

Dayflo 1.1 also reportedly includes a guide that provides step-by-step instructions on creating customized data base solutions. Macrokey is said to allow users to program one or two keys to perform a set of functions or commands.

The package's report writer now offers a preprinted forms option and the ability to print a report to a DOS file in standard Ascii format, the company said. Dayflo also includes the Correspondent, which reportedly allows users to create, edit and print letters and memos, and the Personal Contact Manager package, which permits users to organize and access their daily business contacts, the supplier said.

Dayflo 1.1 is priced at $495. The Correspondent and the Business and Personal Contact Manager are currently provided free with Dayflo 1.1. Otherwise, they are $35 each.

Dayflo is located at No. 400, 2500 Michelson Drive, Irvine, Calif. 92715.

General Computer releases disk unit for Macintosh

CAMBRIDGE, Mass. — A hard disk storage unit said to combine 10M bytes of storage with optional memory expansion to 512K bytes for the Apple Computer, Inc. Macintosh has been introduced by General Computer Co.

The Hyperdrive reportedly speeds program loading and data transfer by Apple's Macintosh. The Hyperdrive's disk interface logic board is directly connected to the main circuit of the Macintosh, allowing all of the computer's serial ports to remain free for use by a modem, printer or the Apple Applebus, according to General Computer.

System software provided with Hyperdrive reportedly allows the storage unit to divide into many virtual disks that automatically resize themselves to accommodate files.

According to General Computer, Hyperdrives for the Macintosh are available in two models. The unit with memory expansion to 512K bytes is priced at $2,795. The unit without the random-access memory is priced at $2,195.

More information is available from General Computer at 215 First St., Cambridge, Mass. 02142.

Desq integrator enhanced by Quarterdeck

LAS VEGAS — Quarterdeck Office Systems has announced an enhanced version of the Desq multiwindowing software integrator that supports Microsoft Corp.'s MS-DOS 2.1 and 3.0.

Desq 1.2 supports the IBM Personal Computer AT, the Compaq Computer Corp. Deskpro series and many other recently introduced IBM-compatible systems, according to Quarterdeck President Therese Myers.

Myers claimed that the new version of Desq is the first windowing program to take advantage of MS-DOS 3.0 features. "The new program is able to use up to 3M bytes of extra memory in these systems as virtual disk, thus facilitating program swapping," she said.

The new release, scheduled for shipment by year-end, will be available free to registered users currently running Desq under earlier versions of MS-DOS or under IBM's PC-DOS. Desq is priced at $399.

Quarterdeck also announced that versions of Desq for the Digital Equipment Corp. Rainbow 100 and for the NCR Corp. PC4 will be offered through those system manufacturers. Desq for the Rainbow will be available in December, while a version for the PC4 will ship in January, the company said.

Quarterdeck is located at 1918 Main St., Santa Monica, Calif. 90405.

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AARON/SMITH ASSOCIATES, INC.
Search Companion

Aaron/Smith Associates, Inc. has introduced Search Companion, a text editor for work with downloaded on-line searches on the IBM Personal Computer.

Search Companion reportedly allows users of on-line services and information utilities to select only those parts of the downloaded data that they want to keep and to print those parts in any order.

On-line searchers can use the product to take output from commercial data base systems, keep only those parts desired, remove all unnecessary computer codes, sort the remaining information in any order, reformat and print or store the results, according to the vendor.

Search Companion is priced at $295 and requires a minimum of 128K bytes of memory.

Aaron/Smith Associates, Suite 518, 1422 W. Peachtree St. N.W., Atlanta, Ga. 30309.

MITCHELL MANAGEMENT SYSTEMS, INC.
Quick-Plan

Mitchell Management Systems, Inc. has announced Quick-Plan, a project management package that runs on a number of microcomputers with Microsoft Corp.'s MS-DOS operating system.

The product constructs project plans and tracks time, cost and available resources, the vendor said. Quick-Plan reportedly handles 250 activities, 99 resources and 500 connectors for each project.

It is said to include editing and modeling capabilities and 13 types of report formats. Zoom, spread and isolating graphics are available on-screen or in reports, the vendor said.

The program runs on the IBM Personal Computer, Wang Laboratories, Inc. Professional Computer, Data General Corp.'s Desktop Generation, Digital Equipment Corp.'s Rainbow Plus and Hewlett-Packard Co.'s HP 150. The program requires 384K bytes of random-access memory.

Quick-Plan sells for $995.

Mitchell Management Systems, Westboro Office Park, 2000 W. Park Drive, Westboro, Mass. 01581.

AUTODESK, INC.
AE/Cadd

Autodesk, Inc. has announced that it will market Archsoft Corp.'s recently introduced AE/Cadd software, a set of drawing tools for use with

Continued on page 91

Tools out for micros running Xenix

SANTA CRUZ, Calif. — The Santa Cruz Operation, Inc. (SCO) has introduced a line of business software for the IBM Personal Computer, the Apple Computer, Inc. Lisa and the AT&T 6309 running under Microsoft Corp.'s Xenix operating system.

The Xenix Now! line reportedly includes versions of Microsoft's Xenix for those machines and several Xenix-based applications programs, including SCO's Lyrix word processor; Relational Data Base Systems, Inc.'s Informix relational data base manager; Microsoft Corp.'s Multiplan; and Micro Focus, Ltd.'s Level II Cobol.

The Xenix operating system reportedly allows users to call up, with one keystroke, a screen display from any of up to 10 simultaneously running applications programs. Two optional Microsoft programs are available for it — the Xenix Text Processing Package and the Xenix Software Development Package.

Lyrix reportedly is menu-driven and has an on-line Help facility and mail-merge capability. Informix provides audit trails, compatibility with Level II Cobol Isam files and support for multiuser applications, according to the vendor. Multiplan for Xenix reportedly offers standard Multiplan capabilities such as cell capacity of 63 col. by 255 rows and built-in formulas to create models.

Compact Level II Cobol reportedly offers a runtime system written in C language and a data-entry program generator that generates Cobol programs for screen input and data file upkeep.

The Xenix operating system is priced at $595 for the IBM Personal Computer and AT&T 6300 and at $795 for the Apple Lisa. The other software is priced the same for the three machines as follows: Lyrix, $595; Multiplan, $495; Informix, $795; and Compact Level II Cobol, $795. The Xenix Development System and Xenix Text Processing System are priced at $595 and $495, respectively.

SCO is located at 500 Chestnut St., Santa Cruz, Calif. 95061.

The Goal News

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MICROCOMPUTERS

Continued from page 89

Autodesk's Autocad computer-aided design (CAD) system. It reportedly can run on any microcomputer able to run both Autocad and Microsoft Corp.'s MS-DOS operating system.

Said to be useful for architects, engineers and others in the construction industry, AE/Cadd reportedly enhances Autocad by providing a set of digitizer overlays and a symbol library. These overlays and the library reportedly allow creation of working drawings for the architect, along with specialized engineering drawings.

AE/Cadd Master, the first overlay/symbol library in what will reportedly be a more extensive drawing set, is priced at $1,000, the vendor said.

Autodesk, 2658 Bridgeway, Sausalito, Calif. 94965.

NETS

from page 85

networking solutions," Biba said.

Most network vendors forecast that sales will double or better in 1985. Joseph Hughes, marketing vice-president at Corvus Systems, Inc. of San Jose, Calif., estimated that overall industry shipments have reached the 200,000 node per year level and will triple in a year.

Hughes listed three main reasons for tremendous growth: heavy local-area network advertising by IBM and Apple Computer, Inc., the availability of net software from major software vendors and lowered hardware connection costs.

Noting that Corvus has signed an agreement with NEC Corp. to develop a single-chip version of the Corvus Omninet network controller, Hughes agreed with a prediction by Dallas-based Future Computing, Inc. that 30% of all computers will have local-area networking built in by 1987.

Also at the show, microcomputer networks got a strong vote of confidence from Zenith Data Systems Corp., the first major personal computer supplier to announce an off-the-shelf diskless model. The diskless Z-150 demonstrates "that networking is becoming more and more an integral part of our business," said marketing vice-president John Frank.

Comdex/Fall displayed early signs of a 1985 bonanza of networking software, with products introduced by Micro Data Base Systems, Inc., Software Products International and other vendors.

However, network licensing problems still cropped up. In one case, Lotus Development Corp. sent personnel around the show to check that its 1-2-3 package was not delivered across networks, exhibitors said.

CHARLES RIVER DATA SYSTEMS, INC.
Enhanced Unos

Charles River Data Systems, Inc. has enhanced Unos, an AT&T Unix-compatible operating system that runs on Charles River Data's Universe 68 and Universe 2203 lines of supermicrocomputers.

The enhancements reportedly include the ability to manipulate larger disks and data files. The operating system now supports files up to 2G bytes in size, compared with 67M bytes previously, the company said.

The operating system can connect to an IBM mainframe, and up to 32 Charles River terminals can emulate IBM 3270, 3770, 3780 and 2780 terminals, the vendor said.

Unos is said to support Charles River Data's Universenet, which complies with International Standards Or-

Continued on page 92

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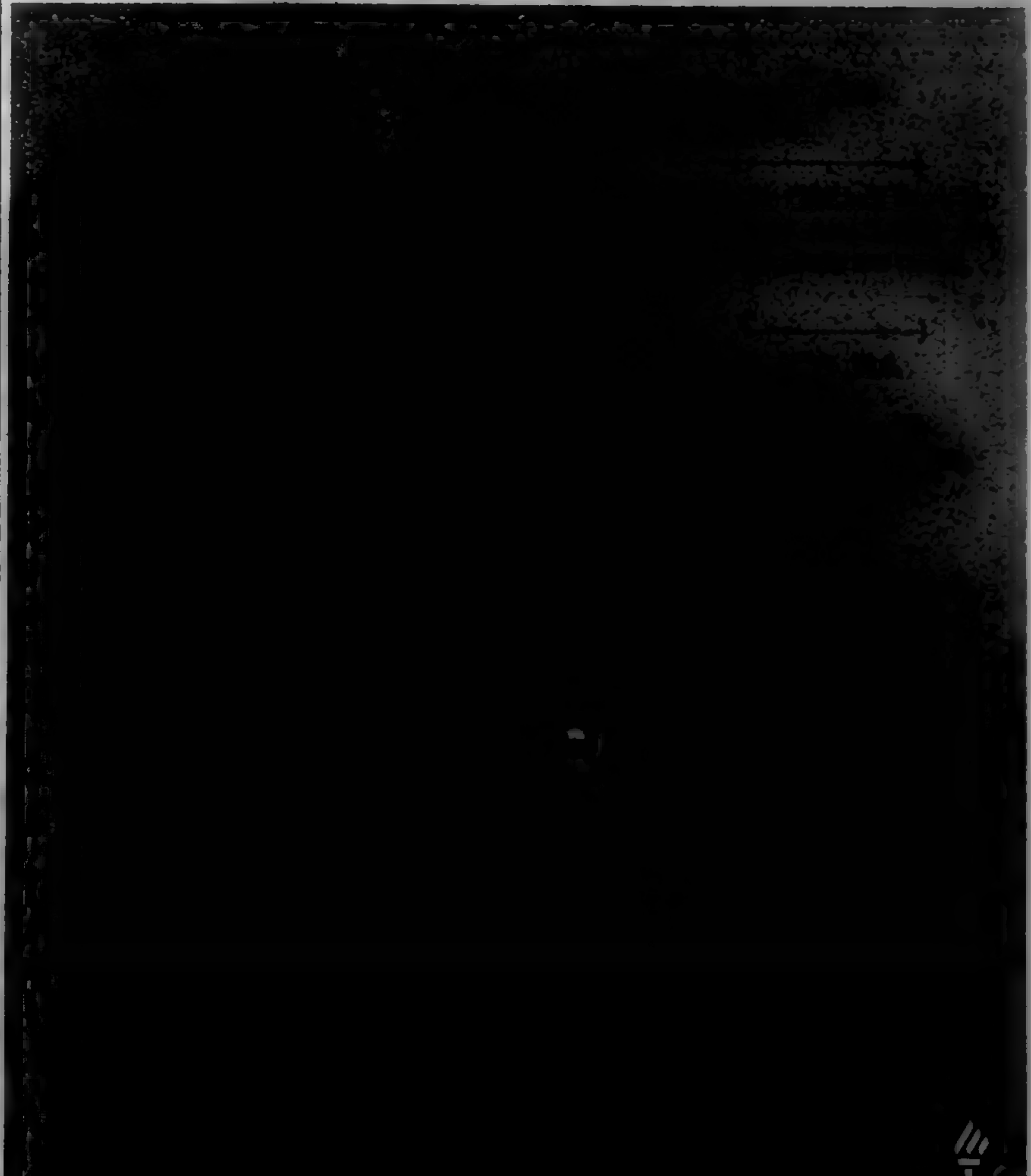


MICROCOMPUTERS

Continued from page 91

ganization standards. The net features electronic mail, file transfers, remote job execution and message passing.

Unos costs $4,000; current users can upgrade to the new operating system for $1,200.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 01701.

COMPUTER-AIDED DESIGNWARE, INC.

PC-CICS

Computer-Aided Designware, Inc. has introduced its PC-CICS software, which reportedly permits the IBM Personal Computer to test command-level IBM CICS programs.

The development of CICS programs reportedly can be done without the use of the mainframe by using PC-CICS. The software allows finished programs to be uploaded to a mainframe, recompiled and executed without modifications, according to the vendor spokesman.

PC-CICS is said to use an IBM Vsam file structure with utilities to convert data files between the mainframe and the Personal Computer. Among other capabilities, the utilities are said to give the ability to convert PC-CICS data files to sequential data files.

PC-CICS is priced at $500, according to the vendor.

Computer-Aided Designware, P.O. Box 17188, Salem, Ore. 97305.

DAVELL CUSTOM SOFTWARE

DCS Multistat

Davell Custom Software has introduced its DCS Multistat for the IBM Personal Computer and Personal Computer XT.

DCS Multistat is said to be a statistical analysis program designed specifically for engineering and scientific applications.

The software reportedly is an integrated package that does not require programming and includes an editor, statistical routines, screen graphics and report writing capabilities.

No special loading or linking commands are needed to move among the sections of the program, a vendor spokesman said.

DCS Multistat is priced at $290, according to the company.

Davell Custom Software, P.O. Box 4162, Cleveland, Tenn. 37311.

ITT

from page [illegible]

The $1,295 ITT Voice Communication Subsystem consists of a voice option board, voice communications software, documentation and telephone cable. Other options include a microphone for $55, voice utility software for $25, telephone cables costing $2 and Executive Desk Set software priced at $65 that provides an appointment calendar, phone directory, speed dialing and automatic answering.

Two micro-to-mainframe packages were announced, one offering IBM 3278 and 3279 terminal emulation, and the other giving IBM 3270 Personal Computer features, the vendor said.

The $1,145 IBM 3278 and 3279 adapter reportedly provides four windowing sessions: one interactive host session, one personal computer mode and two notepads. Each window can occupy a full screen or various user-defined combinations. The user is able to alternate between host and personal computer applications, ITT said.

The $1,595 3270 Personal Computer-like adapter provides eight windows: five interactive host sessions, one personal computer mode and two electronic notepads. The product allows a printer on the system to act as an IBM 3287 printer, ITT said.

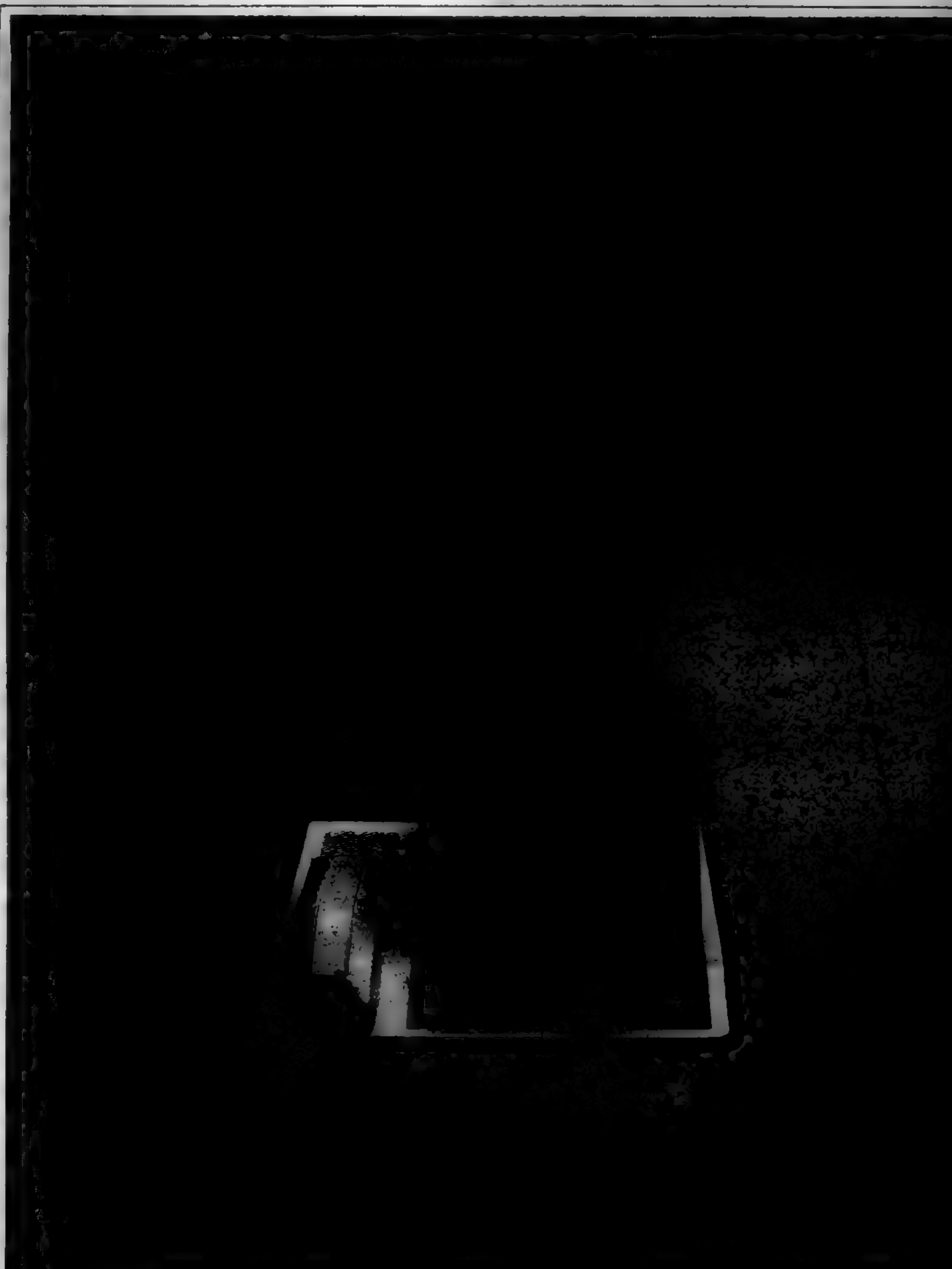
The heart of the graphics enhancements is a $650 Integrated Graphics Adapter that features a real-time clock, selection of font styles, single-slot system expansion and support for all ITT monitors, according to the vendor.

Other graphics options include 128K bytes of random-access memory (RAM) for $295 and 256K bytes of RAM for $400. The company also added two 14-in. monitors: a $695 color-graphics monitor and a $395 dual-mode monitor that allows a user to switch between monochrome or color displays.

Finally, customers can purchase a 30M-byte hard disk drive for $3,950.

The color graphics monitor is available now, while the other products will be shipped in March.

ITT Information Systems is located at P.O. Box 52016, Phoenix, Ariz. 85072.



HANEY

from page 85

the new software along the lines of the original Wordstar or to explore different options, Haney said.

"For Wordstar, there are over 1¼ million users who bought the product," he noted. "A lot of Wordstar users don't want to switch." The decision was to start from scratch with the new product, while maintaining and developing the Wordstar line, Haney said.

Starting from scratch left Micropro free to address the ease-of-learning and ease-of-use complaints of many Wordstar users, Haney said. Testing showed that Wordstar 2000's mnemonic commands were far superior to Wordstar's control-key functions, Haney said. Other upgrades include power features such as windows, list management, simple calculation functions, format sheets and an Undo command.

Micropro defines word processing broadly, from conceptualizing through writing and editing to specialized output, Haney said. Among future enhancements, "grammar correctors are clearly on the horizon," he said. Better communications, improved file management and links for automatic typesetting are also scheduled.

The first release of Wordstar 2000, set to ship by December, is for the IBM Personal Computer. Other versions for Microsoft Corp. MS-DOS-based computers are in the works, and Micropro is also studying releases for AT&T's Unix-based machines or Apple Computer, Inc.'s Macintosh.

Micropro endorses IBM's Topview operating environment, and versions of Wordstar 2000 supporting Topview are running in the lab, Haney said. "Topview really legitimizes the viability of stand-alone products that work together," Haney said. "The bloom is off the seamless integrated package idea, because you have to be so clever to use [one]."

Noting that Micropro has seen heaviest competition from low-priced products, the company will continue to be "a price stabilizer," Haney said. "Wordstar itself was a $495 package for five years, and now we've established a new umbrella. We will continue to stuff more functionality into the product; that's an insidious price erosion in itself," he added.

MICROS

from page 95

organization. Certainly the general introduction has meant that we now know things about our jobs that were not available in preautomated days, and much the same development can take place with the introduction of micros.

An organizational example is budget management within a cost center.

Centralized fiscal reporting in a large organization typically lags behind the need for information by budget authorities at a departmental level. But a spreadsheet or a data management system on a microcomputer frequently makes it possible to arrange a budget control procedure to alleviate the problem.

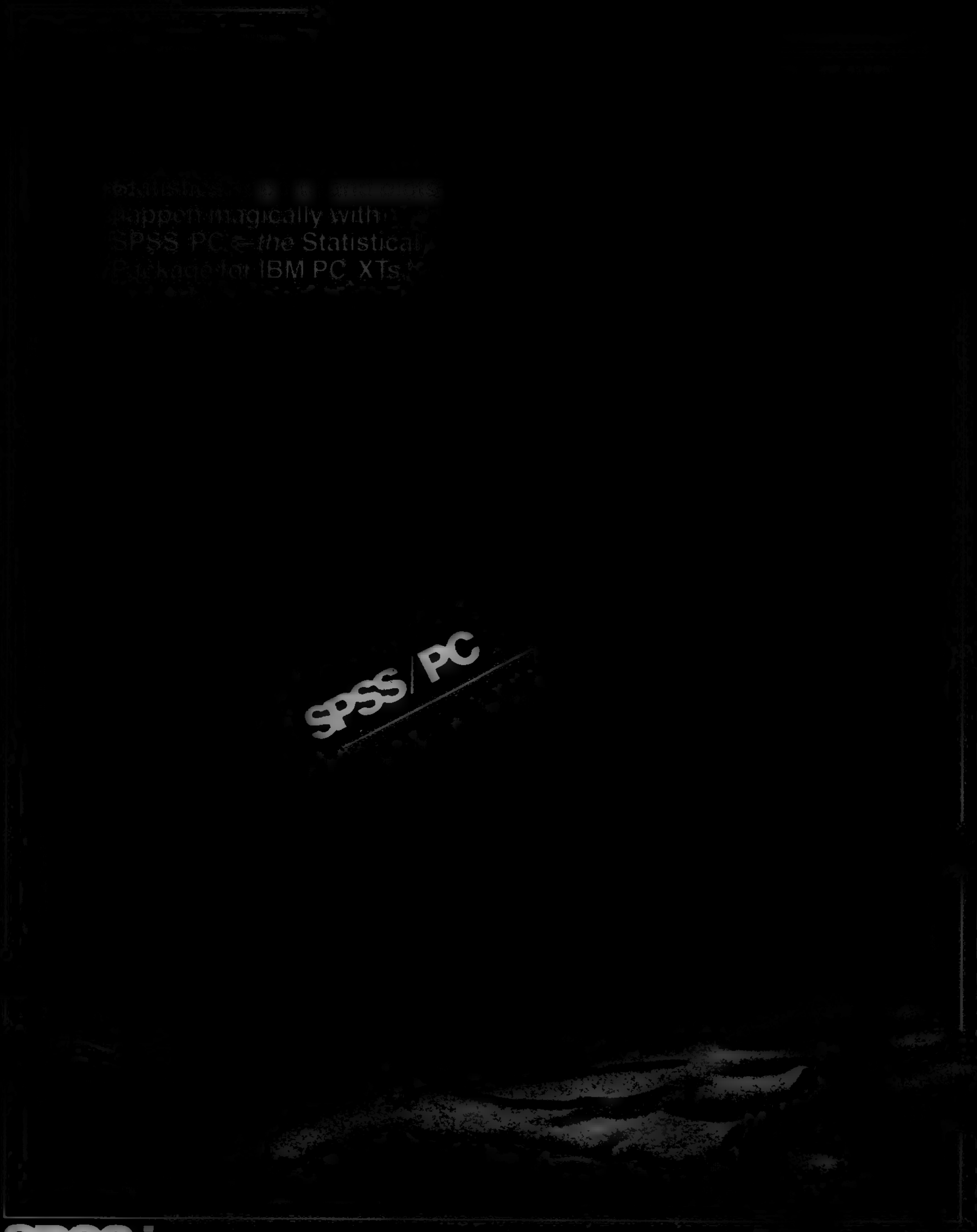
Budget control

Simple budget control processes that are difficult to implement centrally may be easy to do on micros. The result is that department heads can have the minute-by-minute updates they need to do an effective job of budget control.

Because one of the primary objectives for the deployment of micro-based workstations for professionals and managers is productivity improvement, it is incumbent on an organization to understand what "productivity improvement" means.

Vendors use productivity improvement measures to demonstrate that their equipment will be cost-effective, but those measures sometimes are very subjective. However, when micros are deployed along with support services such as training programs, productivity indeed can be improved.

"Say, that really is a micro-computer!"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COMPUTER INDUSTRY

Wang programming institute blends business, tech skills

By David [illegible]
CW Staff

TYNGSBORO, Mass. — "We would like to think we're the wave of the future," said Richard Fairley, a professor and department chairman at the Wang Institute of Graduate Studies here, as he described the mission of the school's graduate program for software engineers.

With its 55-student enrollment and one main building — a former seminary surrounded by 200 acres of woods, water and fields — the school has carved out a unique curriculum by combining the disciplines of computer science and business management.

Founded in 1979 by Dr. An Wang, founder and chairman of Lowell, Mass.-based Wang Laboratories, Inc., the institute is one of only three schools in the U.S. offering a master's degree in software engineering and is said to have the only full-time program of its kind. It has nine faculty members.

Wang Institute

The school's program is targeted at industrial software engineers seeking to gain a better grasp of both the technical and managerial skills of software development and maintenance, according to Fairley.

"We are different from computer science and we are different from business school-MIS programs," Fairley said. Most schools do not offer an interdisciplinary approach to the two subjects, he said. As a result, computer science graduates typically lack managerial skills and business school graduates lack technical skills.

"A lot of other schools are looking at our program and are interested in what we are doing," he asserted.

Another goal of the school is to help alleviate the nationwide shortage of software specialists with highly advanced, graduate-level skills. Fewer than 200 students graduate each year from U.S. colleges with Ph.D.'s in computer science, Fairley said, adding that the school is considering forming a Ph.D. program.

Although the school was founded and is primarily funded by An Wang, there is no affiliation between Wang Laboratories and the school. The school is not a training ground for future Wang employees, Fairley said.

The program, which typically takes a full-time student a year or more to complete, has a core of six required courses: systems architecture, formal methods, programming methodology, management concepts, software engineering and project management. The students also choose from three elective courses and are required to complete two team projects.

Students at the institute typically have four to five years of work experience in the software field and are in their late 20s or early 30s. Many, but not all, of the students are sponsored by corporations. "They are people who have made the basic decision that they need more education for career advancement" to supervisory positions such as project managers, Fairley said.

"Our people are already good programmers when they get here," Fairley said, adding that admission requirements are rigorous and include a 90-minute interview.

While the school is small and has yet

See SCHOOL page 103

Healthy perks keep turnover low, firms find

Offers include furnished homes, baby bonuses

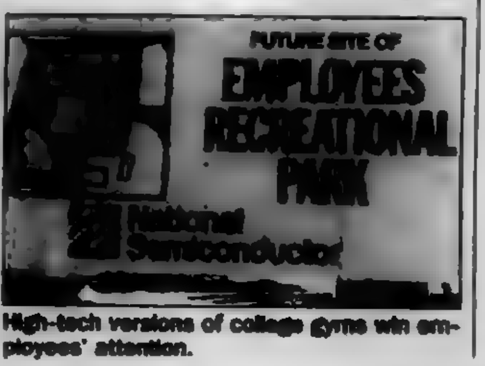
By Kathleen Burton
CW West Coast Bureau

In pre-high-technology eras, a marked parking space near a company's front door, an annual picnic, an insurance plan and a gold watch after 30 years of dedicated service were all an employer had to offer his workers to keep them happy.

Those days are gone forever, at least in the Silicon Valley, according to Craig Justice, a veteran valley headhunter with EDP World, a recruitment agency in San Jose, Calif. "Because there are so many start-ups in the Silicon Valley, there's more job-hopping here than anywhere else in the world," he said. "People only stay with a company two years here on the average."

Because of this employee fluidity, most Silicon Valley-based firms must take a creative approach to luring and retaining a top-notch staff, Justice said. Apple Computer, Inc. in Cupertino, Calif., for example, offers a $500 "baby bonus" for workers who give birth to or adopt a baby; Advanced Micro Devices, Inc. in Santa Clara, Calif., each year raffles away a furnished home to an employee; and Hewlett-Packard Co. sends

See PERKS page 126



High-tech versions of college gyms win employees' attention.

■ AT&T ventures into the disaster recovery field by opening a data security service in Florida and announcing plans for additional facilities throughout the U.S./97

■ After an intense competition among various universities, the U.S. Department of Defense has awarded a $103 million grant to Carnegie-Mellon University to establish a software engineering institute/96

■ Computervision Corp. announced it has realigned the company into five major groups with responsibilities for specific industries/[illegible]

AEA offers ideas for renewing U.S. market strength

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

"'Reduced government spending is more compatible with the goal of increased international competitiveness than higher taxes," the American Electronics Association (AEA) declared in a position paper circulated just prior to the presidential election.

In the paper, titled "Strategies for Innovation, High Technology Industries and International Competitiveness," the AEA reiterated its concern about U.S. industry's "declining international competitiveness in an era of increasing global competition."

But while the AEA embraced the free market, decentralized planning philosophy that the so-called New Right advocates, it lined up closer to the posture of the neoliberals. These, formerly tagged as Atari Democrats, tie entrepreneurial enterprise with the need for limits on government spending on both social and military programs.

Competing successfully

"We cannot successfully compete with Japan and other emerging competitors while almost single-handedly providing a security blanket for the free world," according to the AEA.

National security should rank high, according to the AEA, but national security also requires a strong economy to pay for defense programs and to spur competitiveness in the international arena.

The deteriorating U.S. trade position is highlighted by a seemingly never-ending stream of quarterly reports detailing the declining balance of trade. The AEA sees the decline of the U.S. trade position as being caused by "a combination of complex, interrelated issues, including burgeoning federal budget deficits, excessive civilian and military government spending, an overvalued dollar, foreign targeting, access to foreign markets and export restrictions far greater than those of our competitors."

Rebuilding preeminence

The key to rebuilding America's preeminence on the foreign trade circuit, in the AEA view, is reversing the decline in relative productivity growth.

According to the paper, such a resurgence could be spurred by lowering the cost of capital, increasing the capacity and quality of engineering education and increasing R&D investments.

The AEA was particularly critical of the shift in federal R&D funding to military priorities: "We cannot allocate 70% of federally funded R&D to defense and severely limit U.S. high-technology exports, even in Western trade, without paying a very significant price in terms of competitive strength.

"We cannot siphon off a disproportionate share of our scarce technical resources to military applications and still stay ahead of Japan in commercial markets," the AEA paper stated.

It will be interesting to see if anybody in Washington, D.C., pays attention to a group representing some of the fastest growing industries in the U.S. and worldwide [illegible]

PERSONAL COMPUTER SALES
(Dollar amounts in millions)

	Calendar Year				
	1979	1980	1981	1982	1983
IBM*					
Total sales	$1,000	$1,000	$1,000	$1,500	$ 2,600
Dollar increase				$ 500	$ 1,100
Percent increase				50%	73%
Apple Computer, Inc.					
Total sales	$ 60	$ 165	$ 400	$ 683	$ 1,084
Dollar increase		$ 105	$ 235	$ 283	$ 421
Percent increase		175%	142%	66%	63%
Commodore Business Machines, Inc.					
Total sales	$ 64	$ 99	$ 176	$ 420	$ 969
Dollar increase		$ 35	$ 77	$ 244	$ 549
Percent increase		55%	78%	139%	131%
Radio Shack (Tandy Corp.)					
Total sales	$ 150	$ 220	$ 460	$ 725	$ 945
Dollar increase		$ 70	$ 240	$ 265	$ 220
Percent increase		47%	109%	58%	30%
Other*					
Total sales	$ 626	$ 916	$1,464	$2,692	$ 4,402
Dollar increase		$ 290	$ 548	$1,228	$ 1,710
Percent increase		46%	60%	84%	64%
Totals					
Total sales	$1,900	$2,400	$3,500	$6,000	$10,000
Dollar increase		$ 500	$1,100	$2,500	$ 4,000
Percent increase		26%	46%	71%	67%

* Estimated

IBM compatibility refuted as key to market survival

By David C. Dykstra
Special to CW

First of two parts

There has been an overwhelming amount of discussion that IBM compatibility is necessary for survival, but the facts dispel the myth. The non-IBM world is alive and prospering.

My review of published earnings reports reveals there are now more than 400 publicly held companies in the computer industry. The total number has increased every year since the inception of the industry.

For 1983 vs. 1982 and for the first nine months of 1984 vs. 1983, sales and earnings increases vs. decreases were more than 2:1 for all computer companies, including non-IBM-compatible companies and non-IBM Personal Computer-compatible companies. Computer industry directories indicate an even greater growth for the privately held companies. Here are the facts.

IBM early leader

In the early 1970s, business computers costing less than $100,000 emerged that could operate without a full-time computer programmer on the payroll. IBM was the early leader in this market with its System/32, which included standardized, basic accounting software.

As this market matured, new vendors provided varied customer- and industry-specific software and multiuser capabilities.

The markets became more fragmented and vendor support became more important. IBM virtually abandoned this segment and concentrated on the larger dollar volume — and apparently more profitable — hardware-oriented (as opposed to software- and support-oriented) first market segment.

The pattern in the current under-$10,000 computer market has been repeated: The market emerges and grows; IBM enters the market when it considers market size sufficient; and the experts predict a shakeout. That is where the market is at currently.

Subsequently, the market breaks into new segments or niches, the total dollar volume continues to grow, the number of companies increases and IBM loses total market share.

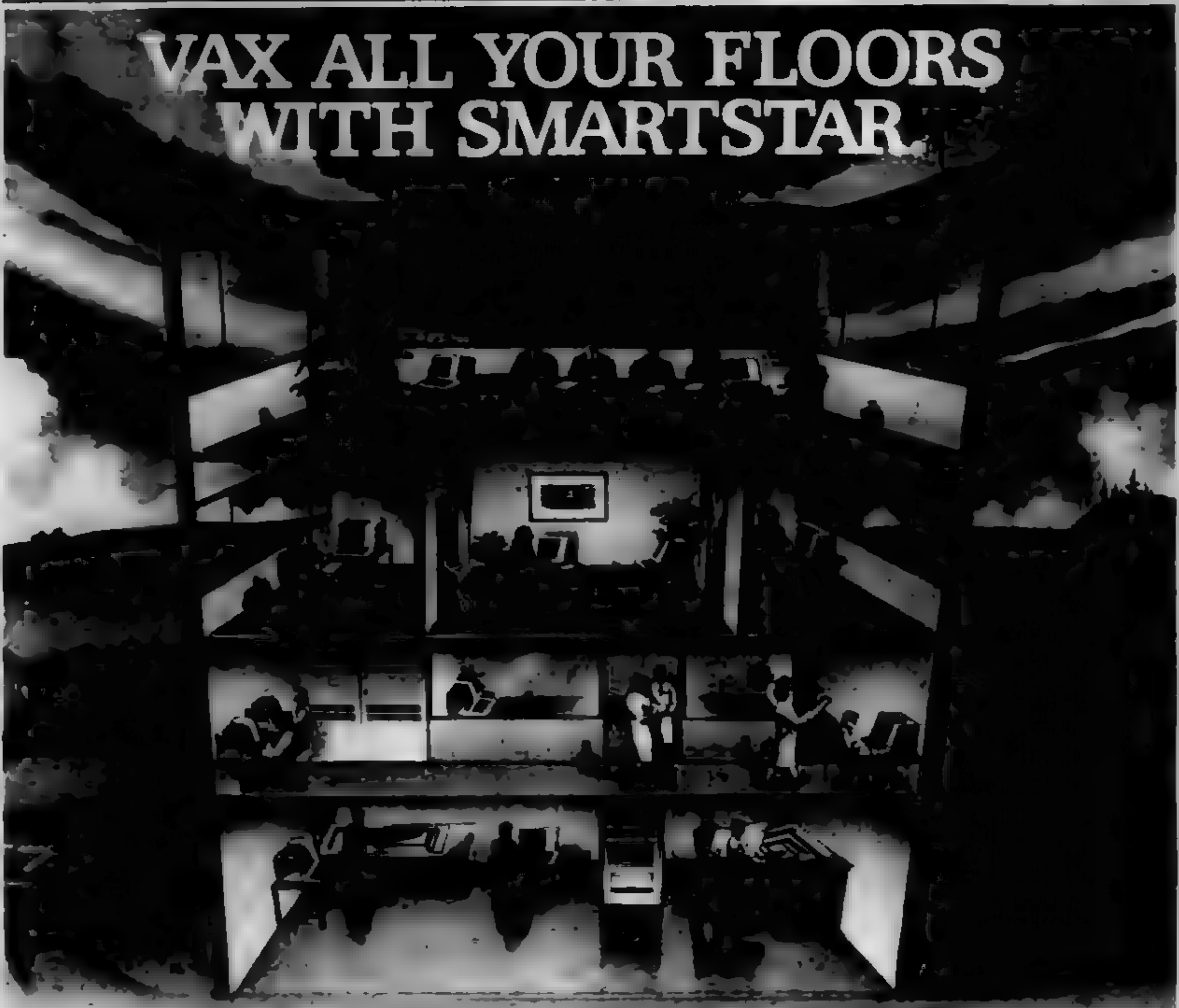
Many U.S. computer companies whose annual sales range from $4 million (0.01% of IBM) to $400 million (1.0% of IBM) are profitably serving many market niches that are too small to be of interest to IBM. These companies obviously cannot afford an IBM-size marketing budget, and the individual markets do not have broad public interest. For both reasons, these companies do not receive much media attention. The marketing campaigns by these companies must be targeted.

Many of these companies are privately held; their owners seem to be content with their low-profile images and their annual personal incomes of $100,000 to $1 million. These types of companies are well represented in the non-IBM-compatible multiuser market.

Because personal computers have received the most media attention and have been the subject of the widest spread myths concerning IBM compatibility, we will direct our at-

See SURVIVAL, page 97

Dykstra is owner and president of Dykstra Consultants, an independent data processing and office automation consulting firm in Newport Beach, Calif. He teaches at the Irvine, Calif., campus of National University and is the author of Computers For Profit, *published by Reston Publishing Co.*



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AT&T branch to expand data security service

JACKSONVILLE, Fla. — A subsidiary of AT&T recently announced the opening of a data security service facility in Maitland, Fla. American Transtech plans to operate underground, hardened facilities in most Standard Metropolitah Statistical Areas (SMSA) around the country. An SMSA is the U.S. Census Bureau designation for metropolitan areas.

The division, based here, said it also has a facility operational for the New York metropolitan area and plans to open several additional sites in 1985, including a facility to serve North and Central Florida that is to open in January.

The data security facilities were designed to provide secure, off-site storage of data processing media. The company said the facilities typically will be underground, two- and three-story structures featuring two-foot steel and concrete exterior walls designed to be waterproof and to withstand significant external pressure.

American Transtech said bonded couriers will handle all media movements. Transportation to and from facilities is currently handled in specially designed, unmarked vans.

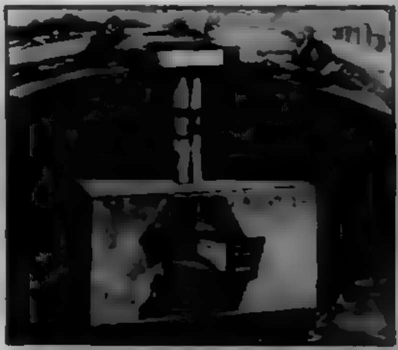
The facilities will be operated round-the-clock, every day of the year to assure client access to data. The company said vault facilities exceed standards set for data storage by various national institutes and associations.

Disaster recovery consulting

Additionally, Transtech Data Security Services will provide disaster recovery consulting for data backup programs. The company said each facility utilizes a tape archival management system providing tape maintenance, cleaning and retensioning on a scheduled basis.

William A. Hightower, president of American Transtech, said the new service "represents a logical extension of business for a company like Transtech, which handles large volumes of highly sensitive financial data for some of America's largest corporations." American Transtech was chartered by AT&T in 1983 to handle all stock and related shareowner services for the divestiture of AT&T and for the resulting new companies.

Transtech Data Security Services' offices are located at 2600 Maitland Center Pkwy., Maitland, Fla. 32751.



An artist's rendering of a typical data security facility that American Transtech planned. Vault facilities reportedly exceed data storage standards.

SURVIVAL

from page 96

tention to the facts in this market.

Some of the recent questions I have been asked pertain to Commodore Business Machines, Inc.'s surprising advertising claim that it sells more personal computer units than anyone else. (Units yes — dollars no.) Many think the IBM Personal Computer buried all the competition.

The fact is that the IBM Personal Computer buried no one and did not even slow down anyone's growth. The Personal Computer created a whole new market, which apparently reflects a large personal computer segment. Many companies have prospered and more new companies have risen than fallen since the Personal Computer was introduced. The failures and slowdowns that have occurred can be attributed to normal product life cycles, product positioning and/or poor management.

The accompanying table on page 96 highlights the growth of the personal computer market segment in total and by the major companies. IBM's figures are estimated because it has not reported consistently for this breakdown, and personal computers are a relatively small portion of its total sales.

The major personal computer companies designated as "Other" in the table include Wang Laboratories, Inc., Hewlett-Packard Co., Digital Equipment Corp., Xerox Corp., Texas Instruments, Inc., Lanier Business Products, Inc., CPT Corp. and Compaq Computer Corp.

This table clearly shows that the ACT (Apple Computer, Inc., Commodore and Tandy Corp.) group's growth in sales has not been adversely affected by the IBM Personal Computer's introduction. All these companies feature non-IBM-compatible systems. Tandy, however, has started to promote an IBM-compatible line (and its overall growth has slowed). Apple, on the other hand, seems to be doing well with the non-IBM-compatible Macintosh.

Next week: the quiet demise of the IBM 5120 "impersonable" computer.

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Carnegie-Mellon wins DOD grant for project

By Tom Neudecker
Special to CW

PITTSBURGH — Richard D. De Lauer, undersecretary of the Department of Defense for Research and Engineering, recently announced a grant to establish a Software Engineering Institute (SEI) at Carnegie-Mellon University. The award of the $103 million, five-year contract concludes nearly one year of competition, discussion and politicking by several universities.

"The center is intended to make DOD computer systems more reliable; . . . these are problems of national significance," said Dr. Angel Jordon, provost of Carnegie-Mellon and member of the team that prepared the university's proposal.

The institute will provide some 250 jobs, 70% of which will be scientists and engineers. Carnegie-Mellon President Richard Cyert predicted that SEI will eventually result in more than 10,000 new jobs in related projects.

Hope for regional economy

Cyert heralded the announcement as an important step in improving the "Steel Valley" regional economy, which has been severely impacted by the decline of the U.S. steel industry. "I really believe that we're going to see important changes in the economy as a result of this; I see this snowballing and I don't think I am being overly optimistic," Cyert said.

To help recruit top engineers to the project, the university has secured support from several of Pittsburgh's corporations to fund professorships. This new talent is expected to provide consultation to the 400 high-technology firms already in Pittsburgh and to those expected in the future.

One of the goals of the project is to develop generic programming approaches that will allow easy interface of new program modules to future programs. These new programming tools should provide an environment that decreases the development time of software. Additionally, SEI will modify and improve existing software for the DOD.

Intense competition

Competition for the award was intense. Insiders said the competitors included the University of Maryland, Wright State University of Ohio, Texas A&M University and a consortium of other Texas schools, the University of California at Berkeley and a consortium of other California schools and Northeastern University of Boston.

Each of the competitors attempted to include local business and political support in their proposals, just as the University of Texas did in its winning proposal for the contract to establish a center for microelectronics and computer technologies in order to develop a rival to Japan's Fifth-Generation Computer Project.

The SEI project joins Carnegie-Mellon's other programs in magnetic storage, microcomputer research and robotics development. The university also intends to convert the abandoned Jones & Laughlin Steel Corp. mill in Pittsburgh into a robotics research and manufacturing center.

Neudecker, a free-lance writer based in Pittsburgh, is a frequent contributor to Computerworld.

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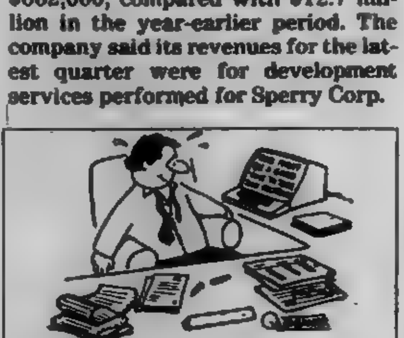
Trilogy posts $5.3 million quarterly loss

CUPERTINO, Calif. — Trilogy Ltd., which in the past year has abandoned its efforts to produce a supercomputer and to develop wafer-scale integration semiconductor technology, reported a loss of $5.3 million for the quarter ended Sept. 29.

The loss, amounting to 14 cents a share, compares with a loss of $1.2 million, or 8 cents a share, for the corresponding period a year earlier. The company further reported that year-to-date losses have totaled $79 million. Those losses include a $43 million write-down in the second quarter related to the company's decisions to discontinue development of a large-scale IBM-compatible computer system, development of its semiconductor manufacturing operations in Cupertino and Ireland and the wafer-scale technology project.

Revenue for the quarter was $662,000, compared with $12.7 million in the year-earlier period. The company said its revenues for the latest quarter were for development services performed for Sperry Corp.



FORECASTS AND FINDINGS

PBX users rate Rolm tops

FRAMINGHAM, Mass. — Rolm Corp. finished ahead of AT&T in a recent survey of private branch exchange (PBX) end users who plan to purchase a replacement digital PBX during the next year to 18 months.

The study by the Market Information Center, Inc., a market research company here, found that 30% of the respondents said they planned to install replacement systems manufactured by Rolm, while 20% listed AT&T as the likely choice. Northern Telecom, Inc. and NEC Corp. were tied with 10.7% each.

Rolm was also the top choice among users who said their organizations planned to add a system, with 41.7% picking Rolm and 35% choosing AT&T.

The survey, priced at $295, is available from the Market Information Center, Suite 350, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Chip vendors to up spending

NEW YORK — U.S. manufacturers of semiconductor devices plan to increase spending for automating their production processes by about 30% a year through 1993. Spending for automation will increase from a projected $83 million this year to $1.1 billion in 1993, according to a recent study from Frost & Sullivan, Inc.

The study, "The Automated Semiconductor Wafer Fabrication Market in the U.S.," concluded that U.S. chip makers are being spurred toward increased automation as a result of cost pressures from their highly automated Japanese counterparts as well as the need for enhanced quality control.

Automation of the wafer fabrication process is just one area of a pattern of increased capital spending by chip makers. The study estimated that Intel Corp., Texas Instruments, Inc. and IBM will allocate $300 million each in capital spending in 1984.

The study is available for $1,550 from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Distribution channel emerging

DALLAS — Microcomputer manufacturers elbowing for shelf space are finding office product dealers are emerging as an alternative distribution channel, according to the "Office Products Dealers Survey: 1984," a nationwide study of 1,400 office products dealers.

The survey by Future Computing, Inc., an industry research firm here, estimated that $800 million of personal computer products will be handled by office products dealers in 1984. That figure is expected to increase to $3.5 billion by 1989.

Among other information, the report profiles both the typical dealer and the dealer that carries personal computer products. The profiles cover revenue, revenue and profit mix, purchasing methods, typical customers and sales personnel.

Priced at $1,500, the survey is available from Future Computing, 8111 LBJ Freeway, Dallas, Texas 75251.

Survey: Training level low

FRAMINGHAM, Mass. — More than 60% of companies contacted in a recent survey offered no level of training for their personal computer users, according to International Data Corp. (IDC), a market research firm here.

The study, "PC Training Issues for Managers and Professionals," projected that annual revenue for micro training products designed for business use will reach $616 million by 1990, up from $27.8 million in 1982.

The report is available for $195 from IDC, 5 Speen St., Framingham, Mass. 01701.

Computervision regroups

BEDFORD, Mass. — Computervision Corp., a manufacturer of computer-aided design and manufacturing systems, recently announced a major corporate realignment, including the establishment of five major groups with responsibilities for specific industries.

Under the realignment, Computervision will be restructured into five-groups, each to be headed by a group executive. James Berrett, president and chief executive officer, said the move is centered on "the concept of decentralized operations organized under major groups to serve specific industries."

Berrett called the realignment "a critical step for Computervision in growing to a billion dollars in annual sales in the next few years." The company reported revenues for the fiscal year ended Sept. 30 of $504 million.

The five units will consist of the North America Group, headed by Robert Gothie, vice-president; the Business Development Group, headed by Peter Chiasso, division vice-president; the International Group, headed by Karl Geng, vice-president; the Product Group, headed by Richard Paulson, vice-president; and the Operations Group, headed by Robert Callaway, vice-president.

All five executives formerly held the titles of division general managers.

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5 NICKELS AND DIMES 10¢

Centronics Data Computer Corp. announced revenues for the third quarter of fiscal year 1984 of $41.8 million, compared with $38.9 million for the comparable period one year earlier. Net loss for the quarter was $1.2 million, or 11 cents per share, compared with a net loss $2.1 million, or 19 cents per share, for the comparable quarter one year ago.

■

Key Tronic Corp. reported revenues for its first quarter of fiscal year 1985, ended Sept. 22, of $1.5 million, compared with $28 million for the like period one year earlier. Profits were $1.8 million, or 21 cents per share, compared with $2.6 million, or 30 cents, for the comparable quarter one year earlier.

■

Western Union Corp. reported a net loss of $15.5 million for the third quarter ended Sept. 30, or 80 cents per share, compared with a profit of $16.6 million, or 60 cents per share, for the same quarter one year ago. Revenues were $300 million, compared with $845 million for the same period one year earlier.

■

Daisy Systems Corp. announced that profits for the fiscal year ended Sept. 30 were $11 million, or 73 cents per share, compared with $2.5 million, or 19 cents per share, for the like quarter last year. Revenues were $69.1 million, compared with $17.4 million for the corresponding quarter one year ago.

AGS Computers, Inc. announced third-quarter revenues of $56.1 million, compared with $38.7 million for the like quarter last year. Profits were $1.7 million, or 34 cents per share, compared with $1.5 million, or 34 cents per share, for the comparable period one year earlier.

■

Fortune Systems Corp. reported revenues of $16.7 million for the third quarter ended Sept. 30 — an 85% increase over the $9 million for the same fiscal period last year. A net loss of $3.6 million, or 17 cents per share, was posted, compared with a loss of $9.1 million, or 40 cents per share, for the same quarter last year.

■

Equitable Life Leasing Corp. achieved revenues for the third quarter ended Sept. 30 of $31.1 million, compared with $22.5 million for the like period one year earlier. Profits were $2 million, compared with $1.4 million for the same quarter last year.

■

Uccel Corp. announced profits for the three months ended Sept. 30 of $2.1 million, or 13 cents per share, compared with $224,000, or 1 cent per share, for the same period one year ago. Revenues were $42.7 million vs. $38 million a year earlier.

■

Science Management Corp. reported profits of $22,000, or 1 cent per share, for the quarter ended Sept. 30, compared with $188,000, or 7 cents per share, for the third quarter last year. Revenues were $16.2 million, compared with $14.7 million for the same period one year earlier.

■

M/A Com, Inc. announced fourth-quarter profits of $12.8 million, or 30 cents per share, compared with $8.9 million, or 21 cents per share, for the comparable quarter one year earlier. Revenues were $214.2 million, compared with $184.8 million for the like period last year.

■

Protocol Computers, Inc. reported fourth-quarter profits of $62,200, or 1 cent per share, compared with $559,000, or 12 cents per share, for the like period one year earlier. Revenues were $4 million, compared with $3.9 million for the same quarter last year.

■

MPI Systems, Inc. announced second-quarter results of $45,535, or 1 cent per share, compared with $319,201, or 6 cents per share, for the corresponding period one year earlier. Revenues were $2.8 million, compared with $2.6 million for the prior year.

■

Voicemail International, Inc. reported a third-quarter loss of $540,412, or 18 cents per share, compared with a loss of $540,659, or 40 cents per share, a year ago. Revenues were $556,349, compared with $283,973 in the corresponding quarter one year earlier.

■

Wicat Systems, Inc. reported revenues for the fiscal quarter ended Sept. 30 of $6.5 million, compared with $3.2 million in the like period one year earlier. Loss for the quarter was $1.7 million, or 9 cents per share, compared with a year-earlier loss of $3.5 million, or 18 cents per share.

■

Applied Computer Techniques announced revenues for the first six months ended Sept. 30 were $46.4 million, compared with $26 million in the prior year. Profits were $4.9 million, or 46 cents per share, compared with $2.3 million, or 22 cents per share, for the comparable period one year earlier.

■

Lexidata Corp. reported revenues for the fourth quarter were $10.2 million, compared with $8 million for the comparable quarter one year ago. Profits were $243,000, or 4 cents per share, compared with $88,000, or 2 cents per share, in the like period one year earlier.

■

Cray Research, Inc. reported revenues of $71.6 million for the third quarter ended Sept. 30, compared with $31.3 million for the prior year's quarter. Profits were $19.5

See NICKELS page 102

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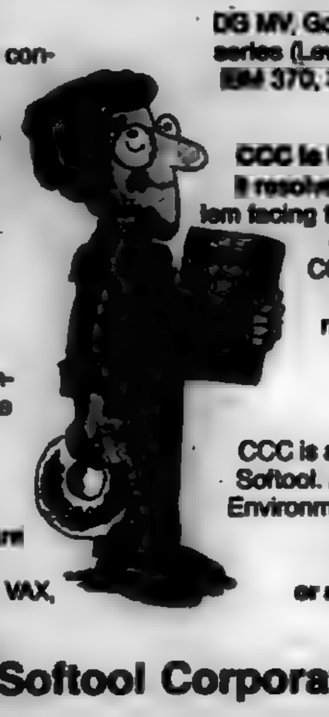

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EXECUTIVE CORNER

The board of directors at Telco Systems Management, Inc. announced it has appointed the following: **Roy Curtis**, president; **James Ormsbee**, executive vice-president; **Denese Gordon**, vice-president; **Thomas Hepler**, vice-president of marketing; and **Robert Edwards**, secretary-treasurer.

■

Michael Bernath has been named president and general manager of Gould, Inc.'s Systems Protection Division in Horsham, Pa.

■

Jerome Meyer will join Varian Associates, Inc. in the newly created position of president and chief operating officer. Meyer previously worked for Honeywell, Inc.'s Information Systems. Also announced were the following executive appointments: **George Caryotakis** will move from president of Electron Device Group to assistant to the president and, eventually, to managing director. **Norman Pond** will join the firm as president of the Electron Device Group.

■

Roger Gower, formerly of Qume Corp., has been named president and chief operating officer of Miniscribe Corp.

■

Robert Prether has been promoted to vice-president and general manager for the Cipher Data Products, Inc. High-Performance Peripherals Division.

NICKELS

from page 100

million, or $1.32 per share, compared with $2.8 million, or 19 cents per share, in the corresponding period one year earlier.

■

Micom System, Inc. for the second quarter reported revenues of $43.2 million, an increase of 44% over the $30.1 million announced in the like period one year ago. Profits were $6.3 million, or 41 cents per share, compared with $4.7 million, or 31 cents per share, in the prior year.

■

Lotus Development Corp. announced that profits for the third quarter ended Sept. 29 were $9.1 million, or 57 cents per share, vs. 1983's third-quarter profits of $4.7 million, or 35 cents per share. Revenue was $45.6 million, compared with $16.4 million for the corresponding period last year.

■

Emulex Corp. reported a first-quarter fiscal 1985 revenue of $24.1 million, an increase of 60% over last year's $15.1 million. Profits were $2.3 million, or 18 cents per share, compared with $2.9 million, or 21 cents per share, in the corresponding quarter one year earlier.

■

Altos Computer Systems, Inc. announced that revenue for the first quarter of fiscal 1985 was $33.3 million, an increase of 84% compared with $18.1 million the same quarter one year ago. Profits were $3.7 million, or 25 cents per share, compared with $1.1 million, or 8 cents per share, in the like period one year earlier.

■

Harris Corp. reported that profits in the first quarter of its 1985 fiscal year increased 38% to $25.3 million, or 63 cents per share, compared with $18.4 million, or 46 cents per share, in the corresponding quarter one year ago. Revenue was $511.7 million, compared with $432.5 million in the year-earlier period.

■

Computervision Corp. announced revenues for the third quarter ended Sept. 30 of $137.1 million, compared with $104 million in the like quarter one year ago. Profits were $11.1 million, or 39 cents per share, compared with $9 million, or 32 cents per share, for the same quarter one year earlier.

■

Data I/O Corp. reported revenues for the third quarter ended Sept. 30 of $10.5 million, compared with $10.1 million for the like quarter last year. Profits were $1.7 million, or 21 cents per share, compared with $1.8 million, or 26 cents per share, for the same period one year ago.

■

Zitel Corp. announced profits for its fourth quarter of $362,000, or 7 cents per share, on revenues of $7.1 million.

■

Automatix, Inc. reported a third-quarter loss of 40 cents per share on a revenue of $5.4 million. This compared with a net loss of 1 cent per share for the same quarter of last year on a revenue of $3.7 million.

■

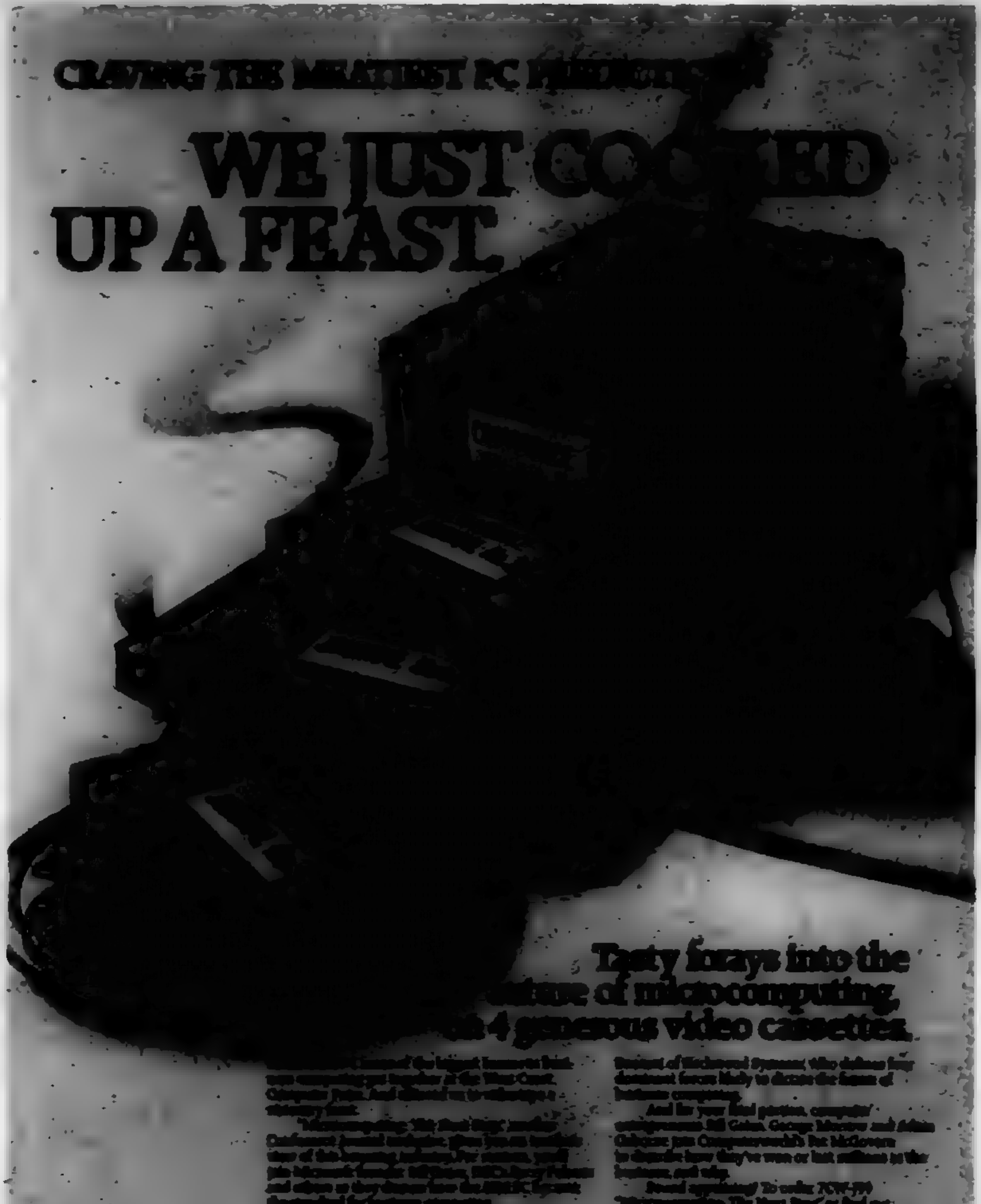
General Automation, Inc. announced that revenues for the fourth quarter ended July 28 were $19.8 million, compared with $16.1 million for the like period one year ago. A net loss of $2.4 million, or 91 cents per share, was also reported, compared with a net loss of $2.7 million, or $1.04 per share, in the corresponding quarter last year.

■

Gearad, Inc. reported a net loss of $1.6 million, or 10 cents per share, for the third quarter, compared with a net income of $4 million, or 26 cents per share, in the comparable period last year. Revenue was $52.7 million, compared with $54.8 million for the corresponding period last year.

■

Computer Identics Corp. announced that for the third quarter ended Sept. 30 revenues were $2.5 million, compared with $1.4 million in the like quarter one year ago. Profits were $196,000, or 5 cents per share, compared with a loss of $19,000, or 2 cents per share, for the comparable period one year earlier.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MERGERS AND ACQUISITIONS

Data I/O Corp. and **Futurenet Corp.** jointly announced they have entered into an agreement in principle for Data I/O to acquire all of Futurenet's outstanding shares in exchange for 2.16 million shares of unregistered Data I/O common stock.

The acquisition will be accomplished through the merger of a Data I/O subsidiary and Futurenet and will be accounted for as a pooling of interests.

The transaction depends on execution of a definitive merger agreement and approval of two-thirds of Futurenet's shareholders.

■

Zitel Corp., San Jose, Calif., announced that the company has acquired **Gifford Computer Systems, Inc.**, San Leandro, Calif., for 250,000 shares of Zitel common stock. Gifford will operate as an autonomous subsidiary of Zitel.

■

Basix Corp., New York, announced it has agreed to acquire **Multisonics, Inc.**, Dublin, Calif., for a maximum purchase price of $5.25 million, including payments contingent upon future revenue of Multisonics, up to a maximum of $4.5 million, and a payment of $750,000 at closing.

Basix said that the purchase price, substantially contingent upon Multisonics' product sales over the next five years, is payable in Basix common stock.

■

Printronix, Inc., Irvine, Calif., announced that it has completed the acquisition of **Anadex, Inc.**, a privately held California-based company. The acquisition was completed through a merger of Anadex into a newly formed, wholly owned subsidiary of Printronix in exchange for 380,948 shares of Printronix common stock. The subsidiary will continue to conduct business with its former management under the name Anadex, Inc.

■

Computer Power Systems Corp., Carson, Calif., has become a wholly owned subsidiary of **Emerson Electric Co.**, St. Louis. Terms of the acquisition were not available.

Wang Institute photo

Wang students rarely have to wait in line to access computer equipment.

SCHOOL

from page 95

to earn the reputation of an MIT or Stanford University, its small size is a plus to some students. "I chose Wang because there was clearly a concern about me as a person and how I could develop into an excellent software engineer," said Susan Cardwell, a recent graduate who now works as a software development engineer at Hewlett-Packard Co. in Waltham, Mass., which sponsored her studies.

The school is equipped with an assortment of computer hardware and software, much of it from corporate donors. The systems include two Digital Equipment Corp. VAX systems, one running the AT&T Unix operating system and the other running VMS; a Prime Computer, Inc. 750; Wang VS100; and Apollo Computer, Inc. DN Domain Processing System. There are also a dozen or more different microcomputers for student use.

"We are a very rich computing environment," Fairley noted. "Students never have to wait in line to get access to computer equipment."

The master's program in software engineering is the only program so far in the institute's School of Information Technology, according to Fairley.

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PERKS

from page 96

its staff on a six-week, fully paid sabbatical every four years.

But several Silicon Valley companies have discovered that another way to win the talents and loyalties of today's fitness-conscious workers is with a high-tech version of the college gymnasium.

Jean Hollands, a psychologist at the Good Life Center in Los Altos, Calif., specializes in helping corporate clients at IBM, HP and AT&T combat what she calls "high-tech stress." Employee fitness and image-building are becoming increasingly important corporate priorities, Hollands said. "High-ticket recreation centers help companies reduce the toll that smoking, stress and [being] overweight takes on its workers and lets companies say 'I value you,' to employees. Basically, when people feel better about themselves, they do a better job."

National Semiconductor President Charles Sporck (far right) leads area politicians and others through National Semi's employee recreational park.

According to Robert Levering, coauthor of the best-selling book *The 100 Best Companies to Work For In America*, the bottom line is return on investment rather than corporate humanism. But, Levering said, "Because these facilities definitely lower staff turnover, companies gain from higher employee productivity and increased profits. It's a win-win situation."

Computerworld took a look at four companies in the Valley who have chosen this route and found out why.

■ **Rolm Corp.** Rolm's three-acre headquarters in Santa Clara, Calif., nicknamed "the campus" by envious outsiders, typifies most people's vision of the mellow California work style. The company's $1.5 million employee recreation center, built after employees voted for it over their annual Christmas party in 1980, boasts two heated swimming pools, a sauna, several Jacuzzis, a steam room, tennis and racquetball courts, an indoor track, a full-size basketball gymnasium and a mirrored hall for fitness and martial arts classes.

According to Rolm spokesman Ken Rowe, because of the center, staff turnover has decreased to half that of the rest of the Valley.

On one afternoon, Jim Weisert, Mark Lyon and Bill Kirsch, three engineers with Rolm's technical group, relaxed on lawn chairs near Rolm's outdoor pool after jogging and swimming. "I love coming here," Weisert said over the noise of a spirited game of water polo. "It motivates me to work harder." Kirsch added, "I think the ambience here helps Rolm keep younger people. All this would definitely make it hard for me to leave."

■ **National Semiconductor Corp.** On Sept. 29, Charles Sporck, National Semiconductor's chief executive officer, and Frank Deal, National Semi's recreation park manager, formally cut the ribbon on the company's 14-acre, multimillion-dollar Employee Recreation Park, a dream of Sporck's and Deal's since 1968.

"When it's finished," Deal said, "it will be the pride of the Valley. It's a park for those who want to [play] sports and for those who just want to sit by the lake and get some sun. I think everybody here at National [Semi] will use it."

The park, surrounded by 1,000 Burn trees, boasts a lighted baseball field, landscaped paths, an amphitheater with a sound system, a 1.3-acre lake, several picnic areas, a one-mile jogging course and a central green for sports.

■ **IBM.** Paid for out of corporate coffers, IBM in 1980 converted 17 acres of fields and orchards at its San Jose, Calif., manufacturing plant into an employee recreation area with softball, basketball, volleyball, tennis and shuffleboard courts, picnic gazebos and a ¼-mile asphalt running track.

Ken Hollenbacher, IBM's manager of recreation services, estimated that 20% of the company's 10,000 West Coast employees use the recreation area regularly and said that usage is up 50% over the last two years. "Employees want to stay healthy," Hollenbacher said. "Corporate headhunting is so competitive now that companies must offer these kinds of things. IBM is no exception." IBM has just added $180,000 to the next phase of the project, he added, and will build lighted tennis courts and another softball field by mid-1985.

■ **Tandem Computer Corp.** "Employees spend a lot of time here, and we want to give something back to them," said Gina Burr, a spokeswoman for Tandem. The company gives the "something" back in the form of a four-building, 442,000 sq-ft athletic complex perched amid several acres of prime Santa Clara land. The complex includes tennis courts, a golf course, a weight room and a full-size lap pool, Burr said.

According to Tandem legend, the company's enlightened personnel policies go back to founder James Treybig, who modeled the company's corporate philosophy on the Japanese concept of "heiwa," or a state of tranquillity, Burr said. "We make sure the perks here are for all employees, not just top executives."

Tandem's turnover rate has decreased 20% since Tandem refurbished the buildings in 1979, according to Burr.

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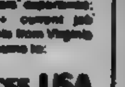

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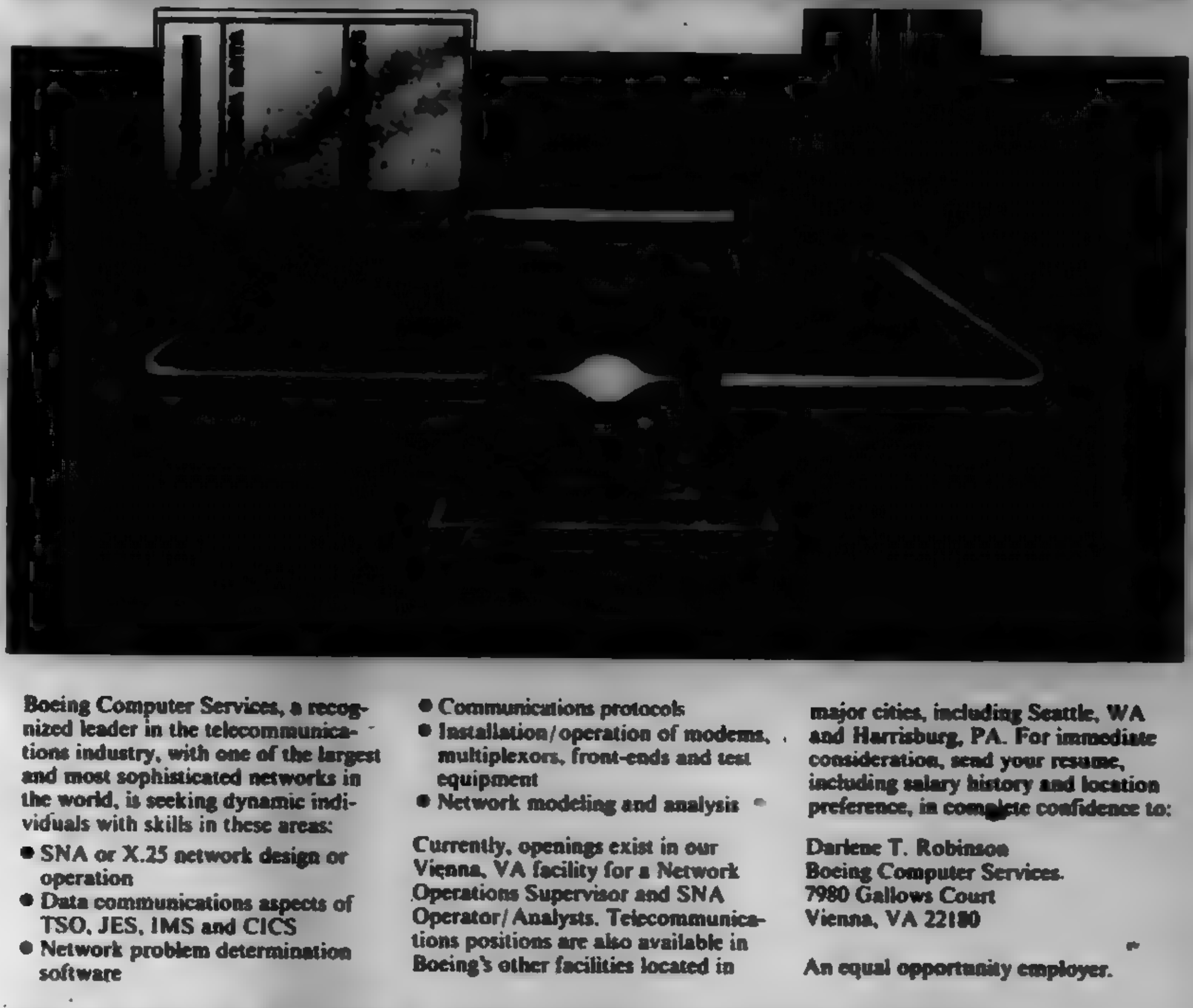

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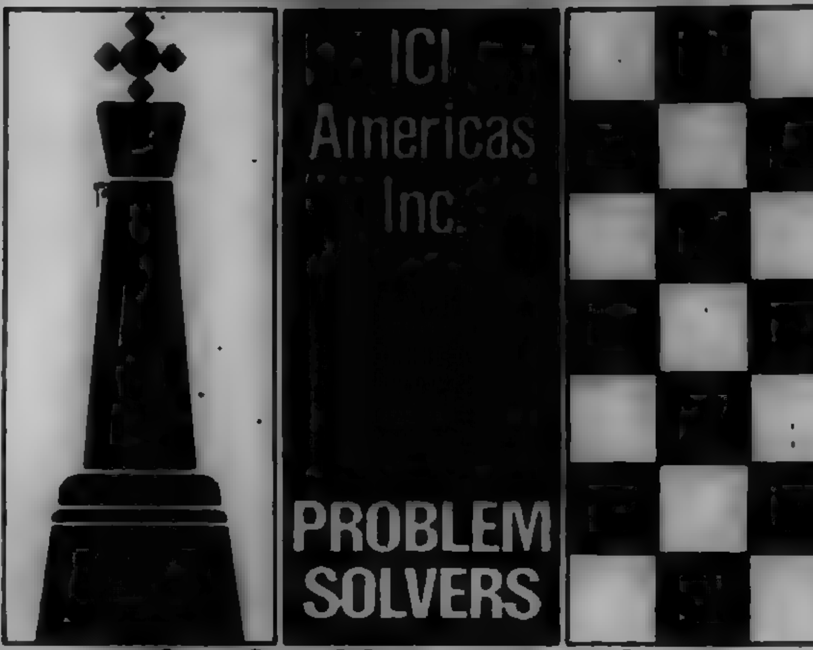

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IBM

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4321	0.25	1	3083E	4.2	8 to 32
•4333-1	0.25	0.5 to 1	3083EX	4.4	8 to 32
4331-11	0.38	1 to 2	3033N	4.3	4 to 16
4331-2	0.50	1 to 4	3033UP	5.0	4 to 24
4341-9	0.52	1 to 4	3083B	6.3	8 to 32
4341-10	0.75	2 to 4	3083BX	6.6	8 to 32
4341-1	0.88	2 to 4	•3083CX	3.3	8 to 32
4341-11	1.1	2 to 8	3083J	8.4	8 to 32
4361-4	1.15	2 to 12	3083JX	8.8	8 to 32
3031	1.2	2 to 8	3033MP	8.5	8 to 32
4361-5	1.45	2 to 12	3033AP	8.5	4 to 24
4341-2	1.5	2 to 16	3081D	10.0	16 to 32
4341-12	1.85	2 to 16	3081G	11.0	16 to 48
3031AP	2.0	2 to 8	3081GX	11.9	16 to 64
4381-1	2.1	4 to 16	3081K	14.0	16 to 48
3032	2.5	2 to 8	3081KX	15.5	16 to 64
4381-2	2.7	4 to 32	3084G	26.6	32 to 96
•4381-3	4.0	8 to 32	3084QX	28.7	32 to 128
3033S	2.9	4 to 16			

• First installation 1985

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SYSTEMS	MIPS	MEGABYTES
470V/7A	4.5	8 to 32
470V/7	5.5	8 to 32
470V/8	6.5	8 to 32
5840	8.4	16 to 64
5850	11.6	16 to 64
5860	14.0	16 to 64
5867	22.0	24 to 64
5868	22.0	32 to 128
5870	26.8	16 to 64
5880	36.6	32 to 128

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SYSTEMS	MIPS	MEGABYTES
AS/6650	2.4	4 to 16
AS/8023	2.9	4 to 32
AS/8043	5.2	8 to 32
AS/8053	6.5	8 to 32
AS/8063	8.4	16 to 32
AS/9040	7.2	8 to 48
AS/9050	9	8 to 48
AS/9060	11.2	16 to 64
AS/9070	16.2	16 to 64
AS/9080	20	16 to 64

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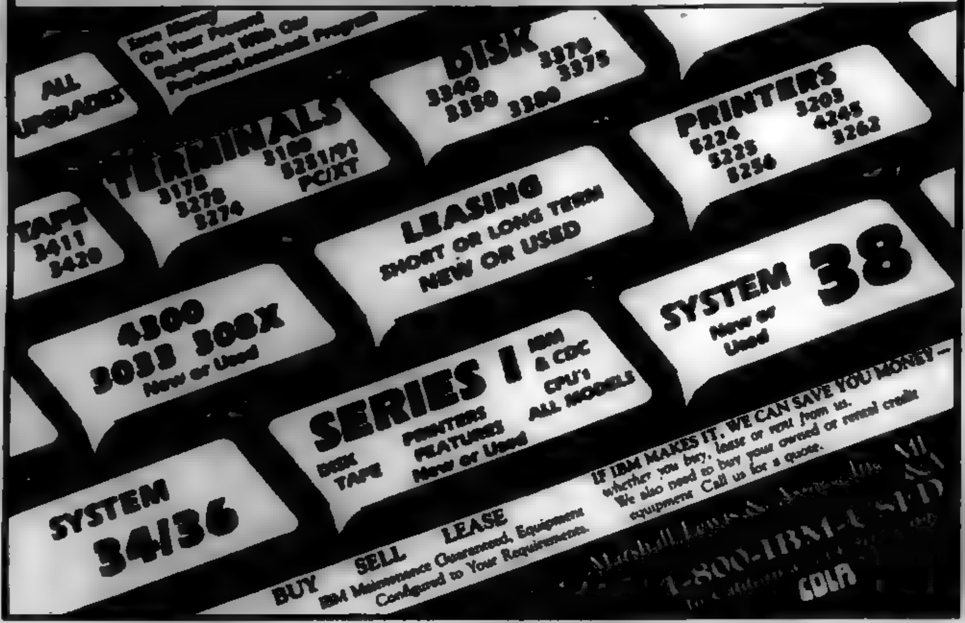

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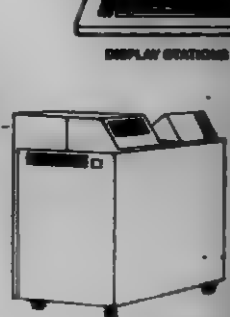
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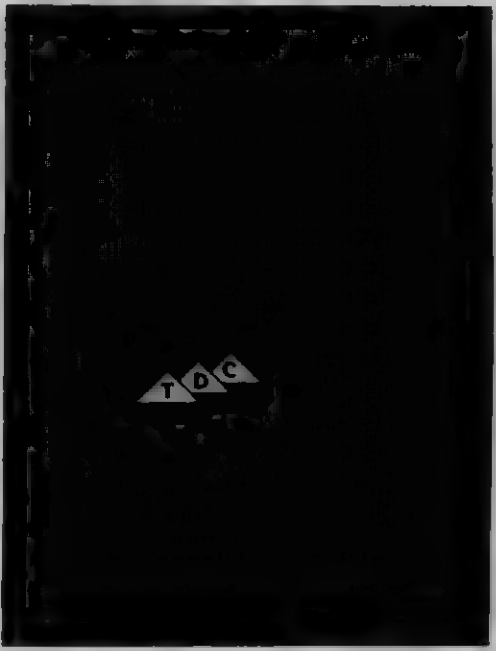

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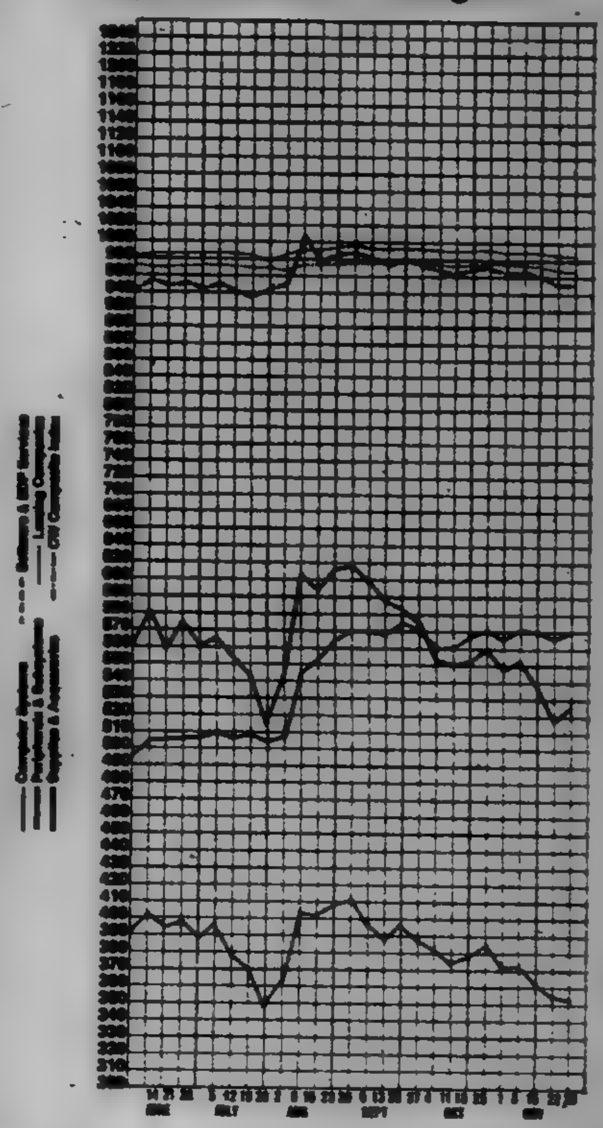
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 28, 1984

All statistics compiled
computed and formatted
by
TRADE QUOTES INC
Cambridge Mass. 02139

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 28 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	7- 26	8 1/8	+1	+14.0
O	ALTOS COMPUTER SYST	8- 21	8 1/8	- 1/4	-2.9
A	AMDAHL CORP	11- 28	11 1/8	+ 7/8	+8.4
O	APPLE COMPUTER INC	18- 63	28 7/8	+4	+16.0
N	AT&T	15- 21	18 3/8	+ 1/4	+1.3
N	BURROUGHS CORP	44- 58	54 7/8	+1 3/8	+2.5
O	COMPAQ COMPUTER CP	4- 13	4 1/2	- 1/4	-5.2
O	COMPUTER AUTOMATION	4- 17	4 3/8	+ 1/4	+6.0
A	COMPUTER CONSOLES	6- 25	8 3/8	+ 1/4	+3.0
N	CONTROL DATA CORP	28- 62	34 3/8	- 1/4	-0.7
O	CONVERGENT TECHNOL	6- 41	8 7/8	- 1/4	-4.0
N	CRAY RESEARCH INC	39- 58	51 1/4	+ 3/8	+0.8
O	DAISY SYSTEMS CORP	14- 28	25	+1 1/2	+6.1
N	DATA GENERAL CORP	27- 59	54 1/8	+1	+1.9
N	DATAPOINT CORP	14- 31	17	+2 3/8	+16.2
N	DIGITAL EQUIPMENT	84-130	108 7/8	+4 3/8	+4.3
A	EECO INC	12- 16	13 3/8	+ 1/8	+0.9
N	ELECTRONIC ASSOC.	3- 13	3 1/2	0	0.0
N	FLOATING POINT SYST	19- 64	23 3/4	-1 1/8	-4.6
N	FOXBORO	30- 47	30 1/8	- 3/8	-1.2
O	GENERAL AUTOMATION	0- 16	3 1/2	0	0.0
N	GOULD INC	21- 40	28 3/4	+ 1/8	+0.4
N	HARRIS CORP	25- 48	28 3/8	+ 7/8	+3.0
N	HEWLETT-PACKARD CO	33- 48	33 1/8	+1 1/8	+3.5
N	HONEYWELL INC	46- 69	57 3/8	- 7/8	-1.5
N	IBM	109-134	123 1/8	+3 1/8	+2.6
O	IPL SYSTEMS INC	3- 14	1 5/8	- 1/8	-7.1
N	ITT CORP	21- 47	27 1/8	+1 1/8	+4.3
N	M/A-COM INC	13- 38	18	+ 5/8	+3.5
O	MANAGEMENT ASSIST	3- 35	27 3/8	+ 3/8	+0.3
N	MATSUSHITA ELEC(ADR)	85- 88	87 1/2	0	0.0
O	MODULAR COMPUTER SYS	6- 16	6 1/2	- 1/8	-1.9
O	MOHAWK DATA SCI	3- 17	10 3/4	+ 1/8	+0.9
N	MOTOROLA INC	30- 48	31 7/8	-2 1/8	-6.3
N	NAT'L SEMICONDUCTOR	11- 30	11 1/8	+ 1/4	+2.3
N	NBI INC	13- 36	14 7/8	-1 1/4	-7.7
N	NCR	22- 34	25 7/8	+ 1/8	+0.5
N	PERKIN-ELMER	19- 37	25 3/8	+1 1/8	+4.6
N	PRIME COMPUTER INC	11- 26	16 1/4	0	0.0
N	SPERRY CORP	35- 50	37 3/4	+ 1/2	+1.3
O	STRATUS COMPUTER INC	8- 17	9 1/2	+ 1/4	+2.7
O	TANDEM COMPUTERS INC	15- 40	18 1/4	+1 1/8	+6.5
N	TANDY CORP	24- 42	24 3/8	- 1/4	-1.0
O	TELEVIDEO SYSTEMS	2- 41	2 7/8	- 1/8	-4.1
O	TELXON CORP	8- 17	13 3/4	- 1/8	-1.3
N	TEXAS INSTRUMENTS	101-160	118 3/8	-3	-2.4
A	ULTIMATE CORP	10- 24	13	+ 1/4	+1.6
O	VECTOR GRAPHICS INC	0- 9	1/8	0	0.0
A	WANG LABS "B"	24- 42	27 3/8	+ 1/2	+1.8
A	WANG LABS "C"	24- 42	27 3/8	+ 1/8	+0.4
N	XEROX CORP	35- 51	38	+1 3/8	+4.4
	LEASING COMPANIES				
O	[illegible] FINANCIAL CP	10- 22	20 1/4	- 1/2	-2.4
A	CPI CORP	4- 10	6 1/2	+ 1/2	+8.3
N	COMDISCO INC	9- 48	8 7/8	-2 3/8	-21.1
O	CONTINENTAL INFO SYS	5- 16	6 1/4	- 3/4	-10.7
N	DPF INC	10- 16	10 1/4	- 1/8	-1.2
O	FINALCO GROUP INC	4- 12	4 1/8	- 1/8	-2.9
O	PHOENIX AMERICAN INC	4- 17	3 7/8	- 1/8	-3.1
O	SELECTERM INC	10- 21	9 1/2	0	0.0
N	U.S. LEASING	30- 44	38 1/4	-1 1/8	-2.8
	COMPONENTS				
N	ADVANCED MICRO DEV	20- 46	27	-2	-6.8
O	ADV'D SEMICONDUCTOR	15- 30	13 1/4	- 3/4	-4.8
N	ANALOG DEVICES INC	20- 38	30	+1 1/8	+3.9
O	ANALOGIC CORP	10- 21	18 1/2	+ 3/4	+4.2
N	APPLIED MAGNETICS CP	9- 37	9 1/8	+ 1/8	+1.3
O	[illegible] CORP	4- 13	8 7/8	+ 1/8	+1.4
O	MICRO MASK INC	10- 19	10 1/8	- 1/8	-1.2
N	TERADYNE	22- 39	24 5/8	+1 1/2	+6.4

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EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 28 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 6	2 1/8	0	0.0
N	ADVANCED SYSTEMS INC	10- 20	12 7/8	- 1/8	-0.9
O	AGS COMPUTERS INC	10- 22	16 3/8	+ 5/8	+4.0
O	AMERICAN SOFTWARE	13- 28	13 1/2	+ 1/2	+3.8
N	ANACOMP INC	2- 13	2 7/8	- 1/8	-4.2
O	ANALYSTS INTL CORP	8- 17	9	+ 1/8	+1.4
A	APPLIED DATA RES	20- 37	27 1/8	- 3/8	-1.3
O	ASHTON TATE	6- 19	4 3/4	+ 1/8	+2.6
O	ASK COMPUTER SYSTEMS	12- 21	17	+1	+6.2
O	[illegible] CORP INC	1- 7	1 1/8	0	0.0
N	AUTOMATIC DATA PROC	30- 41	36 1/8	- 1/2	-1.3
O	COMPUTER ASSOC INT'L	20- 30	17 1/4	+ 1/4	+1.4
O	COMPUTER HORIZONS	9- 30	6 1/8	- 1/8	-2.0
O	COMPUTER NETWORK	5- 11	8 3/4	+ 1/8	+1.4
N	COMPUTER SCIENCES	11- 20	14 3/8	+ 1/2	+3.6
O	COMPUTER TASK GROUP	12- 19	14 1/2	- 1/2	-3.3
O	COMPUTER USAGE	5- 10	5	+ 1/8	+2.6
O	COMPUTONE SYSTEMS	4- 20	4	- 1/8	-3.0
O	COMSERV CORP	1- 18	3 1/8	- 1/4	-7.4
O	COMSHARE	7- 14	6 1/2	- 1/4	-3.7
N	CULLINET SOFTWARE	24- 50	45 3/4	+2 7/8	+7.0
O	CYCARE SYSTEMS INC	16- 29	19 1/4	- 3/4	-3.7
O	[illegible] SYSTEM INC	5- 27	5	- 1/8	-2.7
N	GENERAL ELECTRIC CO	48- 58	55 3/8	+ 1/8	+0.2
N	GTE CORP	35- 48	39 3/8	+1	+2.5
N	INFORMATICS GENERAL	15- 18	15 3/8	0	0.0
O	INFORMATION SCIENCE	3- 17	4 3/4	- 1/8	-2.5
O	[illegible] SYSTEMS CP	15- 40	19 1/4	-4	-17.2
O	KEANE ASSOCIATES	6- 13	9 1/2	- 1/2	-5.0
A	LOGICON	18- 26	25 3/8	- 5/8	-2.4
O	LOTUS DEVELOPMENT CP	15- 40	28	+2	+8.3
O	MCI COMMUNICATIONS	6- 20	7 7/8	+ 1/2	+6.7
O	MGMT SCI AMER INC	9- 30	14 1/8	- 1/8	-1.2
O	MATHEMATICAL APP GRP	6- 10	7 1/2	-1	-11.7
O	MICOM SYSTEMS INC	18- 35	28 3/4	- 1/2	-1.5
O	MICROPRO INT'L CP	2- 10	2 1/8	- 1/2	-18.2
O	NATIONAL DATA CORP	9- 26	8 1/8	+ 3/4	+9.5
O	ON-LINE SOFTWARE INT	9- 29	5	- 1/2	-9.0
O	PANSOPHIC SYSTEMS	14- 30	13	0	0.0
N	PLANNING RESEARCH	10- 23	11 5/8	+1 7/8	+19.2
O	POLICY MGMT SYSTS CP	20- 38	25	+ 5/8	+2.5
O	PROGRAMMING & SYS	4- 8	4 1/2	0	0.0
O	REYNOLDS & REYNOLDS	20- 33	30	+ 3/4	+2.3
O	SEI CORP	11- 24	14	+ 1/2	+3.7
O	SHARED MEDICAL SYST	23- 40	34 1/8	+ 3/8	+1.1
O	SCIENTIFIC COMPUTERS	3- 14	5 3/8	+ 1/8	+2.3
O	SOFTWARE AG	9- 18	14 1/8	- 1/8	-0.8
N	URS CORP	10- 18	12 3/8	0	0.0
N	UCCEL	7- 27	11 1/2	+ 3/8	+3.3
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	2 7/8	+ 1/8	+4.5
A	ANDERSON JACOBSON	4- 12	4 3/8	+ 3/8	+10.4
O	AUTO-TROL TECHNOLOGY	8- 25	8 1/8	- 1/4	-2.9
O	AVANT-GARDE COMPUTING	15- 28	16 3/8	-3 1/4	-16.2
O	BANCTEC INC	9- 20	6 1/2	- 1/4	-3.7
A	BEEHIVE INT'L	1- 10	5/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	19 3/4	- 1/4	-1.2
O	CAMBEX CORP	1- 3	1 1/2	- 3/8	-20.0
N	CENTRONICS DATA CORP	5- 30	9 1/8	+ 1/4	+2.7
O	CETEC CORP	7- 12	7 1/8	- 1/8	-1.7
A	[illegible]	4- 20	5 7/8	- 1/4	-4.0

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 28 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUGRAPHIC CORP	24- 40	27	- 5/8	-2.3
O	COMPUTER TRANSCEIVER	1- 10	5/8	-	-9.1
N	COMPUTERVISION CORP	25- 50	30 1/2	- 1/8	-0.4
N	CONRAC CORP	11- 24	12 3/8	- 3/8	-3.2
A	DATAPRODUCTS CORP	13- 30	14 1/2	-1 3/4	-10.7
A	DATARAM CORP	4- 12	4 1/8	0	0.0
O	DATA SWITCH CORP	5- 41	5 5/8	- 3/8	-6.3
O	DATUM INC	5- 17	4 3/8	+1 1/4	+40.3
O	DECISION DATA COMPUT	5- 16	10 7/8	+ 1/8	+1.2
O	DOCUTEL-OLIVETTI	4- 20	4 3/8	- 5/8	-12.5
N	ELECTRONIC M & R	5- 12	5 3/4	- 1/8	-4.1
O	ENDATA, INC	7- 14	7 1/4	+ 1/4	+3.5
O	EVANS & SUTHERLAND	13- 50	33 1/8	+ 3/4	+2.3
O	[illegible] TECHNOLOGIES	9- 16	12 5/8	- 1/8	-0.8
N	GEN'L DATA COMM IND	10- 30	15 1/2	-2 1/8	-12.0
N	HAZELTINE CORP	18- 38	30	+1 1/8	+4.0
O	ICOT CORP	3- 8	3 7/8	+ 1/8	+3.3
O	INFORMATION INTL INC	10- 18	11 1/8	0	0.0
O	INTECOM INC	7- 28	9 3/4	- 1/2	-4.4
O	INTEL CORP	27- 48	29 1/8	+ 1/2	+1.8
A	LUNDY ELECTRONICS	7- 13	10 3/8	+1 3/8	+15.3
O	MEGADATA CORP	6- 13	12 3/4	+ 1/4	+2.8
A	MSI DATA CORP	6- 20	11 5/8	+1 1/2	+14.4
N	NASHUA CORP	19- 50	28 3/4	+ 1/8	+0.4
O	NETWORK SYSTEMS CORP	14- 24	23 1/8	+ 5/8	+2.7
N	NO AMERICAN PHILIPS	30- 48	46	+5 7/8	+14.7
N	NORTHERN TELECOM LTD	28- 48	35 3/8	+ 3/8	+1.7
O	[illegible]	1- 4	1/8	0	0.0
N	PARADYNE CORP	11- 35	12 1/2	-1 7/8	-13.0
A	PENRIL CORP	6- 14	11 5/8	- 3/4	-6.0
N	PLESSEY CO (ADR)	30- 41	33 3/4	-2	-7.7
O	PRINTRONIX INC	14- 30	10	-4 1/2	-31.3
O	[illegible] CORP	4- 20	4 1/4	- 3/4	-15.0
N	RECOGNITION EQUIP	10- 17	12 1/8	- 1/8	-0.5
N	SANDERS ASSOCIATES	26-130	38 3/8	+2 3/4	+7.6
O	SCAN DATA	1- 3	5/8	- 1/8	-20.0
O	SCAN-TRON CORP	7- 15	11 3/4	+ 1/8	+1.0
N	SCIENTIFIC ATLANTA	8- 23	9 1/8	+ 1/8	+1.3
O	SEAGATE TECHNOLOGY	4- 20	4 1/8	- 1/8	-10.0
N	STORAGE TECHNOLOGY	3- 20	3 1/8	+ 1/8	+0.6
O	SYKES DATATRONICS	1- 12	3 5/8	+ 7/8	+30.0
O	SYSTEMS & COMP TECH	20- 38	20 3/4	- 1/2	-2.4
A	T BAR INC	7- 17	6 1/8	- 3/8	-5.7
A	TAB PRODUCTS CO	13- 20	17 3/8	+1 3/8	+8.6
O	TANDON CORP	7- 38	8 3/8	- 1/8	-1.0
A	TEC INC	6- 12	8 3/8	- 1/2	-5.6
N	TEKTRONIX INC	50- 87	57 3/4	+ 1/2	+0.9
N	TELEX	19- 35	33 3/4	+1	+3.1
O	[illegible] SYSTEMS CP	2- 17	2 1/2	+ 1/2	+25.0
N	TIMEPLEX INC	13- 30	19	+ 1/4	+1.3
O	VISUAL TECHNOLOGY	3- 25	2 5/8	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 23	21	- 1/8	-0.3
N	BARRY WRIGHT	20- 30	25 1/2	-1 1/8	-4.3
A	DUPLEX PRODUCTS INC	20- 27	25 5/8	+ 3/8	+1.6
N	ENNIS BUS. FORMS	15- 28	24 1/4	+ 1/2	+2.1
N	3M COMPANY	68- 90	81 1/4	+1 3/8	+1.7
N	MOORE CORP LTD	30- 51	45 1/2	+1	+2.2
O	STANDARD REGISTER	37- 48	41 3/8	+ 1/4	+0.6
N	WALLACE BUS FORMS	20- 30	28 1/8	+ 7/8	+3.3

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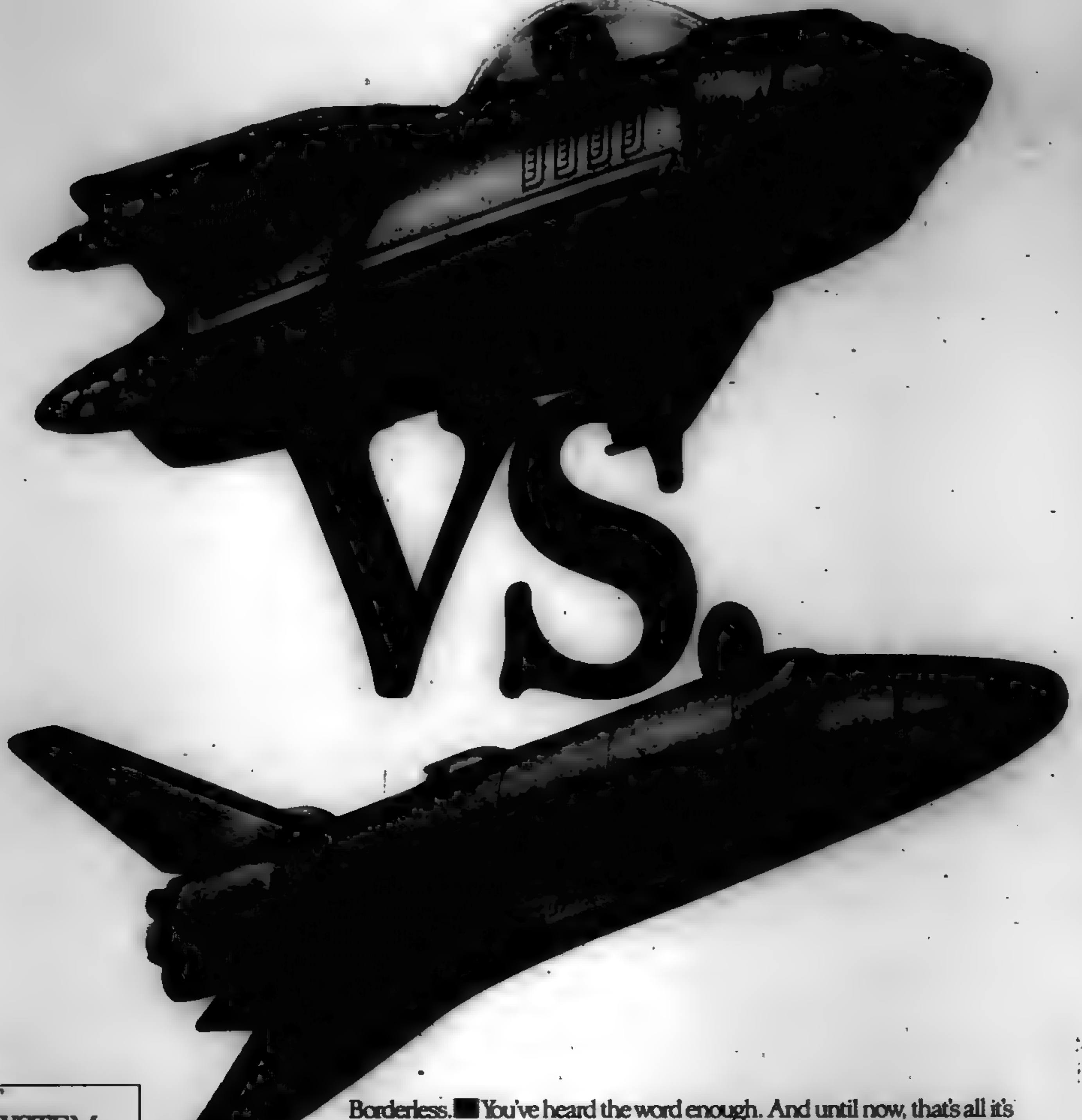

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Computer Corp. of America	MODEL 204 DBMS, [illegible] WORKSHOP 204
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D & B Computing Services	NOMAD2
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Digital Equipment Corp.	VAX INFO ARCH, VAX Rdb
GE Information Services Co.	MIMS
Henco Software	INFO
Hewlett Packard Co.	IMAGE
IBM Corp.	SQL/DS, DB2, DMS, DATA DICTIONARY
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Infodata Systems	INQUIRE
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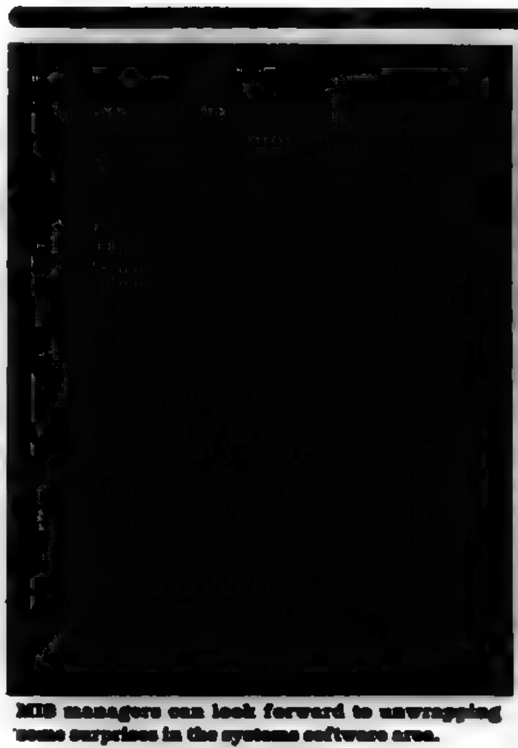

MIS managers can look forward to unwrapping some surprises in the systems software area.
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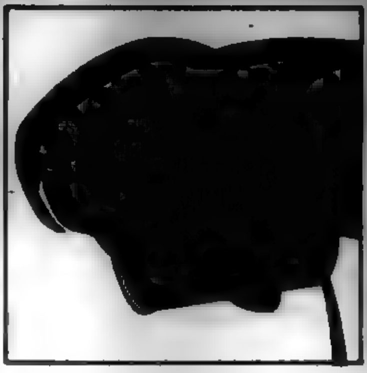

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By Paul Gillin

With an ever-increasing array of software tools available for micros, end-users have established themselves as resourceful and independent in the face of traditional DP control. However, without proper controls, end-user computing might be a time bomb waiting to explode.

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EDITORIAL

Nothing remains the same in the computer industry. The impetus for change is too strong and potential gains in revenue, productivity and quality of work too great for vendors, MIS managers or users to be satisfied with the status quo for very long.

Office automation, for example, is in some ways changing very rapidly and in others moving very slowly. Microcomputers have become the driving force in OA and have opened up vistas of information power to end users. The demand for more computing capacity has become insatiable.

The speed with which all this is happening is breathtaking. Until 1983, the equipment cost per factory worker exceeded that for a white-collar worker. Last year, for the first time, white-collar equipment costs — technology — outpaced that of factory workers, signifying a shift in the whole economy.

At the same time this demand for technology is rising, other factors are working against true OA. Overall planning is still uncommon; coordination of technology with business goals and procedures is rare; and training, ergonomics and implementation are too often glossed over, frequently to the detriment of the current and future system. OA has always suffered from a lack of sharp definition — it can mean too many different things to too many different people. Although some of the technology is in place, it is not being utilized to full capacity. OA is not just a set of applications or a checklist of technologies. It is that, of course, but it is also a change in the way we work — a change that is occurring slowly and with difficulty.

Because the nature of the industry is evolving and our readers' needs are changing, *Computerworld OA* will also be undergoing some transformations. This is the last issue of *Computerworld OA*. We believe we have an even better idea in store for you for '85. Through extensive reader and market research, we have determined how to help you stay on top of what's happening. On Jan. 16, *Computerworld* readers will receive the premier issue of *Computerworld Focus*, a whole new concept in editorial coverage for us. In 10 issues next year, we will present concise, tightly integrated packages of articles covering the trends, state-of-the-art products, analysis, issues and news by top experts in the field as well as by our own staff. Rather than cover end-user computing in general, we will deliver to our MIS readers in-depth coverage on the industry's hottest topics. We will provide you with all you ever needed to know about micros, OA, Unix, software, business graphics, networks and even factory automation. We'll concentrate on one topic in each issue, so we'll be able to tell you what's happening where, when and for whom.

You as an MIS manager are already or soon will be deeply involved in planning, selecting and implementing technologies and products in these areas. If not, you *should* be. We're excited about the changes in store; we feel they will provide that very special perspective and critical information resource you'll be needing. We won't report on everything that happens — only on what's important. And we'll tell it in a way that you, your staff and (even) your boss will be able to benefit from.

We thank you for your enthusiasm and loyalty to *Computerworld OA* and promise you an even better package next year — *Computerworld Focus*. From myself and the staff, Merry Christmas and Happy New Year!

LETTERS

GIBBERISH OVERLOAD

Your editorial in the Aug. 15, 1984, issue of *Computerworld OA* asked what it was that was keeping users from attending computer shows.

In my opinion, there is one reason for the lack of interest shown at, and therefore in, computer shows of late: INFORMATION OVERLOAD. I recently attended the Federal Computer Conference. (I had received a "free" invitation to this exposition — only to see the same "free" pass published in the *Washington Post* a few days before the show opened.)

Within one hour, I could not tell you the difference between a modem and a VDT, between local-area networks and long-distance telecommunications, between professional computers and office automation equipment. My feet hurt. I got no in-depth answers from the salespeople (who were not trained to answer in-depth questions), and I heaved home a lot of product literature that did not address my needs.

As I left the convention center, I felt like part of the madding crowd — ready for the padded cell.

Having noted that certain major computer and office automation firms were not present, I determined why IBM sells so well: "IBM" takes up much less room in my brain than does the roomful of gibberish I had just left.

Ellen L. Bouwkamp
Washington, D.C.

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FORUM

By Andria Rossi

An integrated office system must extend beyond just the integration of functions to the file manager and the operating system. The success of a hardware design should also be measured by its ability to support various operating systems and to process different file structures through its file manager. The ideal product will support integration on three levels: application, file and operating system. Today, however, most developments are at the application level only.

Application Integration. Integration at the application level can best be described as integrated packages available on personal computers. One example of these packages is Lotus Development Corp.'s 1-2-3. Different functions are closely coupled to ensure interactive relationships among the various applications.

The next step, which only a few vendors have mastered, is to include data transfers from one application to another. It is not sufficient just to copy data into another application and data transfers should not be restricted to similar kinds of hardware. Rather, all types of systems should participate in data transfers and be executed within an interrupt mode. The integrity of the data file should also stay intact following the transfer.

For vendors, the most difficult task will be to develop a common user interface across all applications. Vendors that have developed programs to run under specific hardware have succeeded in these developments, but the industry is evolving into integrating third-party software programs into the turnkey office applications. Unless the vendor is willing to add a superficial layer on top of these applications, one cannot assume third-party software will use similar command structures just because it can be accessed from within that vendor's integrated software offering.

File Integration. The complexity of a file system will depend on the operating system it is built upon and, in some cases, on the underlying data base management system. The file system also directly affects the flexibility users have within applications. If it can support compound documents or if different application files can be stored in a single file element (folder or drawer), then the process of simultaneously transferring and manipulating multiple application files is simplified.

For the vendor designing it, this type of file system is the result of very complex program routines. Even so, a few vendors are on the right track. Generally, these vendors support one file manager for every system in their product line.

Those that have not insisted on a consistent file system are realizing that utilities and/or conversion programs must be written for each file structure that will be part of their integrated system plans. For the end user, this will in most cases translate into more operator keystrokes. The end user will also sacrifice flexibility by not being able to access one common file directory or by not having access to a directory that may not be in his file manager. This defeats the power of an integrated system; at the crux of file services should be a facility to instantly access or retrieve data from the file directory. A directory should be able to be accessed from within any type of application or any screen form. The file system should support a facility that would allow interrupting one application to enter into another, then returning to the original location in the working file. Without a consistent file manager, these operations are cumbersome — in most cases, not even implemented.

Operating System Integration. Until networking different systems together became the "in thing," operating systems were hardly discussed as issues in office systems analyses. Now, with the need to have consistent, portable and even nonrestrictive operating systems, the operating system's influence on the user interface is being acknowledged. Because all applications are developed to run on top of it, the operating system becomes the foundation of the command sequences needed to run these applications.

Most vendors protect the user from having to cope with the "programmer's language" by putting a mask over the operating system. This mask can take the form of menus, fill-in-the-blank screens and even user-friendlier commands. Many WP and DP vendors have succeeded in implementing this disguise, but personal computer vendors have not.

When a vendor decides to design an integrated office system by linking together its existing products, the underlying operating systems play a major role in the user interface. If one consistent operating system is employed, the user is hardly aware of the operating system processes.

If, however, an integrated office system consists of multiple operating systems, either the vendor must develop translations and utilities for each operating system on the network or the user becomes explicitly involved in instructing the system about how he wants to interact with the other operating systems. Another counterproductive issue surfaces when one operating system is upgraded with a new software revision. How will the other operating system applications interact with the revisions? What must be done to allow this interaction?

One of the most important operating system concerns is how multiple operating systems will coexist in a networked architec-

(Continued on Page 46)

Q&A

Ericsson, Inc., a subsidiary of the Sweden-based telecommunications and information systems manufacturer L.M. Ericsson, recently cosponsored a conference on ergonomics in seven cities in the U.S. and Europe. The company, which is highly involved in European ergonomics, is entering the U.S. intending to take a 5% to 7% share of the U.S. PBX market over the next three years. Hakan Ledin, Ericsson, Inc.'s president and chairman, talked with Computerworld OA *about his company's entry into the market here and about the contributions ergonomics can make in the U.S. office.*

What advantages can Ericsson offer in the U.S. market?

Ergonomics — it has differentiated us in Europe and contributed very much to our success there, and I think the same can be true here. I know, most people in this country tell me nobody knows what ergonomics is and people are not prepared to pay for it.

My answer is, first, it is true — people here don't know what ergonomics is; nevertheless, they deal with ergonomic issues every day. Second, people do not have to pay for ergonomics. If you ask the right questions when a product is being designed, you design it correctly from the beginning. In most cases, the buyer won't have to pay anything for good ergonomics — it is an extra benefit.

What can ergonomics contribute in the U.S. office?

A good definition of ergonomics is that it is quality, productivity and human satisfaction. If I add that together and ask a businessman what it represents, he will answer that it represents profitability. OK, another name for that combination is ergonomics!

More and more of the organisation's cost is now related to the information family, and management is becoming more aware of this. Traditionally, you could look at the DP department and see if it was productive. Now, a rapidly increasing portion of the total cost for information handling is at the end user's desk — not just the cost of the equipment on that desk, but also the cost of the time people spend at the workstation.

Are you in favor of legislating ergonomics?

Legislating ergonomics doesn't serve anybody's purpose. Legislation is always perceived as something that costs money. The businessman says, "Here comes more legislation; that means I have to pay for it." You can explain to people what these concerns are and that many of the solutions are available for free.

Do you believe education is an effective way to reach these goals in the U.S.?

Well, we are trying to educate people through this conference. We sent out a special invitation to chief executive officers of about 1,200 companies — not inviting the CEO personally, but telling him that the conference was coming up and, if the CEO was interested, asking him who in his organization we should address on these matters.

More than 80% of the CEOs responded. That's not only very interesting, it also shows something important: On the bottom of the organization, there is an absolute awareness of the need for ergonomics — the people sitting there working all day are aware of it. But now top management is also becoming aware; they are finding out that information technology means more than just a computer center. To many companies, the application of the information technology is becoming a strategic issue, not a cost-cutting issue.

The link that is missing is the middle manager, the link between the top and the bottom.

Do you think the middle manager is seeing the problem, but for some reason is not communicating it?

That's right. They don't know if they dare to mention these concerns. They don't know if top management will oppose their suggestions because perhaps finding solutions will cost a lot of money. If people can come to understand that ergonomics is nothing but common sense, it would really be to everybody's benefit.

What segment of the U.S. market is Ericsson targeting?

We are basing our entry into the market on our communications systems, and we are looking at two major market areas. In the first, the PBX market, we are offering our MD 110 voice and data PBX product. We believe the PBX will tie the office together as the means of horizontal communication. Local-area networks can offer high speed and high capacity, but how many in the office really need that speed?

The other area is the central office, where we want to take advantage of AT&T's divestiture. We are developing our AXE [digital central office switching] system so we can offer it to the Bell Operating Cos. We are also exploring our opportunities in the workstation market.

IBM recently announced it would acquire Rolm Corp. Will this affect your plans?

This move did not come as a major surprise to us. IBM already existed as a presence in the market because of the minority interest it owned in Rolm, of course.

If anything, IBM's move lets us know we are moving in the right direction by pursuing the PBX market. OA

OA NEWS

DEMISE OF DISPLAYWRITER?

Though IBM says otherwise, industry analysts and IBM customers are convinced the Displaywriter is dead. The dirges began when interest in the IBM Personal Computer as an office workstation soared, and analysts now feel Displaywriter's demise is simply a matter of time — the time it takes IBM to introduce a new keyboard for the PC.

In its relatively short lifespan, the Displaywriter has fallen from grace rather quickly. The product was introduced amid the stand-alone stampede in 1980-81 and was an immediate hit. Tom Willmott, director of user programs for the International Data Corp., estimated that as many as 200,000 Displaywriters were shipped in its first 18 months on the market. Unfortunately for Displaywriter, the IBM PC, introduced in 1981, was enjoying even greater popularity. As the PC began to dominate the Fortune 500 market, IBM began to focus attention on that product to the detriment of Displaywriter.

IBM customers and industry consultants began to sense a change in focus earlier this year when Big Blue started quoting 11-month delays on shipments of Displaywriters. According to one customer, orders used to be filled within three weeks. Though he had installed more than 200 of the workstations in 1982 and 83, this customer added just 11 this year. "The Displaywriter is dead here," he said.

"The impression I have is that the PC running Displaywrite software is the replacement for Displaywriter," said Patty Seybold of the Seybold Consulting Group in Boston. "It won't be too long before software for the PC is equivalent to the functionality of Displaywriter, and then the only remaining missing piece will be a new keyboard."

According to Willmott, the Displaywriter costs too much money and is not compatible with IBM's workstation strategy. "There's no reason to have two boxes doing the same thing . . . one costing $14,000 and the other $5,000. People will no longer buy that. Even the sucker-born-every-minute routine will run dry in 1985," he said.

IBM is still "talking up" Displaywriter until the new keyboard is ready, Willmott added. "They have been quoted as saying they want an 'orderly transition' to the new keyboard," he explained. "I believe they are waiting for inventories on the Displaywriter to get lower and they want to avoid another 'Chiclets' fiasco like they had with PC Jr. They want the dust to settle on keyboard design in the industry."

Of course, only IBM knows for sure what its plans are for its products. A company spokesperson pointed out that IBM is committed to both the Displaywriter and the PC functioning in the marketplace. "Customers will continue to want high-function, stand-alone word processing," the spokesperson said. "They will also want to move away from dedicated word processors to more intelligent workstations, so we see a need for both." There are no plans, she said, to do away with the product.

Stay tuned.

OA GROWS IN MIS

Office automation expenditures within the management information systems (MIS) budget increased nearly 50% over the past year, reflecting both the steady growth of OA and increasing consolidation with MIS. This was among the key findings of the Diebold Group's 1984 Biannual MIS Budget Survey.

According to David Dell, director of research services for Diebold, OA still remains a very small percentage — between 1.5% and 2% — of the MIS budget in major corporations. Despite those numbers, Dell is convinced that they point to a trend.

"We're not talking about huge dollar increases, but there is a significant share of new moneys that go into the MIS budget being diverted specifically to office automation," Dell explained. The figures also reflect a better accounting and control of expenditures as well as increased MIS responsibility in the OA area, he added.

The survey also found that 80% of respondents have information centers, up from 67% in 1983. This reflects what Dell called a growing commitment to end users from within MIS. Off budget expenses are growing in the continued turning over of responsibility and expenses to end users, he said.

According to the survey — which included 150 companies with MIS budgets of approximately $30 million to $40 million — MIS budgets have increased only modestly in comparison with the sharp increases in work load most companies are demanding from their information resources. This has forced MIS management in these companies to reallocate resources and shift more work and responsibility to the users of computer services and equipment within the corporation.

"The real problems of growth and managing and having something to manage are just beginning," Dell stated. "It's like saying the most exciting part of a

(Continued on Page 44)

BRIEFS

NEW YORK — Europe may be learning the wrong lessons from U.S. high-tech companies, according to John Diebold of The Diebold Group, Inc.

In a speech he gave recently in Frankfurt, Diebold warned that Europeans expect too much from venture capital, especially in a European environment where risk-taking is discouraged and failure is not tolerated. He also warned that too much emphasis is being put on European high technology and said that only 1.5% of new U.S. businesses each year are high tech. For more information, contact The Diebold Group, Inc., 475 Park Ave. South, New York, N.Y. 10016.

WELLESLEY, Mass. — The demand for integrated software on personal computers will skyrocket from 445,000 packages in 1983 to more than 3.6 million in 1988, according to a report by Venture Development Corp. (VDC).

"Integrated Software for Personal Computers 1983-1988," said that about half of the packages are currently sold at computer stores and that standard distribution channels will be severely tested in the future.

The report is available for $2,650 from VDC, One Washington St., Wellesley, Mass. 02181.

DELRAN, N.J. — NBI, Inc.'s word processing systems swept the top three positions of Datapro Research Corp.'s 1984 Honor Roll of Word Processing Systems.

The other vendors selected after a survey of 3,400 WP users were CPT Corp., Compucorp and Exxon Corp. NBI was the only vendor selected in both stand-alone and multiterminal categories.

The 25-page report, "User Ratings of Word Processing Systems," costs $29 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

PORTOLA VALLEY, Calif. — U.S. expenditures on expert systems will grow to $2.2 billion by 1990, according to a report from International Planning Information (IPI). The 380-page report, "The Commercial Application of Expert System Technology," said that while Digital Equipment Corp. computers are currently the most widely used, the market for workstations and software "shells" for expert system development is expanding. The report costs $395 from IPI, 164 Pecora Way, Portola Valley, Calif. 94025.

WELLESLEY, Mass. — There are more than 3,000 software packages for the IBM Personal Computer and IBM compatibles, according to a report by Venture Development Corp. (VDC) that describes each of them.

The study, "IBM PC Software: Directory and Analysis," said that 26% of the titles fall in the general business category and 18% are designed for specific vertical markets. The $795 report is available from VDC, One Washington St., Wellesley, Mass. 02181.

PORTOLA VALLEY, Calif. — The number of personal computers shipped to European end users will skyrocket 57% in 1984, according to a report by International Planning Information (IPI).

The 275-page report pointed out that the installed base of micros in Europe is expected to reach 11 million by 1990. IBM's share in this market reached 27% in 1984. The report, "The European Personal Computer Market 1984-1990," is available for $970 from IPI, 164 Pecora Way, Portola Valley, Calif. 94025.

YORKTOWN HEIGHTS, N.Y. — IBM research scientists have produced an experimental system that can correctly recognize 5,000 spoken words from a standard business vocabulary, the company reported.

The system, which requires a user to train it by reading a brief standard text, is reportedly correct 95% of the time. For more information, contact IBM Research Division, P.O. Box 218, Yorktown Heights, N.Y. 10598.

FRAMINGHAM, Mass. — More than 83% of minicomputer and mainframe users choose DP manufacturers for their service contracts, according to a report from International Data Corp. (IDC).

Hewlett-Packard Co. and Digital Equipment Corp. lead the rest of the vendors, according to users surveyed by IDC. The report, "User Satisfaction with Customer Service: Minis and Mainframes," said third-party maintenance firms account for only 5% of the service market. It is available for $2,400 from IDC, 5 Speen St., Framingham, Mass. 01701.

NORWALK, Conn. — One of the greatest fears of DP and corporate security department heads is deliberate harmful acts by disgruntled employees, according to a report by International Resource Development, Inc. (IRD).

Employee revenge, made easy by an accessible microcomputer, was ranked the second greatest fear, following accidental mishaps by workers. The 220-page report, "Computer Security — Hardware, Software, Systems and Facilities Markets," costs $1,850 from IRD, 6 Prowitt St., Norwalk, Conn. [illegible]

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THE YEAR IN REVIEW AND A LOOK AHEAD

GOODBYE, BIG BROTHER HELLO, BIG BLUE

BY GLENN RIFKIN

or three. It was, they pointed out, a time for users to step back and assess implementation strategies and future needs while taking realistic looks at such issues as networking and communications.

Several industry consultants and analysts discussed with *Computerworld OA* some of the major events of 1984 and looked ahead to 1985. Here is what grabbed their attention:

IBM in the Office: The year started slowly for IBM, but by midsummer Big Blue picked up the pace. As one analyst said, "Everything from July on has been one IBM move after another. The pressure just isn't slowing down."

In the spring, IBM shocked the computer industry by announcing a delay of two to three years on its token ring local-area network offering. Though the delay was startling, the statement of direction "made the local-area network market legitimate," according to Melody Johnson, an analyst with Cable, Howse and Ragan in Seattle.

At the same time, IBM offered a cabling configuration and, later, a network from Sytek, Inc. specifically for its personal computers, as an interim network solution. As Ed White, associate director of OA services at Dataquest, Inc. pointed out, user excitement about networks has generally been premature, and "IBM has honestly faced the problem that the user is not ready for networking yet because networking is going to involve integrated voice, text and data."

Despite that, IBM's network announcements and nonannouncements actually stimulated business in that market, according to other analysts.

The IBM PC grew even stronger during 1984 as the de facto standard in the office and IBM increased the pressure on competitors and look-alike vendors by lowering its prices and announcing a glut of software.

The struggling PC Jr. was given a shot in the arm with a new keyboard and additional features, and the long-awaited Popcorn appeared in August in the form of the PC AT. The AT, a powerful, aggressively priced multiuser system, is expected to have a major impact on the desktop market, a market IBM already controls.

Some analysts, however, don't believe the AT is a breakthrough product for office automation. "I was more fascinated that they could put 1.2M bytes on a floppy disk," Tom Willmott, director of user services for the International Data Corp. said, referring to part of the AT's offering. "The fact that they were going to incorporate an Intel 286 into a new high-end product was no surprise, and I haven't seen anything new or innovative in the architecture."

"I question whether or not the AT could be considered an OA device," White added.

However it eventually fits into IBM's office plans, the AT was simply another example of IBM aggressively flexing its muscle. In late September, the company announced its plans to acquire Rolm Corp., a leading PBX manufacturer which it had purchased a percentage of last year.

IBM reportedly wasn't happy with the pace of development on the integrated voice products Rolm had undertaken. According to Randy Goldfield, president of the Omni Group in New York, the Rolm announcement was the last piece IBM needed in order to compete with AT&T in the PBX arena.

Whatever the true reason for the takeover, consultants agreed it underscored the importance of having a powerful voice-switching PBX network capability in order to compete for the office market.

By late October, IBM had moved to secure its position in the office market even further by announcing its office systems family of software incorporating the IBM PC, System 36 and, eventually, System 370.

The announcement was among the key introductions of the year, according to Patty Seybold, editor of the Seybold Report on Office Systems. "This plugs a big hole in IBM's office strategy," she explained. That strategy, according to Seybold, is for a departmental solution which allows PCs to be plugged into a System 36 running Disoss for filing, retrieval, electronic mail and electronic document distribution.

By designating the System 36 as the host system for its office solutions, IBM has essentially pulled the rug out from under both its 8100 and 5520 systems, consultants said. By further extending support of Displaywrite software for the PC and for System 36, the company has also sounded a death knell for the Displaywriter.

As 1985 gets under way, the military cliches are being dusted off. Goldfield said that the industry is now reduced to being IBM versus AT&T watchers. Willmott expects to see "an enormous battle between IBM and Wang for the desktop in the office." IBM is coming at it from the DP side: Wang is already positioned in the office, but without a strong DP background. "Their continued penetration of this market will rest on their success in establishing themselves as the vendor of choice with MIS planning people. Those issues will come to a head in 1985, but the groundwork has been laid this year," Willmott said.

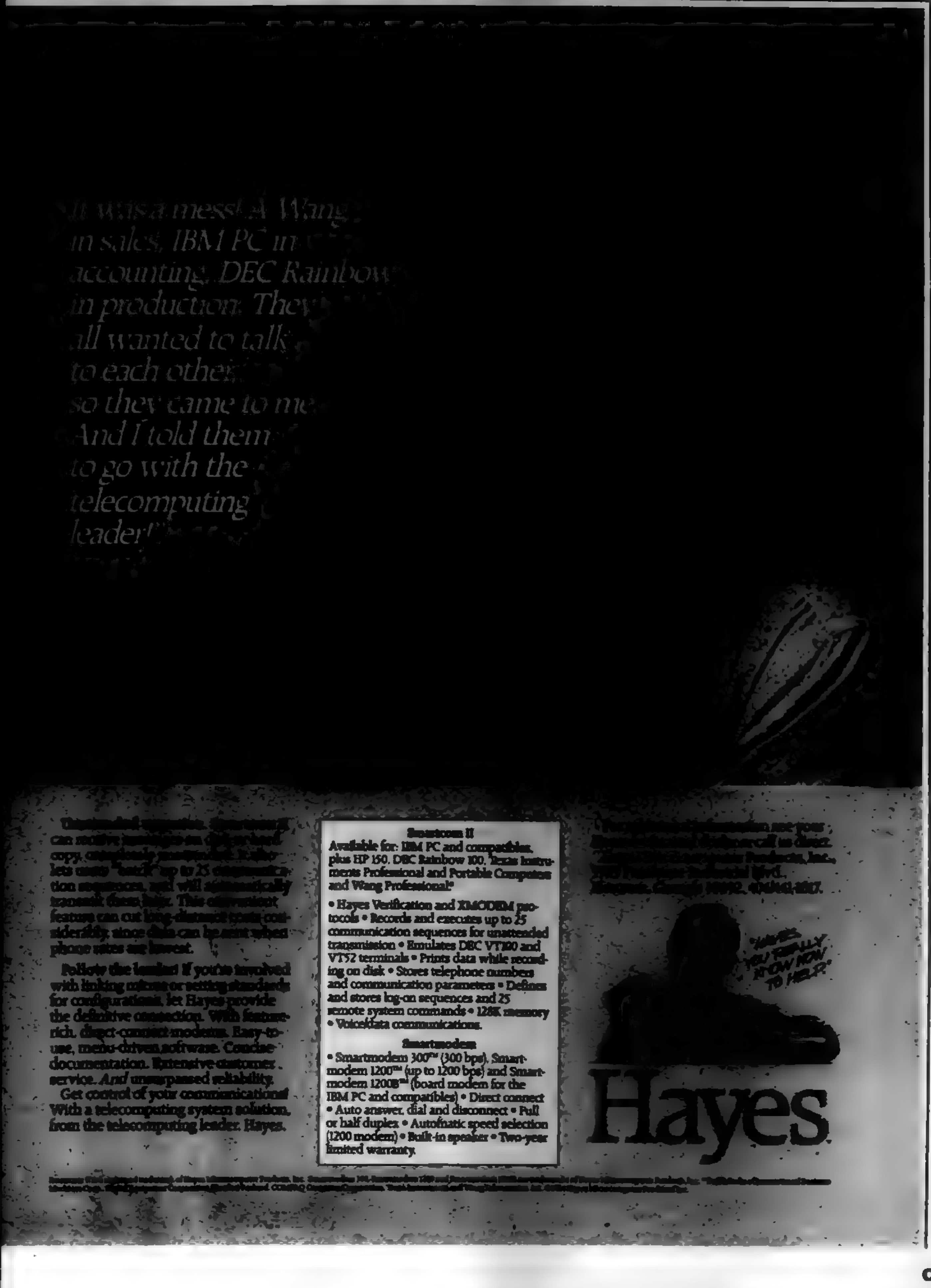
IBM, of course, is setting a fast pace and it has started raising some eyebrows. One consultant, awaiting the November election results said, "They do want it all, but there's a certain point within a couple of percentage points, where their legal department says 'Hey guys, lighten up on market share.' [They believe that] as long as Reagan is reelected, there won't be any problems, but why push their luck?"

By extending support of Displaywrite software to the PC and the System 36, IBM has sounded a death knell for the Displaywriter.

Apple Computer, Inc.'s Macintosh: Seybold called the introduction of the Macintosh "the number-one happening for this year." Setting "a whole new standard" for user interfaces, the Mac served two purposes, according to Seybold. First, it let end users know there is now an easy, nonthreatening way they can use computers; second, it served notice to IBM and the rest of the industry that "this is the interface standard you must meet."

"It attracted a bunch of new users in the office — not because it was an office machine, but because of the interface," Seybold said. "The IBM PC Jr. announcement was a complete catastrophe," Willmott added, "and therefore the Mac appealed to people in large corporations that were unwilling to spend $5,000 per workstation."

Analysts agreed that, after its splashy introduction, the Mac ran into serious problems because of the lack of adequate software for the business environment — data base and spreadsheet packages, for example. "That has hurt the Mac in the OA environment," Willmott said. "However, its original introduction and appeal to office planners


It was a mess! A Wang in sales, IBM PC in accounting, DEC Rainbows in production. They all wanted to talk to each other so they came to me. And I told them to go with the telecomputing leader!"

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Hayes

[illegible]

was an interesting surprise in 1984. The jury is still out on its final acceptance."

Seybold pointed out that the Mac sold well in its first year because it was a novelty and that in its original configuration, it simply was not an office machine. In fact, the stepped-up introduction of the 512K-byte "Fat Mac" was Apple's reaction to that, she said. "They knew from corporate customers that they had to have a more powerful machine quickly if it was to be taken as anything more than a toy." In November, Apple undertook a multimillion-dollar advertising campaign to bolster sales in the office market.

In 1985, Seybold expects Apple to concentrate on connecting and networking Macs through such products as Apple Bus. She is concerned that Apple is underestimating the amount of work it needs to do in order to connect Macs to other systems. "At this point, all they are saying is that if you want your Mac to talk to a Wang system, buy the source code from us and modify it. No user wants to do that. Apple is going to have to learn a few lessons, but they probably have time," she added.

Wang Laboratories, Inc.'s Office Assistant: Though it wasn't met with a great deal of fanfare, Wang's Office Assistant is considered a key office product for 1984. At $2,395, the multitasking desktop unit is aimed specifically at the secretarial marketplace, an audience that has been swept aside in the rush to automate the professional desktop.

Positioned in between an electronic typewriter and a personal computer, the Office Assistant "addresses the real issues of the secretary," according to Dataquest's White. "It's not a perfect product, but it has combined the necessities of word processing and the electronic typewriter in a single device that also allows for the expansion potential of communications, networking and limited PC applications," he stated.

Not everyone is convinced that Wang was simply identifying an overlooked market. Johnson pointed out that, like other office vendors, Wang is losing money on its personal computers. At Wang, the problems at the low end were starting to hurt earnings; as a result, the company decided against bringing out just another low-cost PC, she said. Instead, they chose to try to differentiate the market.

Analysts agreed 1985 will be a critical year for Wang. Its proprietary office systems software, Wang Office, is now shipping, and customers can decide whether it is prudent to stick with the vendor or to look elsewhere. Elsewhere may just be IBM, which applied a tightening hand to the neck of Wang with its System 36 announcements in October. By offering software that runs across several different office product lines, IBM effectively negates what had long been a Wang advantage.

AT&T Jumps In: In 1984, Americans added the word divestiture to their vocabularies and AT&T took its first tentative steps into the office market. As Seybold indicated, the significance of AT&T's first year in the market "was how badly it did." The company may have done well enough financially and solidified its PBX market, but it did nothing in office systems, she said.

In fact, AT&T did announce its 3B line of minis and supermicros in March and later unveiled an MS-DOS-based personal computer (designed by Ing. C. Olivetti & Co. in Italy). In addition, it stepped up its support of Unix as a de facto standard operating system. All that, however, was not enough.

> ***"No one knows how to [network the workstation], no one knows why they should do it and no one knows how to cost-justify it. If you wind up having a workstation on everyone's desk, but have no network, aren't you missing out on the whole point?"***
>
> **Randy Goldfield, Omni Group**

"They don't have any software," Seybold explained. "They devoted so much time to reorganizing, which was one of the problems and, frankly, they underestimated how much time it takes to create office application software."

In fairness, consultants agreed that AT&T simply needs more time. "They've got a chance to shine when we really get into integrated voice, text and data," said White. "You'll see progress in '85 but more likely in the '85 to '87 timeframe."

Market Trends: With IBM surging, consultants have become cautious about predicting survivors in the office market. In the personal computer battle, IBM has helped kick off the anticipated shakeout, and 1984 was a year of diminished returns for many start-ups. Gavilan Computer Corp., Victor Technologies, Inc., Otrona Advanced Systems, Inc., Eagle Computer Inc. and others either filed for bankruptcy or were on the brink.

In the office market, despite IBM's movements or perhaps because of them, some analysts are predicting a backlash against Big Blue. According to Goldfield, the maturing of the marketplace is making a difference. "In an immature marketplace, people choose IBM because no one ever got fired for picking IBM," she explained. "As the market matures, there are more viable alternatives that emerge."

"Every time IBM makes an announcement it attracts users while at the same time, it tells many that it's not the way to go," Seybold added.

Consultants agreed that Wang would continue to be IBM's strongest competitor in the office, but that both Digital Equipment Corp., bolstered by an internal reorganization, and Data General Corp., with its well-regarded DG/One portable, are becoming major factors as well. According to Johnson, some companies — Xerox Corp., Honeywell, Inc. and Exxon Office Systems, Inc., for example — will have to find niches and vertical markets to survive while others, such as CPT Corp., NBI, Inc. and Syntrex, face uncertain futures.

A surprise for '85 may be Datapoint Corp. which, according to Willmott, has hit bottom and is ready for a comeback with some innovative new products. "I look for Datapoint to make a bold turnaround in 1985," he said.

Other Major Issues: Perhaps the most important issue to emerge in the office this year was the question of networking. Despite White's feeling that users aren't ready for it, networking personal computers and office systems was high on the list of priorities for OA implementors, according to consultants. Goldfield's Omni Group conducted an extensive study involving more than 800 Fortune 500 decision makers and, according to the study, networking the workstation is the single greatest concern.

"No one knows how to to do it, no one knows why they should do it and no one knows how to cost-justify it. If you wind up having a workstation on everyone's desk but no network, aren't you missing out on the whole point?" asked Goldfield.

In that regard, the groundwork has been laid for further controversy in 1985 over IBM's DIA-DCA and the issues of exchanging and formatting the text, graphics and voice capabilities over multiple vendor equipment, according to Willmott. "These are very important issues for office planners when a large corporation wishes to have distribution networks that make sense across the total company," he said. "It's at the point where the giants like DEC, Wang and DG have completed their strategic planning for these issues, but we've yet to see the products or results of the research and development. That's likely to occur in 1985."

Though analysts agreed there were few major software announcements (beyond IBM's System 36) in 1984, Dean Hiller of D.L. Hiller & Assoc. in Sterling Heights, Mich., felt that the first truly integrated software packages, in the form of Ashton-Tate's Framework and Lotus Development Corp.'s Symphony, were shipped. Hiller also pointed out that the acceptance of these kinds of packages by "power users" in corporations was a major trend during the year.

"You tend to spend a dollar on training for every $3 you spend on the system," said Hiller. "Therefore, it makes sense to train somebody on a product that has a consistent command interface. Integrated software and products with the same command syntax are products you should train the masses on."

Seybold predicted that 1985 would be the year of networking and multiuser software as well as applications generation software. "That's going to be the next wave after spreadsheets," she said. Seybold also predicted a solidification of offerings in the telephony arena, including the integration of telephony functions into office systems.

In the Emperor's New Clothes department, Unix was among the hottest topics of 1984. But the Bell Labs innovative operating system was more sizzle than steak, particularly in the office market, according to consultants. "Unix in '84 did not change the way people use computers and do data processing in commercial installations," Willmott said. "Unix is going to continue to be an issue next year and then it will become a nonissue the year after," Seybold added.

Seybold pointed out that despite the fact that people assume Unix is a requirement for minicomputers and for networking personal computers, the vote is still not in. "Either MS-DOS will migrate close enough to Unix, or Unix will be improved so that it's better for networking or there will be a third kind of hybrid operating system that will crop up as a replacement. I don't see Unix as it currently exists surviving as a major factor over the next two or three years," she stated.

The State of OA: In 1984, there was a sense that the term office automation had outlived its usefulness. There was also the very real feeling that despite years of discussion, very little had actually changed in the way people work in the office.

According to Ed White, the complex picture of integrated office systems continues to baffle management and, in order for true office automation to be implemented, the office faces an almost total reorganization in terms of work flow and the way people think about their jobs. "There needs to be a lot of training and a lot of systems design, and it will be a good 10 years before it all happens," White said. **OA**

Rifkin is senior writer at Computerworld OA.

GLENN RIFKIN

EUGENE MANNO, HONEYWELL'S ASSOCIATE GROUP VICE-PRESIDENT FOR SMALL COMPUTER AND OFFICE SYSTEMS, AT THE MICROSYSTEM NX.

HIGH HOPES AT HONEYWELL

BY GLENN RIFKIN

In 1985, Honeywell, Inc. will celebrate its 100th birthday. The $6 billion Minneapolis-based giant hopes to get its 94,000 employees in the party mood by creating an up-scale national celebration of its centennial. In the office automation community the noisy party will probably be met with great surprise — instead of a birthday, the industry was more likely expecting a wake.

Though Honeywell's other businesses (aerospace and defense, control products and systems, communications and so on) may all have reason to celebrate, the company's computer business — Honeywell Informations Systems — has run into hard times and a Big Blue wall. Most hard hit has been the office systems division, which virtually disappeared from sight for nearly two years. The division is now making a comeback attempt with a reorganization, reported autonomy, a new leader, a spate of new products and a new strategy for penetrating the OA market.

Industry analysts are divided on Honeywell's chances for success. Some, like Tom Billadeau, vice-president of the Gartner Group in Stamford, Conn., have written off Honeywell completely. "They have done basically nothing that makes any sense at all in the office automation business to date," Billadeau stated. Others are taking a wait-and-see stance, believing that the company has at the very least set its sights on more realistic goals and has the presence via its large systems to make a go of it.

What Honeywell intends to do, in fact, is forego the broad-based general OA market and concentrate on large but specific vertical markets with tools designed especially for those markets. It also wants to look to its installed base of large computers and serve as a systems integrator for that base in the office. According to Chuck Ross, director of market segment operations, "That is our history. We got into the business as a systems integrator. The others are iron pumpers; they got into the business that way."

For Honeywell, the task at hand will be difficult and multifaceted. The company is still fending off questions about its inability to move swiftly and innovatively in the rapid-paced end-user market. Some analysts, in fact, have pointed out that several of the new products are merely revamped versions of previous failures. In a business driven by marketing and hype, Honeywell has earned a reputation as boring and slow. It is also not out from under the shadow of the massive layoffs and cutbacks that racked Honeywell Information Systems two years ago. Questions about internal morale and corporate commitment to OA still abound.

Although the industry may still be unsure, internally things have been straightened out, according to James J. Renier, vice-chairman of Honeywell and president of Honeywell Information Systems. "It is correct to say that in the past in the office automation area, we did not do a good, quality job. That's prior to 1982. Our products didn't have the requisite quality. They have it now and that period is behind us.

"Sometimes an organization has problems and people get discouraged," Renier said. "A conclusion is drawn that we are not interested any more, and that's a natural kind of assumption. But we have never lost our enthusiasm for the market and we have never backed off in our support of the effort."

During the next year, Honeywell intends to get its message out to the buying public via a stepped-up national advertising and public relations campaign designed to highlight its new strategy and products. Though it has taken Information Systems nearly two years to reorganize and straighten out its internal affairs, company officials are confident the window of opportunity has not closed. "These are huge markets," Renier insisted. "There is still room for many companies to do their thing."

Among the changes was the recent naming of Eugene Manno to the new position of associate group vice-president for small computer and office systems. Manno had served as vice-president and general manager of Office Management Systems and now assumes control of the entire OA push for Honeywell.

According to Manno, the change is a significant one. With its 25,000 employees and wide-ranging line of computers, Information Systems had been a monolithic structure without an identity, he said. It was simply one huge division reporting to Minneapolis. Now, all marketing and pricing, profit and loss and strategic decisions concerning OA rest with Manno in the division's Billerica, Mass., office.

Manno, admitting impatience on his part, explained that the process took so long because "changing an organization and its thought processes and culture that have been deeply engrained over a 25-year period can only be accomplished at the assimilation rate of the people."

While coordinating the structural changes, Manno's group also faced the difficult task of new product development and creating a viable new marketing strategy. The company decided to forego the general OA market — hence the vertical market approach.

Though Honeywell, through its mainframe computers, has a wide DP presence, there is serious question as to how much of its installed base is left to target for office systems.

"We project that 50% of its installed base are Wang customers," Billadeau said. "Another 25% have made a different vendor choice. That leaves them just 25% without a commitment."

David Cushing, an analyst with the Omni Group in New York, pointed out that, despite the presence of other vendors in its base, Honeywell still has "a lot of elbow room in terms of pure market volume." "We want a bigger share of smaller markets," Manno stated.

Those vertical markets include administrative sales support — specifically, remote sales locations for large and mid-size corporations; engineering administrative support; and the intelligent building and shared tenant environment (a market that is carefully tied into Honeywell's expertise in the controls arena). The company is also taking a hard look at the health and medical records market.

"It's a good marketing strategy that others will take as well," said Ronni Marshak, associate editor of Seybold Publications. "They are not specializing too much — sales and engineering are large enough markets to be generic. Frankly, it is the only way they can keep going."

To attack those markets, Honeywell has introduced several new products and indicated that more are on the way. For the sales support market, the company unveiled its Office Management System (OMS) 40 and 90. To address the engineering administrative support market, Honeywell introduced its Microsystem NX, a Unix-based multifunction workstation developed by Corvus Systems, Inc.

The OMS 40, available in two models, is based on Honeywell's 16-bit DPS 6/40 minicomputer and runs the proprietary Gcos 6 operating system while supporting up to eight users on Model 2. The OMS 90, based on the 32-bit DPS 6/95 supermini, is available in three models and is packaged for larger offices. It can reportedly support up to 34 workstations on Model 3. Though repackaged and marketed as new offerings, the OMS systems are merely revamped versions of the ill-fated Office Automation System (OAS) software running on the DPS 6, according to the Seybold Report, an industry newsletter.

With an average per workstation cost of $6,495, Honeywell believes it is aggressively attacking the price/performance levels of competitors such as Wang Laboratories, Inc., IBM and Digital Equipment Corp. Though the OMS systems don't currently offer connectibility to IBM PCs, Honeywell indicated that capability would be offered on the next release of the product in late 1985.

At under $10,000, the Microsystem NX is aimed specifically at the engineering support environment. Based on the Motorola, Inc. 68000 processor, the NX comes with 512K bytes of main memory, a detachable keyboard, 12M or 18M bytes of disk storage and a 15-in. monochrome, high-resolution monitor.

According to Martin Strakhovsky, director of workstation marketing, Honeywell has already begun putting NXs on the desks of its own 30,000 engineers. The NX was not designed to compete with advanced computer-aided design and manufacturing systems; instead, it is geared to provide administrative support for engineers when the design work is done.

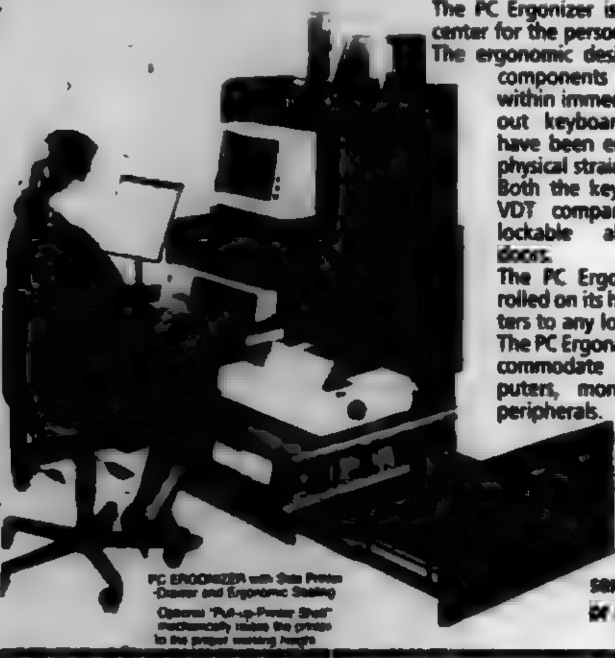
Though Honeywell has centered its office thrust around the DPS 6 minicomputer, it hasn't ignored the low end completely. In 1983, it brought out the IBM PC-compatible Microsystem 6/10 and will soon unveil the Microsystem PC. However, the company seems to be making only a perfunctory gesture toward the low end; both micros are merely OEMed versions of Columbia Data Systems, Inc. products.

"They are pass-through products," Ross admitted. "Our sales people can sell [the 6/10 and PC] to anyone, but we're playing the role of systems integrator and they are aimed at our customer base as added value for a DPS 6 system."

Honeywell has also announced compatibility with several local-area network technologies such as Ethernet, Omninet (from Corvus), Bridge Communications and Hyperchannel. Manno's group is working closely with Honeywell's communications division, but it has also established agreements with such vendors as AT&T, Ericsson Information Systems, Inc. and Northern Telecom, Inc. for PBX technology.

Although offerings such as Omninet solve the short-term networking needs, Manno acknowledged that higher level protocols are necessary. He pointed out that Honeywell offers both its own DSA — an architecture based on the International Standards Organization OSI model — and IBM SNA compatibility. Honeywell, he said, plans to remain committed to IBM de facto standards such as DIA-DCA and plans to use its new OMS line as the gateway to these higher level protocols.

Within the next six months, Honeywell also plans to announce its entry into the image-processing arena. The company is working with the Belgian company



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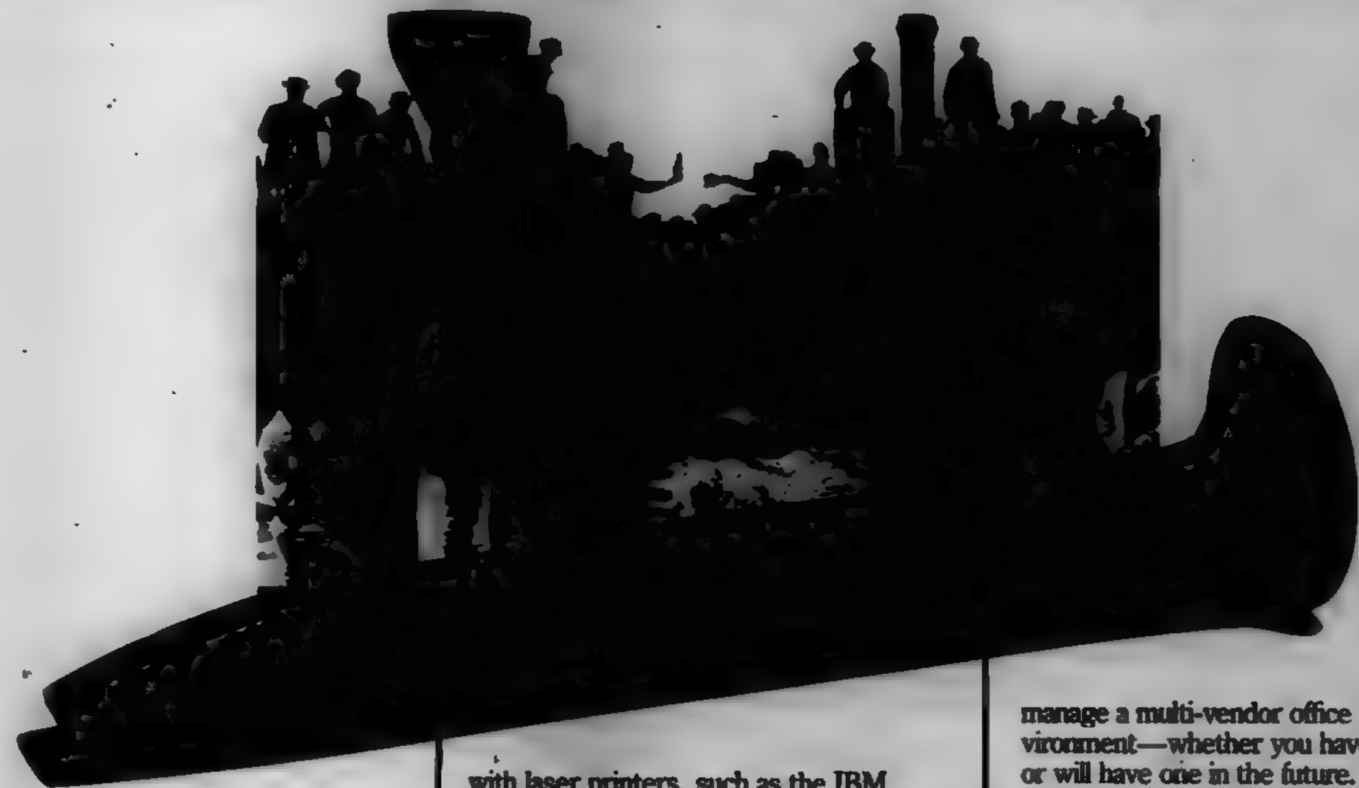

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Correlative Systems, Inc., which has developed an image-handling system based on the DPS 6. Manno said he is confident that image processing will be a large business for Honeywell. "The big key now is storage; no one has it solved as yet," he added.

The newly announced systems, coupled with Honeywell's wide range of minis and mainframes, gives the company extensive coverage across many potential markets. But analysts are reserving judgment about the new offerings and any guarantee of success in the office. Seybold's Marshak noted, "the new products are standard Honeywell fare — not exciting, but they can do the job. Targeting niche markets is probably a good idea, and when you look at who is stumbling — Xerox, Exxon — Honeywell is a little above them, probably because Honeywell's a little more conservative. I don't see it disappearing very quickly."

"The idea of working with the user to develop a tailored system for a specific need is a good idea, and some will take advantage of it," said Ken Sobel-Feldman of the Gartner Group. "But I don't think they can succeed overall with it. Users generally want vendors to supply the solution and do all the work. Honeywell needs user commitment, and that could be a long time coming."

How much time Honeywell will need is as unclear as how much time it will get. Renier insisted that the company is in the market for the long haul. Because of Honeywell's size, it does not release revenue figures for each division, but the company indicated that Manno's group had sales of more than $450 million in 1983. The unit made money in 1984, but "I will say the numbers have got to be better," Manno said. The new vertical markets have yet to earn a profit, but the strategy is too recent to be effectively judged, a spokesman said.

There is also speculation that fallout from Honeywell's internal troubles continues to take its toll. One former employee pointed out that fiscal security has come simply because Honeywell has made its numbers more reachable. The company has cut back so dramatically in terms of overhead and personnel (more than 3,000 Information Systems employees were laid off two years ago) that it is able to appear lean and profitable. Unfortunately, this cutting back has also meant that Honeywell is losing market share in the computer business. With only 2% of that business to its credit, there is not much room for decline.

With IBM, AT&T, DEC and a host of others clamoring for pieces of its niche markets and its installed base, Honeywell has to offer something different and better.

"We're a systems integrator," Ross said. "We said that two years ago, and it wasn't what people wanted. I have no fear that we're too late in the market; if anything, we were too early," he added. "Our fundamental strategy is not to simply have an account, but to integrate Wang, IBM, Hewlett-Packard, etc. and ourselves into an office information network responding to the requirements of large organizations. Before, the market didn't want that. But it's ready now and demanding it."

> ***The company has cut back so dramatically that it is able to appear lean and profitable. Unfortunately, this cutting back has also meant that Honeywell is losing market share in the computer business.***

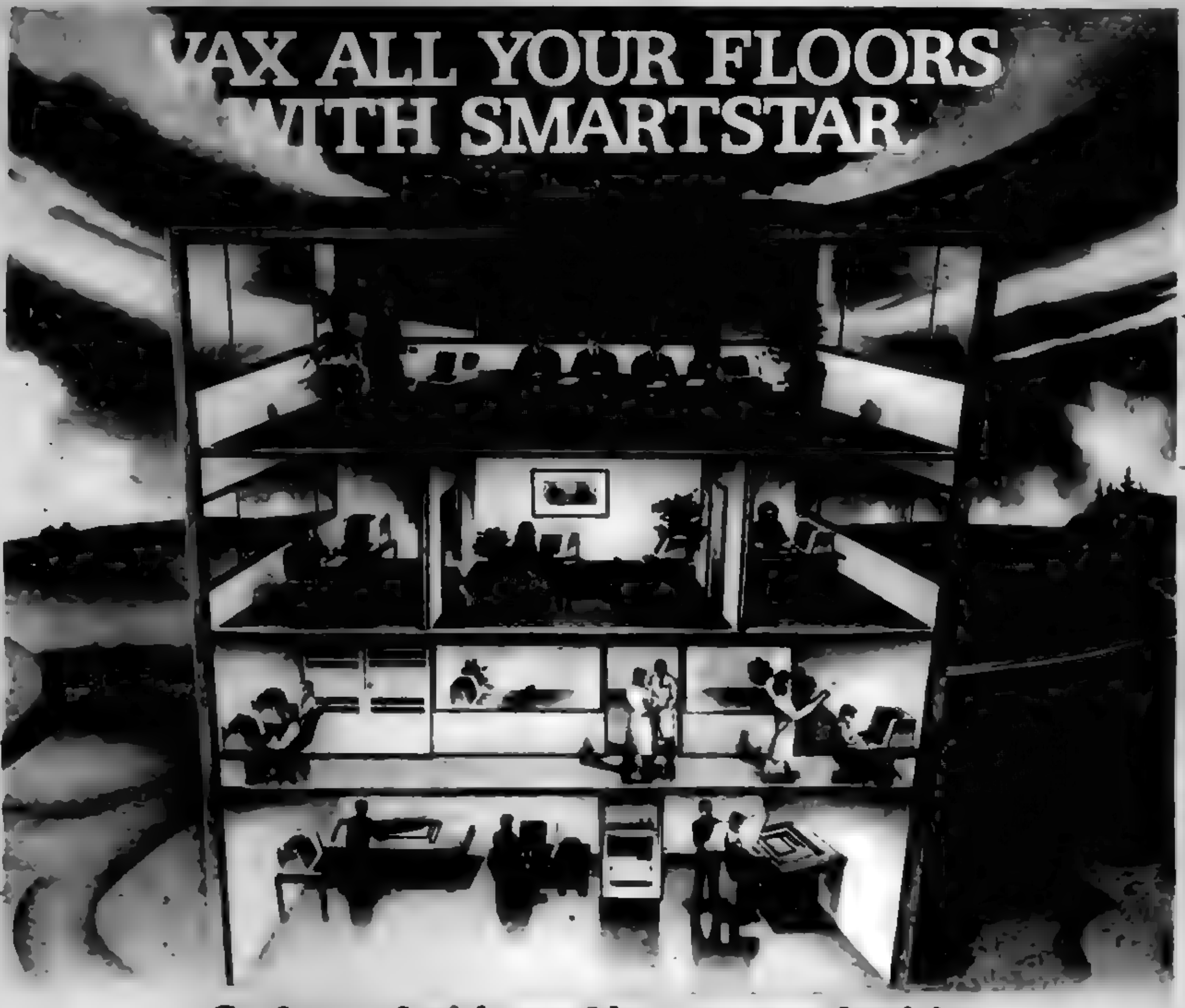
"In the industries we choose to be in, we will be far more flexible than our competitors," added Renier. "We'll offer hardware that will compete with the rest, but they'll get more from us in terms of a system solution and customer service."

Internally, morale is reportedly up again. "I expect relative stability," Renier stated. "I would never promise [no more layoffs], however, simply because promises of that nature are irresponsible. I just don't see anything like what happened two years ago. There's a strong spirit here now."

Though the analysts tend to be a bit more cautious than company executives, there is general agreement that Honeywell has a fighting chance.

"Don't bury Honeywell just yet," Marshak said. "We've been waiting for them to get out of the business since 1975, and they're still here." OA

Rifkin is senior writer at Computerworld OA.



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FEELING AT HOME WITH PORTABLES

BY LAWRENCE F. VOGEL

As relatively low-cost portable computers proliferate, a nearly equal number of questions arise about how these machines can best be used to help the work force do their jobs. An assessment of the suitability of portables as workstations raises many of the same issues found with desktop units. (For the purposes of this article, a workstation is any screen/keyboard unit used by a knowledge worker to support that worker's regular duties.)

Portables and desktops target the same users; it's the technology that's different. While they still can be classified in the microcomputer genus, portables have some strikingly dissimilar characteristics. There is also a

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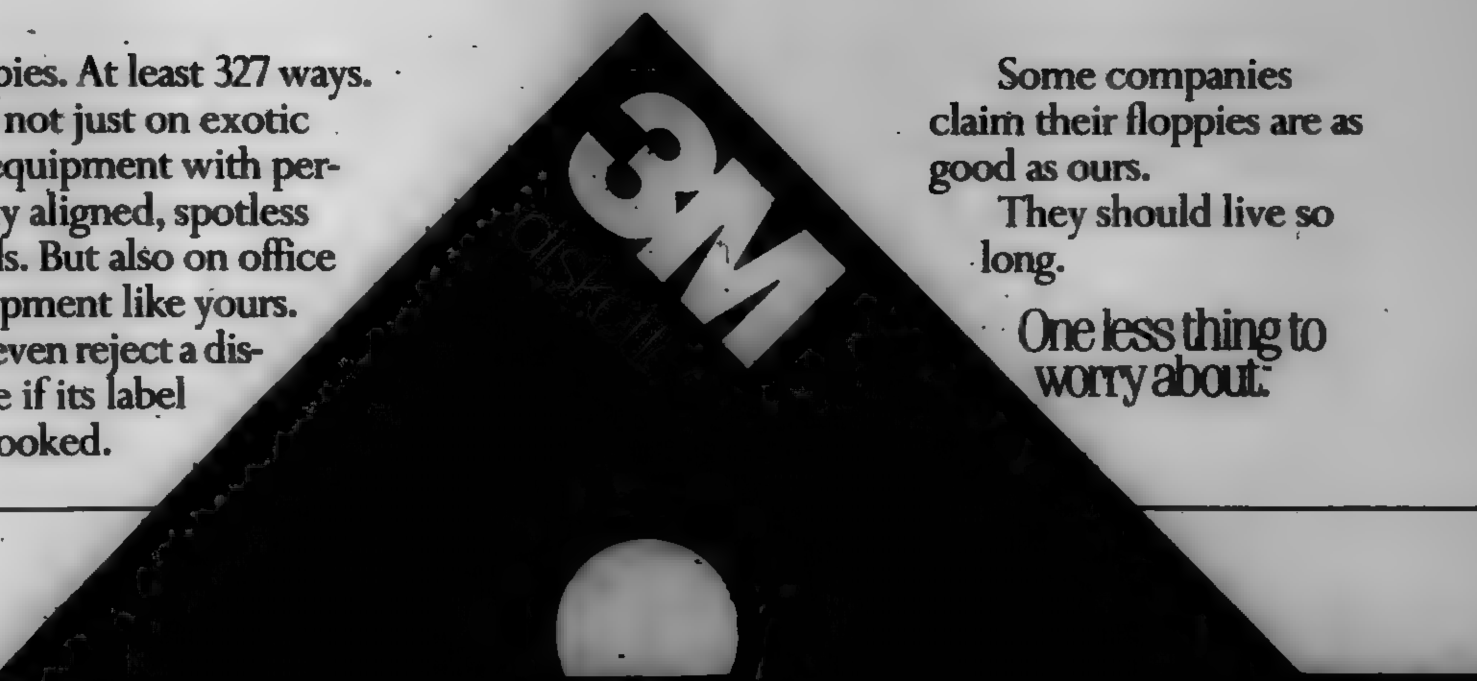

profound difference in the way many users react to the portable as compared with their response to its desktop counterpart.

Adam Osborne is credited with introducing the first portable model in early 1981. Although Osborne's machine could be carried from place to place, it was not an easy task. It and others that followed in the 20-plus pounds category have come to be known as "transportables" or, to less muscular users, "luggables." Purchased as portables, the bulk of these machines became de facto desktop units.

A new category of micros has formed recently and contains products much more worthy of the term "portable." Included are such machines as Hewlett-Packard Co.'s Portable 110, Grid Systems Corp.'s Compass and the Data General Corp. One at the high end and Radio Shack Corp.'s TRS-80 Model 100 and Convergent Technologies, Inc.'s Workslate at the low end. These machines generally weigh less than 10 pounds and can be carried in a standard-size briefcase. Despite some current shortcomings, this class of micros will grow into the portables of the future.

The debate over what characteristics must be present in a successful office workstation has gone on for years. Some advocates have been uncompromising in their demands for the perfect workstation. Others take the position that a stand-alone personal computer, although not offering every bell and whistle possible on a full-blown OA system, might be sufficient for the needs of many users. The lesson to be learned is that the workstation should be utilitarian and acceptable, both individually and collectively, to the users it serves.

The way micros have been accepted and utilized over the past few years has a lot to do with users' attitudes, which usually fall between two extremes. Some users (especially those who had no say in the purchase of their workstations) view their workstations as cogs in the corporate wheel. They react to the machine as if it were a standard company-issued piece of equipment, much like a telephone. It has set operational procedures and those procedures produce a standard result. To these users, the purpose of their machine is to enter data, process it and produce an output.

Other users have a different view of the machine's role. They more often consider it a personal productivity appliance. They use this machine as a tool that provides them with information to support a decision. The process of the input and output of information takes a back seat to the decision support aspect.

Users of portables generally fall into the latter category. The purchasing decision frequently lies with the individual; many portables (especially the new crop) are purchased as personal property. The portability aspect creates a bond between person and machine which is not so frequently found with desktop users.

One executive I recently met is representative of a growing number of new users: "My company bought a number of XYZ PCs last year for all our middle managers," she said. "I learned the basics and it helped me with a few jobs. But, this new portable has done twice the work for less than half the price. I still use the XYZ for big jobs, but the portable is capable of performing at least 85% of my applications. Also, I'm not afraid to depend on the PC, because it can go where I go. It's now easy to take my work home, rather than working late in a deserted office to meet a deadline."

Regardless of attitude, some basic considerations should be part of a decision on which workstation is best for a given user or situation. In considering which hardware/software combination will become the workstation of choice, the user and/or company must answer several basic questions:

- ***What applications are really needed?*** The applications should be, of course, the primary consideration in choosing any workstation product. But the applications must be prioritized. Chances are, there will be some tradeoffs requiring a clear delineation between what's essential and what would be nice to have.
- ***What level of compatibility with other machines is required?*** If files are to be used by other staff members, care must be taken to ensure that they can be accessed on the other machines. Many users, even those who consider these potential incompatibilities, prefer to live with incompatible machines rather than accept second best. A decision must be made about whether the portable will be the user's only workstation or whether it will defer to a desktop in the office.
- ***What level of communication with outside data bases is required?*** Data communications capabilities on portables are every bit as complex as desktop micros. It is realistic to expect that a large number of users will have no need that exceeds the terminal emulator capability offered standard on many of the new crop of portables.
- ***How important is upgradability?*** This is somewhat of a crystal ball question, but is nevertheless important. Accurately predicting at least the next few years can save a lot of money and trouble.
- ***Cost.*** Just like cars, workstations come in luxury and economy models. A clear understanding of how much the user is willing to pay must be present at the outset.

An evaluation of their workstation potential will show that compromises made to reduce the size and weight of portables sometimes translate into user limitations. The most obvious shortcoming is screen size and type.

The typical portable screen is an integral liquid crystal display, similar to those found on many watches. It is seldom larger than 14 lines by 80 characters — a severe limitation in applications such as spreadsheets, where viewing a large area is crucial. Although the user has the benefit of full software functionality — he can access any cell using cursor keys or GOTO commands — the interpretation of data suffers because the spreadsheet cannot be seen as a whole. Those who use spreadsheets frequently or whose spreadsheets are complex are likely to find this limitation overwhelming. And, needless to say, anything more than the most simple graphics are ineffective.

Some machines offer read-only memory chips that contain popular software packages. This concept makes portables much more attractive as workstations because it increases the software options without substantially increasing physical size or weight.

On the other hand, applications such as simple word processing and personal data bases are not significantly inhibited by the screen size. Many users report no particular problem with these applications. In fact, the quality of their written documents often improves because they are free to edit or add to them at any time.

Keyboard type and layout can also be limitations in applications that require substantial data entry — most commonly in WP. This drawback is most apparent on Convergent Technologies' Workslate, which has round buttons for alphanumeric keys. Just as the shape of those keys can slow down input and increase errors, conventional keyboards with tightly packed and badly placed keys can inhibit efficient keyboarding.

Specifications for lightweight portables are very diverse. The virtues and vices of each must be weighed individually, but a few general comments can be made. Mass storage techniques are very important in portables. Many low-end machines have only a microcassette tape; high-end machines like the Grid Compass have advanced nonvolatile bubble memory. The spectrum is very wide.

Some machines offer read-only memory (ROM) chips that contain popular software packages. Purchasers of the Hewlett-Packard 110, for example, can use Lotus Development Corp.'s 1-2-3 (spreadsheet), H-P Memomaker (limited function WP) and a terminal emulator, all from integral ROM chips. Grid Systems Corp. now offers on its Compass II model external ROM software that can be changed at will by the user. Many other vendors are also committed to the ROM software concept, and a number of such enhancements and new product announcements are expected early next year.

This ROM software concept makes portables much more attractive as workstations by increasing the software options without substantially increasing the physical size or weight. As ROM software becomes more widespread on portables, their numbers can be expected to increase dramatically.

The merits and limitations of portable computer hardware can be the source of many debates. Nevertheless, the most important topic is that they *are* portable — their shortcomings are tradeoffs. Portables can, after all, go anywhere from the friendly skies to a hostile boardroom. They can frequently be cost-justified solely on the value of time previously wasted but now productive.

Portables and desktops are not mutually exclusive. A growing number of companies, recognizing the need for portability, have acquired a limited number of compatible machines to be shared among users on an ad hoc basis. This is not an optimal situation; users won't use the portable for permanent tasks like personal data bases. It does, however, lay the groundwork for later acquisitions and affords users valuable hands-on experience without their having to actually purchase the machine.

An evaluation of the portable as a workstation leads back to an age-old concept. The primary consideration of the carpenter who buys an electric saw is not whether it is attractive, runs quietly or comes with a two-year guarantee. It is not even the saw that he is ultimately buying — it's the ability to cut wood. In much the same way, companies and individuals don't buy computers because they're computers. They buy them because of the productivity gains they can achieve through their use. How well the portable computer and its user interact to enhance productivity is the ultimate test of its success as a workstation. **OA**

Formerly a consultant with the Office Systems Consulting Group, Inc., Vogel has recently joined the staff of Gray Strayton International, a Wellesley, Mass.-based marketing communications firm.

GRAPHICS POUR INTO THE OFFICE

BY JEFFREY COGEN

The oft-heard remark, "Show, don't tell," can apply to many forms of business communication. Why choose words when a picture can tell the story better and quicker?

In the office, the influx of personal computers has brought with it the ability to make quick and efficient pictures with an ever-growing supply of integrated and dedicated graphics software. Once considered an unnecessary frill, graphics are quickly being accepted as standard fare in business communication.

According to industry watchers, this acceptance will fuel some staggering growth rates. Most predict that the growth of business graphics hardware and software will range from 30% to 40% annually. Carl Machover, president of the White Plains, N.Y.-based Machover Associates, predicts that sales of business graphics hardware and software will reach $6 billion in 1990, up from $500 million in 1982. According to International Data Corp. (IDC) of Framingham, Mass., the number of microcomputers used for some sort of business graphics will grow, in the next two years alone, from 400,000 to more than 2 million.

Why the unbridled enthusiasm? Graphics have often been overlooked, either because of the time it takes to create a graph manually or because of the cost and turnaround time involved when the job is turned over to an in-house art department or an independent service. Microcomputers have removed these obstacles. Personal computers have automated chart production, and managers are discovering that, with a few relatively inexpensive additions, the micro they bought for spreadsheets can produce graphics. Innovative products such as Apple Computer, Inc.'s Lisa and Macintosh, equipped with high-resolution, bit-mapped displays and graphics software like Lisa Draw and Mac-

paint, have spurred both the industry and end users to take another look at the possibilities of graphics.

Micros, however, are not the only reason for the interest in graphics. The lower cost and higher quality of today's graphics monitors, pen plotters, laser printers and other output devices such as 35mm slide makers make high-quality graphics an affordable option. In fact, many large companies already consider graphics a must-have tool for managers.

More managers have the option of using graphics because "more office equipment is sold with graphics capabilities as a standard feature," according to Maxwell Steinhardt, vice-president of information systems at Strategic, Inc. of Cupertino, Calif. Graphics are becoming a sought-after feature on any office system, and most vendors are obliging.

Business graphics is a catch-all phrase encompassing bar, pie, line, flow, area, scatter and text charts, along with maps and other illustrations. These images can be viewed on a computer monitor or output as overhead transparencies, 35mm slides, video or hard copy.

Managers who make frequent presentations are among those who have long recognized the value of having computer systems produce presentation-quality graphics. Recognition of computer-generated graphics as a powerful tool for decision making, however, has lagged behind. What the vendors and analysts are saying is that graphic information enables a manager to make better decisions quicker.

"Many studies have shown that it is a lot easier to understand a graph or chart than a table of numbers," said Deborah Kelly, manager of computer graphics research at IDC. "You can understand a lot more information, a lot quicker if you can see it in a graph. Even if you don't make any presentations, it can be a very helpful tool," she added.

For busy managers, graphs may be more than helpful. "Graphics are essential in making the best decision," according to Kathryn Alesandrini, president of Microconnect, a Santa Monica, Calif., graphics consulting firm.

Up until a few years ago, color graphics terminals cost about $20,000. Few microcomputer graphics software packages were on the market and, in fact, relatively few micros were found in businesses. The mainframe computer graphics programs, in general, were far from hospitable to non-data processing managers. For decision support, where the manager wants to see something quickly and then experiment with different what-if situations, there were noncomputerized options, but none especially quick and easy. "If you have to draw it out by hand or send it to an art department, you probably won't do it," Kelly said. IBM started a trend when it brought graphics to the masses with its introduction in 1979 of the low-cost 3279 color graphics terminal. The 3279 has since become the de facto standard for that capability. Other vendors followed suit, and the low-end color terminal market now ranges from $2,000 to $4,000.

While low-priced monochrome and color terminals brought graphics to those in mainframe environments, microcomputers brought graphics to smaller businesses and to the office desktop.

The lower cost and higher quality of today's graphics monitors, pen plotters, laser printers and other output devices make high-quality graphics an affordable option. In fact, many large companies already consider graphics a must-have tool for managers.

Increases in desktop memory have expanded the resolution of microcomputer graphic systems, encouraging vendors to beef up hardware and software graphics products for micros.

For example, IBM has recently added color graphics displays, expansion cards and graphics software for its line of Personal Computers. And with the 3270-PC/G and 3270 PC/GX workstations — graphically enhanced microcomputers targeted specifically for the mainframe environment — Big Blue is one of the few vendors to have addressed the question of mainframe data base access for graphics users. In addition, high-resolution bit-mapped displays are becoming more and more popular and have been a boon to computer graphics.

Following the lead of other microcomputer software packages, graphics packages have become increasingly user-friendly. More than 70 graphics packages, priced from $300 to $700, are now on the market. These include Business & Professional Software, Inc's BPS Business Graphics; Decision Resources, Inc.'s Chart-Master; and Graphic Communications, Inc.'s Graphwriter. Most are geared either to presentation graphics or to personal graphics for decision support.

Presentation graphics packages must offer many font styles, line widths and colors; they must also simply look good. Decision support graphics must be highly interactive for quick what-if games, but need not have all the output options.

General Mills, Inc. in Minneapolis, Minn., started implementing a graphics decision support system for plant productivity this year and is still looking for some of the tools, according to Ronald Miller, graphics support specialist. "No one package out there really stands out," he said. About half of the company's micros have graphics capabilities using both microcomputer and mainframe software.

Although there may be no runaway leader in terms of quality in the microcomputer graphics software market, in terms of quantity the race is not even close. Integrated packages with graphics introduced many users to graphics, and they still play a big part in the market. The ease of transferring data from a spreadsheet into a chart, and the convenience and low price of having it all integrated makes Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Framework among the most popular programs that produce graphics.

Whether these packages are considered true graphics packages is another story. "Lotus' graphics capabilities are so limited as to be almost negligible," said Tom Treffinger, assistant editor of Datapro Research Corp.'s Datapro Reports on Microcomputers, based in Delran, N.J. No one, however, disputes that much of the business world uses 1-2-3 to make graphs.

"1-2-3 cuts into the sales for stand-alone packages," said Marilyn Darling, manager of product marketing at Business & Professional Software in Cambridge, Mass. "If Lotus satisfies 80% of a user's needs, he isn't likely to go out and buy a stand-alone graphics package for a few hundred dollars," she added.

According to IDC's Kelly, 1-2-3 is important in the market, not as a full-featured graphics package but because it "serves to whet people's appetites." She said many users discover personal computer graphics through Lotus' 1-2-3 and then move on to specialized packages with more advanced features.

The market is still far from mature. According to IDC, only 14% of the personal computers in businesses produce business graphics. IDC expects this percentage to top 50% by the end of the decade, fueled in large part by sales of specialized business graphics packages.

Although some industry watchers predict more packages integrating decision support and presentation graphics, Deborah Barlow, director of marketing communications at Graphic Communications, Inc. in Waltham, Mass., is not one of them. This is not likely, Barlow said, because "people need both analysis and presentation graphics. You won't expect that in one package; it would be too cumbersome to use. The answer is to integrate on the systems level instead of the application level, so that you can use the specialized packages you like best."

Myriad output devices have also decreased in price, furthering the allure of graphics for businesses. The price of laser printers plummeted from $30,000 to $10,000 in the last year, according to Alan Paller, who is president of AUI Data Graphics in Washington, D.C., and is on the board of directors of the San Diego-based Integrated Software Systems Corp. (a mainframe graphics software vendor). That price drop is overshadowed, however, by the reduction in the time a laser printer takes to print a black-and-white chart: five to 10 seconds compared with the three to five minutes needed by other printers.

Although laser printers do not print color, they do print pages containing both text and graphics. For growing numbers of companies that will produce a large number of documents integrating both text and graphics, "laser printers will take a little of the edge off color," Paller said. "People will make a lot of black-and-white charts because it is faster."

For companies that cannot afford or do not need laser printers, or for those that want color output, there are color ink jet printers and color plotters. Both print only graphics, but do so for $1,000 or less.

According to Steinhardt, the standard dot matrix printer has been extremely successful at the low end of the market. "It will continue to be a major source of output for people who want to merge black-and-white graphics and text at low cost," he said.

For users that want color output in 35mm slide form, film recorders such as the $1,500 Polaroid Corp. Palette can copy images from a microcomputer monitor. When used with certain software packages, these products reportedly produce slides with two to four times the resolution of the monitor.

Some analysts say that, as more companies opt for using graphics software on micros linked in networks, turnkey systems and mainframes will be used less and less for business graphics. Others emphasize the implementation of transparent interfaces between mainframe resident graphics packages and personal computers. Paller said he expects to see Fortune 500 companies implement interfaces allowing micro-generated graphics to be transported up to the mainframe for enhancement and presentation-quality output.

According to Pailler, mainframe-based charting systems have sprung up in a number of large companies over the last two years, providing on-line decision support for executives.

"The technology is just arriving for decision support on an economical basis," Miller of General Mills said. "Before, it was quite expensive to do online activities." Miller predicted that as more information is made available to graphics users, the information will be used more frequently.

Northrop Corp. of Hawthorne, Calif., installed an interactive charting system a year ago for a vice-president of engineering and his staff of managers. According to Bradley Butcher, a graphics product specialist, the vice-president has access to about 200 charts, most updated weekly. Before the system was inplemented, hand-drawn charts were tacked to the walls of one room in the company. "The vice-president and his reporting managers can now go directly to the charts they want rather than scanning an entire wall," he said.

The vast majority of applications involve scheduling staff and resources. According to Butcher, charts provide "a better way to illustrate the parts and current status of a project. You get the big picture a lot quicker."

Some companies, such as the Hartford Insurance Group in Hartford, Conn., have begun to provide microcomputer-based graphics for certain applications not needing extensive data retrieval from mainframe files. This makes it easier for infrequent users to create their own charts.

The graphics stations in the firm's information centers consist of IBM Personal Computers or compatibles with Graphwriter and a Polaroid Palette. They are used primarily for presentation graphics that require input of information by a clerical worker after a manager decides which data and graph style to use, said Phil Archambeault, of the Hartford Group. All the decisions can be made on paper, making the actual production of the graph a clerical job.

The price of laser printers plummeted from $30,000 to $10,000 in the last year. That price drop is overshadowed, however, by the reduction in the time a laser printer takes to print a black-and-white chart: five to 10 seconds compared with the three to five minutes needed by other printers.

The firm's mainframe system is used primarily for decision support. "We have a definite place for both," Archambeault said.

Although computer graphics will surely be used more frequently and more creatively in the future, the trend of using graphics for decision support will have the greatest impact on business. Said Kelly of IDC, "I can't see that not happening." OA

Cogen is a free-lance writer and an editorial intern at Computerworld OA.

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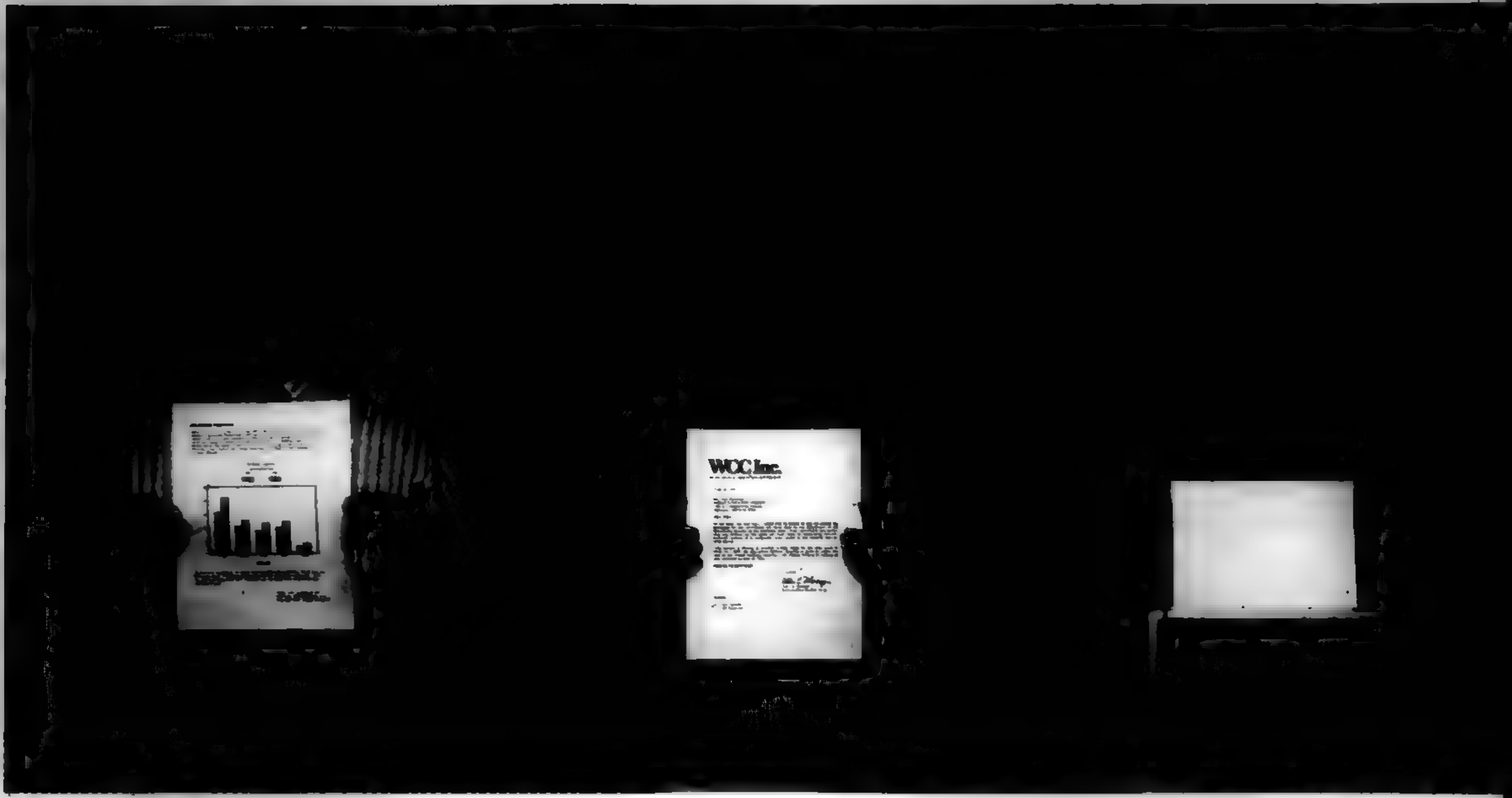

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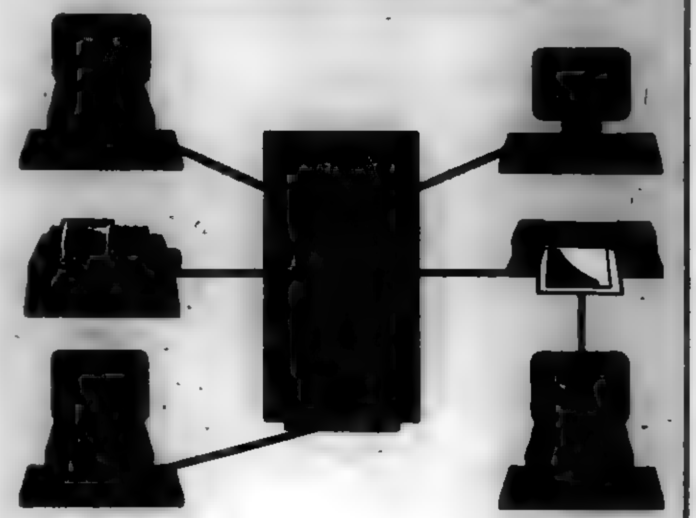

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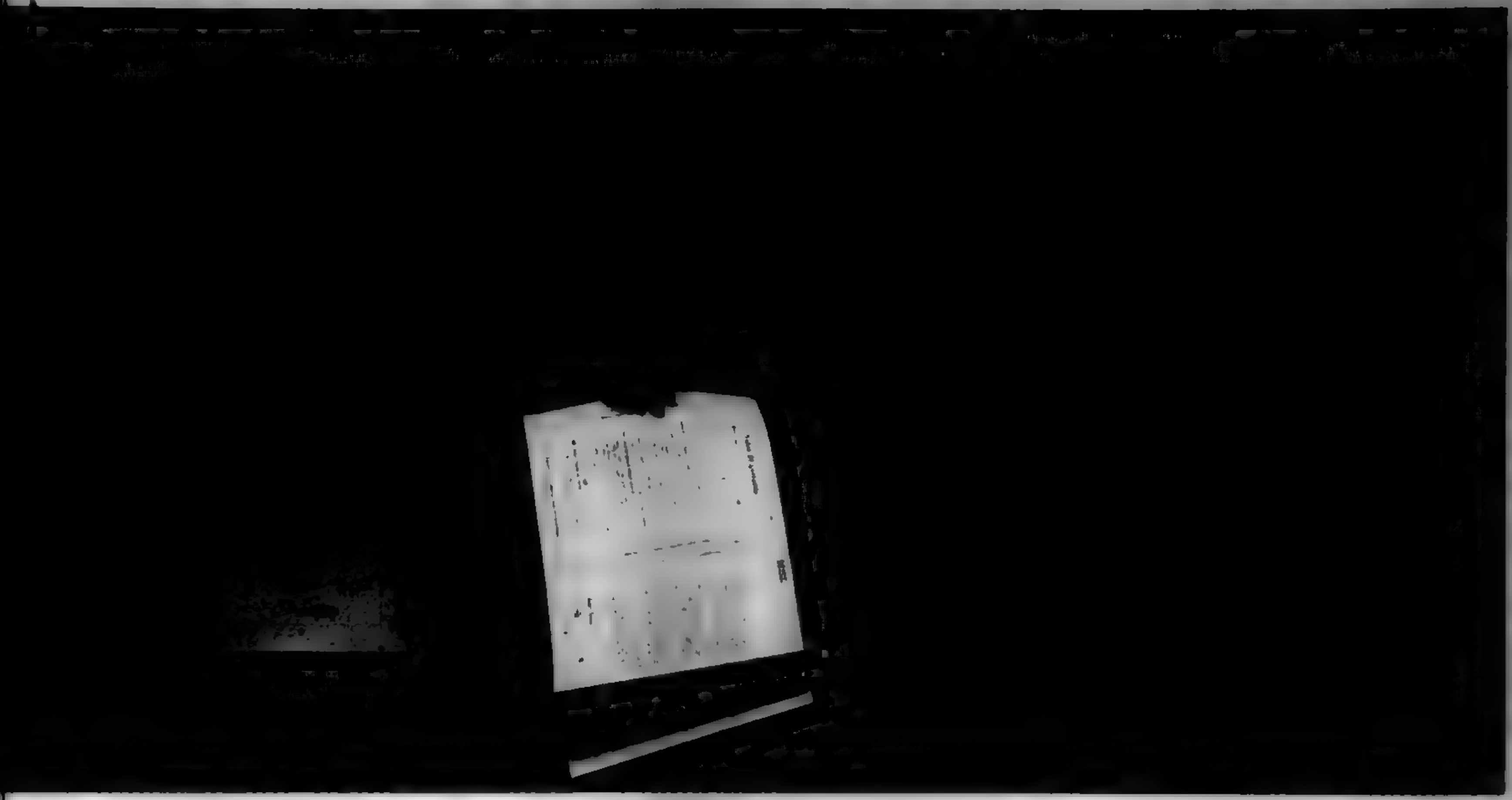

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OA FOCUS:
SYSTEMS SOFTWARE

Software planners and purchasers face a difficult challenge: keeping up to date on the state of the art in software today while charting a course for the growth and development that will be needed tomorrow.

This issue of OA Focus provides help in both areas [illegible] planning and implementation easier.

Decision Support Systems 27
Knowledge-Based Systems 31
Support Tools for Microcomputing 33
Information Centers: Solution or Problem? 37

DECISION SUPPORT SYSTEMS

BY LEONARD P. BERGSTROM

Forces currently at work within the information processing industry are posing tremendous challenges to both users and vendors of decision support systems (DSS) products and services.

One of these forces is the advent of the information revolution. Another is the growing trend toward computer literacy and acceptance. Together, these two forces have created a dynamic and expanding marketplace, accompanied by extraordinary demands made by end users on suppliers. At the same time, the relentless march of technology continually offers better and less expensive solutions in the areas of hardware, software and communications.

These rapidly evolving factors have profoundly influenced all sections of the industry. They have also helped create a major opportunity — not only for firms in the computer business, but also for the individuals responsible for the delivery of information services within corporations.

Vendors and authors of DSS products have been particularly affected by all this movement. All face the need to effect a quick transition in order to capitalize on the opportunities available and fulfill an expanding list of requirements. Proper resources must be directed in delivering software and services which not only meet current and latent demands, but which also integrate evolving technologies and prepare for future challenges.

This situation has led to an extremely competitive environment, characterized by a diversity of approaches, many instances of product overlap and an increasing number of cooperative "arrangements" between companies.

To understand DSS software trends, one must understand three industry forces — the demand for information, the increasing computer literacy and acceptance and the need for integration. End users are basically concerned with three types of information: private (owned and controlled by the individual or department); corporate (historically owned and controlled by DP); and public data bases (such as financial, econometric or demographic sources).

Of particular importance to the end user is the window to the corporate data warehouse. In today's business world, information is a valuable corporate resource, and its access is a critical ingredient to corporate survival and success. The DP organization can no longer regard corporate data as something removed from the everyday world, locked away in Cobol programs. Instead, DP must take an active role in making corporate data available to the broad range of managers throughout the corporation and encouraging the use of this information in as many ways as possible.

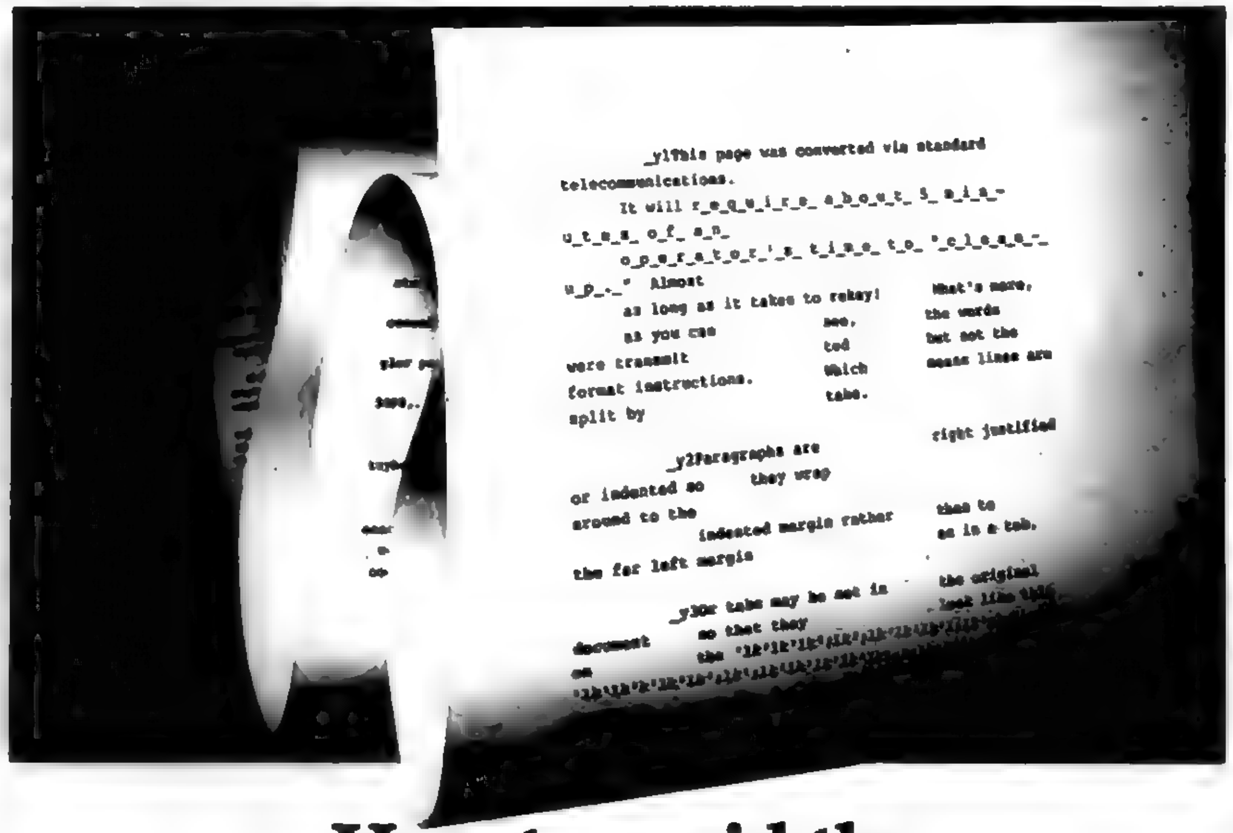
Accessing external and corporate information has been a major activity area for many DSS vendors. Software must provide either direct access to summary and aggregate data residing in production systems or must closely interface to data base management packages like Information Builders, Inc.'s Focus and Mathematica Products Group Inc.'s Ramis II, traditionally the gateway to corporate information resources.

Similarly, in the external data base arena, many software products support a wide variety of offerings. Two good examples are marketing and econometric information. Analect (OR/MS Dialogue, Inc.), Express (Management Decision Systems, Inc.) and Stratagem (Integrated Planning, Inc.) all support Sami, Nielsen and Majers data, used in market research and analysis departments in the consumer goods industry. In the econometric area, Fame (Citicorp Information Services) directly accesses Citibase, and Xsim (Chase Decision Systems) supports Chase Econometrics.

DP must take an active role in making corporate data available to the broad range of managers and encouraging the use of this information in as many ways as possible.

One of the interesting trends in software on the information center level is the blurring of the traditional distinction between financial and data management systems. In our benchmark-based reports, *Financial Modeling Decisions* and *Data Management Decisions*, more and more products qualify as able to handle the different problem sets necessary to be included in both publications. Until recently, few products could successfully complete entries for both these reports. Currently, Analect, Express, Nomad 2 (D&B Computing, Inc.) and SAS (SAS Institute, Inc.) are represented in each published report. A number of others will soon be completed, including AS (IBM Information Network), EMS (Economic Sciences Corp.), FCS-EPS (EPS, Inc.), Interactive Financial Planning System (IFPS from Execucom Corp.) and System W (Comshare, Inc.).

More of the financially based systems seem to be adding stronger data management capabilities than not. Data management has traditionally been one of the weakest aspects of DSS systems. To shore up this deficiency, DSS products have appeared with integrated multidimensional data



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bases; others have developed hierarchical consolidation systems or interfaces to relational data base management systems. Three products have modified the public domain version of RIM to beef up capabilities in the information management sector.

Understanding the increasing computer literacy and acceptance is another key to meeting the challenge of the fu- More and more business schools are requiring students to purchase a personal computer before admission. This literacy does not imply that all current executives will buy a micro, roll up their sleeves and begin programming. It does indicate that decision makers will have a better understanding of the current technology and what can be accomplished with it.

By accepting automation, members of the new generation of managers are increasing their own productivity, as well as contributing to the overall use of automation in the work place. This growth has caused coincident booms in microprocessing, spurred the need for sophisticated communications and established the information center as an integral part of corporate structures.

With the advent of the 16-bit micro with its larger addressable memory size and the plummeting cost of peripheral storage, more DSS authors are developing micro versions of their products. Although a few vendors still employ the ostrich approach to personal computing, this attitude is rare. Microcomputer software is a hot button in the industry today. Minimally, an interface must exist to popular or existing products.

Although the vast majority of DSS software vendors have jumped on the distributed bandwagon, the approaches, styles, capabilities, delivery and pricing vary as much as those of the mainframe versions. These products can be grouped into two general categories: subset and full versions of mainframe functionality. The list of these products is much too long to cover in detail; but several examples will highlight general capabilities and common concerns.

One philosophy utilizes the personal computer for the functions for which it is best suited: modeling, reporting, information maintenance and so on. Boeing Computer Services Co. embodies this philosophy in the EIS micro workstation, which provides mainframe communication and emulation of EIS full-screen capabilities, local data collection and modification, 3279-style color graphics and links to popular Calc products. On the IBM PC, the predominant delivery vehicle in the arena today, the user can operate either on-line or locally and is freely allowed to switch back and forth between the two modes.

Many leading DSS vendors offer subset versions of their products. These include several of the more well-known industry names as Execucom Systems Corp. (IFPS/Personal), Comshare, Inc. (Micro W), EPS, Inc. (Micro FCS) and Xerox Computer Services (Control). Generally, all two-dimensional capabilities are found in the micro version, leaving the mainframe environment for more complex tasks like hierarchy consolidation or activities requiring heavy I/O or data management needs such as risk analysis. One author, Lloyd Bush, has four separate micro-based offerings, the top end of the line very similar to the mainframe version.

Among the other software vendors that have implemented micro versions with 100% capability are the following: Command/DSS (Decision Support Systems, Inc.); CPL/Tactix (Mercur Planeringssprak); FPS/PC (STSC, Inc.); Maps/Pro (Ross Systems, Inc.); Micro Foresight (Information Systems of America, Inc.); Micro Impact (MDCR, Inc.); Prophit II (Via Computer, Inc.); and Spread (L & L Products, Inc.).

All these products offer built-in communications, and the vast majority take advantage of the screen-oriented features of the microcomputer and its strength in the area of user interface. Other trends that emerge in the field are the inclusion of the Visi-like capabilities (such as the statement, "the equivalent of any Calc product"), the use of C or Pascal as the underlying development language and aggressive volume discount policies. It is worth noting that another stand-alone micro product, Encore by Ferox Microsystems, Inc. actively interfaces to the most popular mainframe offerings.

These developments offer real hope for the manager of corporate in-house time-sharing services in providing distributed DSS while solving some of the control, planning and support problems engendered by the rapid proliferation of microcomputers in departmental and other end users' hands.

The availability of compatible microcomputer and mainframe DSS products with built-in communications will satisfy the decentralized, stand-alone user. In addition, a pattern of growth is available when applications expand beyond initial expectations; require the networking of data, models or reports; and demand the processing capabilities and sophistication of the mainframe.

One of the most pressing concerns of DSS users is integration, and this subject poses challenges to suppliers on several levels. The needs vary relative to hardware, software and end-user viewpoints. In the hardware area, numerous decision support centers are faced with the problem of interfacing micro, mini and mainframe software, many times involving diverse operating systems and manufacturers. Some DSS products run on multiple environments or, in the IBM arena, with compatible VM and MVS versions. This flexibility in delivery systems is especially important to large organizations with multiple decision support center offerings.

Two approaches have been used to satisfy various DSS requirements. One philosophy says that everything needed by the user should be embedded in a single system; when the user is in that system, everything is readily available for use. Other systems adopt the philosophy of concentrating on specific activities; they provide interfaces with data base management systems, with graphics packages, risk analysis, time series analysis, statistics and others. A popular example of this approach is named Fits (Focus, IFPS, Tell-A-Graf, SAS).

In the hardware and software issues of integration, the DSS user must be aware that the presentation of integrated solutions is often more of a marketing concept than a practical reality. It is advisable to scrutinize each vendor's claims closely.

A final challenge to the DSS vendor is the need to provide user-seductive software — user-friendly is no longer enough. A comprehensive-solution orientation is required. DSS software must be able to grow with increasingly sophisticated user needs and must be attractive to all types of users. DSS vendors have responded by increasing their efforts in such critical areas as documentation and education, full-screen interfaces, expert systems and quality support and delivery.

In conclusion, the demand for information, the greater computer literacy of the population and the proliferation of increasingly sophisticated micros along with the need for integration have brought heavy pressures to bear on DSS vendors. The firms that succeed will be the ones providing total solutions. Because of the rapidly evolving marketplace, users of DSS should regularly evaluate their software offerings. **OA**

Bergstrom is vice-president of marketing and a principal of Real Decisions Corp., a consulting and research firm in Darien, Conn.

A SAMPLE OF AVAILABLE FINANCIAL MODELING SYSTEMS

Analyst
OR/MS Dialogue, Inc.
New York, N.Y.

CA-Autotab
Computer Associates
International, Inc.
Jericho, N.Y.

Command/DSS
Decision Software
Systems, Inc.
New York, N.Y.

Context MBA
Context Management Systems
Torrance, Calif.

Control Strategist
Xerox Computer Services
El Segundo, Calif.

CPL/Tactix
Mercur Planeringssprak
Stockholm, Sweden

CSS/Final
Dun & Bradstreet
Computing Services
Wilton, Conn.

Cuffs-80
Cuffs Planning
and Models, Ltd.
New York, N.Y.

EIS
Boeing Computer Services
Seattle, Wash.

Empire
Applied Data Research
Princeton, N.J.

EMS
Economic Sciences Corp.
Berkeley, Calif.

Encore
Ferox Microsystems, Inc.
Arlington, Mass.

EPS
Data Resources, Inc.
Lexington, Mass.

Express
Management Decision
Systems, Inc.
Waltham, Mass.

FCS-EPS
EPS, Inc.
Windham, N.H.

Foresight
Information Systems
of America, Inc.
Norcross, Ga.

FPS
STSC, Inc.
Rockville, Md.

IDSS
Management and Planning
Software Group
Toronto, Ont.

IFPS
Execucom Systems Corp.
Austin, Texas

Impact
MDCR, Inc.
East Brunswick, N.J.

Input
Schonfeld Associates, Inc.
Evanston, Ill.

Maps/Model
Ross Systems, Inc.
Palo Alto, Calif.

Model
Lloyd Bush and Associates
Dallas, Texas

Powerplan
Quasar Systems, Ltd.
Ottawa, Ont.

Prophit II
Via Computer, Inc.
San Diego, Calif.

QED/Insight
TSR, Inc.
Great Neck, N.Y.

SAS
SAS Institute, Inc.
Cary, N.C.

Simplan
Simplan Systems, Inc.
Chapel Hill, N.C.

Spread
L&L Products, Inc.
Hanover, N.H.

Strategem
Integrated Planning, Inc.
Boston, Mass.

System W
Comshare, Inc.
Ann Arbor, Mich.

Tabol
General Electric
Information Services Co.
Rocksville, Md.

TFM
Comshare Target Software
Atlanta, Ga.

Xsim
Chase Econometrics/
Interactive Data Corp.
Waltham, Mass.

KNOWLEDGE-BASED SYSTEMS

BY ROBERT KELLER AND PETER TOWNSEND

One of the world's first knowledge-based expert computer systems, a program called Dendral, was begun in 1965. "Knowledge-based" refers to a system's ability to perform tasks at the level of a human expert, and Dendral's task was to emulate a human expert's performance in deducing the molecular structure of a compound, given its chemical formula and some mass spectrographic data.

Today the technology of expert systems has produced several successes and propelled the field of artificial intelligence into the public view. Systems have appeared that have raised hopes of truly intelligent computer assistance

for professional experts in any discipline.

Two of these are Stanford University's Mycin, which performs diagnosis of bacterial blood infections at a level of competence reported equal to those of the best physicians, and Xcon, which was developed for Digital Equipment Corp. to provide expert assistance in configuring the VAX line of computers.

Most early expert systems, however, were aimed at solving problems in scientific and engineering areas. Only in the last two or three years have workers in AI begun to apply knowledge-based systems to business problems.

There are now many start-up AI companies interested in developing, for business and industry, products that exploit the fruits of research in expert systems. To date, although several companies are nearing the end of their development phases, very few have successfully released a commercial knowledge-based product.

Application generators: Expert system application generators are more common than knowledge-based products. These application generators possess the ability to reason in a way similar to human reasoning, but are independent of any particular area of specialization. To use such a product, a human expert must enter extensive knowledge of a domain, a task that may take many months or years. (A knowledge domain is an area of expert endeavor; an expert in that area is a domain expert.)

Among the excellent media for the company that wishes to build a proprietary knowledge base are products such as Timm (General Research Corp., Santa Barbara, Calif.); S1 and M1 (Teknowledge, Palo Alto, Calif.); and KEE (Intelli Corp., Palo Alto, Calif.). The products generally possess one or more techniques for representing knowledge and can apply different techniques of reasoning, depending on the requirements of the domain being explored. In addition, they include fairly user-friendly interfaces to help the expert develop a complete and consistent compilation of the expertise gained over many years of practice.

Knowledge-based products: Easier to work with is a generation of intelligent products that come with a predeveloped knowledge base for a particular domain. Several would-be AI vendors are known to be working on such products, although many of them prefer not to have their developmental efforts publicized.

The first company to have released an off-the-shelf knowledge-based product is Intelligent Business Systems (IBS) of New Haven, Conn. IBS markets a complete general accounting software package along with the hardware needed to run it. The IBS accounting package runs on a VAX 730.

Included in the package is an extensive knowledge of accounting practices and a query facility, Easytalk, which allows users to ask complex accounting questions in natural English.

For example, in addition to asking questions based on simple retrieval requests — such as "How many IC96's do I have in stock?" — the user can assume the system understands relationships in a bill of materials. The user could, for example, ask, "How many IC96's do I need to build 300-dozen level-2 tractors?" Even more complex reasoning is available to answer such questions as "How many of them should I stock to fill an order of this size next time?"

The successful IBS release of Easytalk and its companion accounting software is one of the first signs that knowledge-based systems are ready for the commercial market. Many more such products are likely to follow.

Two other areas being explored for knowledge-based applications are risk management — particularly in the insurance industry — and financial planning. Although these two areas are receiving substantial attention just now, any area in which people are clearly expert at some task is a candidate for knowledge-based system application.

Among the most credible young contenders in the insurance field is Syntelligence (Menlo Park, Calif.), which has the services of several well-known AI people as well as experienced business management, and which is believed to have completed a prototype knowledge-based underwriting system for a major New York casualty insurance company.

Although this work cannot yet be considered a commercial product, it represents successful groundwork from which a series of knowledge-based products could evolve.

Features of knowledge-based products: Although phrases such as "user-friendly," "smart systems," and "Help facility" have been in use for some time now, the new generation of knowledge-based products is giving these terms decidedly enhanced meaning. Further, in addition to much deeper domain knowledge than traditional software products, knowledge-based products exhibit something like self-awareness in the sense of being able to explain why they took certain actions and also being somewhat aware of what they don't know.

At this time, Courtier, a system in the financial planning area, stands out as an excellent example of the features that should be expected from most future knowledge-based products. Courtier — French for broker — is a security portfolio advisory system developed at Cognitive Systems, Inc. (New Haven, Conn.) for installation in the lobbies of most branches of a major Belgian bank. Its purpose is to provide high-quality investment advice to customers of the bank, without the need for highly-paid investment analysts in each branch.

Because of natural language user interfaces that possess a deep knowledge of the user's situation, knowledge-based products can come much closer than previous products to the user-friendly ideal — being able to get what I want from the computer when I want it and without help from anyone else.

Courtier, for example, is to be used directly by the bank's customers, regardless of whether they have ever used a computer system before. The system, which will accept both conversational French and English input, offers specific recommendations about stock purchases and portfolio distribution and will also answer factual questions about the Belgian stock market.

For a new customer, Courtier conducts an interview to collect information about the user's financial situation. Then, based on the user's current portfolio distribution, common sense investment practices and current market conditions, Courtier gives advice about which stocks to buy or sell.

Although Courtier can conduct an interview with a customer and offer investment advice without any prompting from the user, the user may interrupt at any time. The user can then express likes or dislikes or ask questions about an individual stock, the advice given or investment matters in general. This mixed-initiative user environment is another essential aspect of the meaning of user-friendly for the new generation: The system has the expertise to operate in a free-running mode, but its self-determination can always be overridden by the user.

Depth of knowledge: Knowledge-base generally means an extensive collection of facts, rules and guesses which an expert in a domain uses in achieving expertise. The knowledge base in essence is a model of some human expert. Courtier, for example, is a model of an expert human investment adviser.

Like a human financial analyst, Courtier can give detailed investment advice only if it has a detailed financial profile of the customer. Courtier gives the customer the option of completing a brief or in-depth financial questionnaire, including current investments, assets and liabilities and cash available for investment.

Based on this information, Courtier may make stock recommendations or it may determine that, according to its built-in investment policy, the customer's assets are not large enough to warrant investments in the stock market. As always, the customer can choose to override the system's recommendations.

If the customer decides to invest in the stock market despite Courtier's recommendation to the contrary, the system would present a recommendation of stock purchases appropriate to the customer's financial profile and current portfolio.

At this point, the customer could say, "I don't want any utilities," and Courtier will respond by revising the portfolio to reflect this preference.

Self-awareness: One of the more frustrating aspects of traditional query facilities is that they tend to interpret questions too literally and provide answers that are less than the user really wants. Knowledge-based products have the means to discover the real question that's being asked and to provide a meaningful answer. Courtier, for example, uses its knowledge of the market to provide helpful answers to questions where a simple yes or no might be adequate. For example, a customer might ask, "Should I buy SGB?" A simple yes or no would be adequate, but Courtier is more likely to respond with something like "Soc. Gen. de Banque would not be a bad investment (it has average market performance); however, Kredietbank would make a better investment in the banking sector."

As another example, assume the system has only current price and earnings data available and that the customer has asked for a five-year history of price and earnings for SGB. Data base query systems are likely to tell the user the question cannot be answered. In contrast, the knowledge-based system is aware that it can't answer the question as asked, but that it can answer some part of the question. Its belief system suggests that some part of the total answer is better than no answer at all.

Courtier would produce an answer such as, "I do not yet have historical data available. However, this current data may be useful: The price-to-earnings ratio for SGB is 6.3."

Research applications of knowledge-based technology that have been done are many and are generally discussed in the literature. They have served well in their role as precursors of a possible future for intelligent computer systems. However, a second generation of systems is now bringing this potential into reality in ways that can benefit everyone.

Both through systems that allow expert personnel to transmit their own expertise to the machine and through knowledge-based off-the-shelf products, the computer is being transformed from a widely accepted, competent clerk into an intelligent professional. OA

Keller, president of Renaissance International Corp. in Harvard, Mass., consults both with vendors and users of AI products.

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SUPPORT TOOLS FOR MICROCOMPUTING

BY ANN L. MORLEY

End users are finding themselves faced with a wide array of technologies. The range of this technology is good evidence that no single blueprint will meet the requirements of architects charged with the design and maintenance of productive personal computing.

A company that attempts to organize for managerial productivity will find its ability to do so is influenced by many support tools, among them financial modeling and planning systems, fourth-generation DBMS-based languages, graphics software, spreadsheets, text processing and retrieval packages and natural language query systems.

Furthermore, their implementation on mainframes, minicomputers and/or personal computers and their ability to connect with users intra- or intercampus merely enhances the architect's opportunity to fashion a tool that takes into account a number of organizational considerations.

The information systems manager in many instances will find that the current crop of decision support tools is composed of familiar faces. Academics and industry pundits have envisioned a comprehensive system with highly general ways of handling information, but this system is far beyond the capabilities of the offerings on the marketplace today. Users, as a result, are looking at discrete solutions to meet the short-term requirements of end-user constituencies. Suppliers of single-purpose systems tools and languages are investing significantly in enhancements for broader-based decision support or are looking for third-party alliances for products that complement their own.

Organizational decision makers will continue their cry for improved software as hardware resources are distributed throughout their firms.

Application tools most frequently implemented for decision support read like an excerpt from the table of contents of any major packaged software directory. This article will briefly review the programs organizations are using to solve ad-hoc information needs and will look at what users can expect from software developers in the coming year.

Among the first to embrace the concept of decision support were a group of software houses and time-sharing companies offering programs developed in the 1970s to automate financial modeling and planning applications. These companies were a clearcut example of what the marriage between computers and management science might produce, and they became vigorous proponents of DSS in the '80s. The market for this type of application will top $587 million this year, according to International Data Corp. (IDC), the Framingham-based market research firm. Of that amount, $405 million will find its way into the pockets of the remote computing firms.

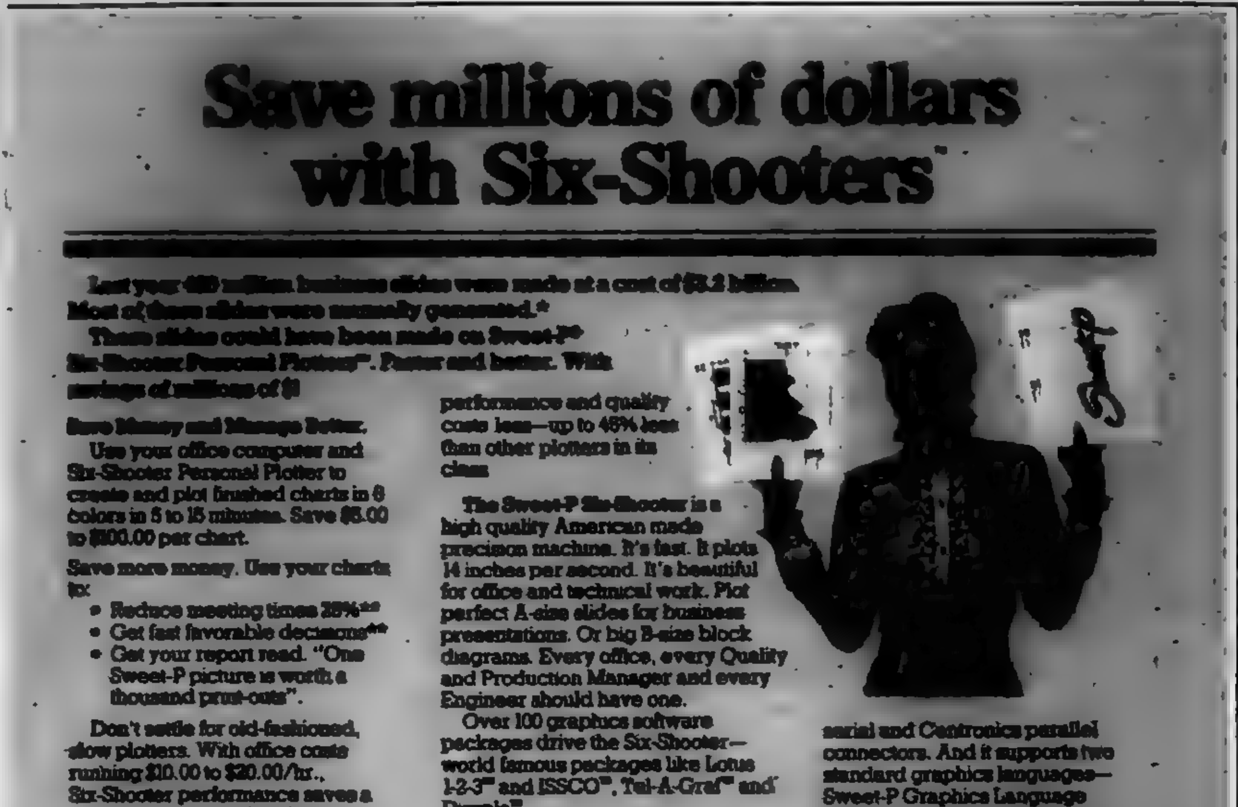
Market dynamics favor the packaged software supplier; these firms can expect to grow at a rate of approximately 40% compounded over the next five years. Moreover, IDC data indicates that at the end of 1983 only 10% of U.S. IBM mainframe sites had, in fact, implemented financial modeling and planning systems.

Users will find more and more companies competing for their dollar. Some are industry stalwarts, like Execucom Systems Corp. (Austin, Texas), Management Decision Systems (Waltham, Mass.) and Evaluation and Planning Systems, Inc. (Windham, N.H.). Others are new entrants like Comshare, Inc. (Ann Arbor, Mich.), Infotym (Cupertino, Calif.), Fame Software Corp. (New York, N.Y.) and a host of vertically niched companies enhancing their industry-specific offerings with planning and forecasting features.

The spreadsheet pioneered the widespread use of personal computers for financial budgeting and forecasting. In large and small businesses, however, there exists a group of users who desire access to some features that only modeling languages support. Ferox Microsystems (Arlington, Va.) and Addison-Wesley (Reading, Mass.) have targeted this particular customer, as have the mainframe software companies, which are steadily announcing personal computer versions of their software. For example, Comshare's clientele have access to Micro W; Execucom is shipping IFPS/Personal; Lloyd Bush and Associates (New York, N.Y.) is marketing Simple Basics; and Information Systems of America (Norcross, Ga.) is providing Micro-Foresight.

The marketplace for modeling applications on personal computers is predicted to grow at an annual rate of approximately 78% compounded over the next five years. It is exactly the kind of application users will want to distribute as more powerful machines and workstations become the order of the day.

In 1984, integrated and integrating software became the defining characteristics of the personal computer software industry, and they are becoming the pivotal strategy of large systems software houses as well. The integration of broad-based applications — graphics, report generators, data base management, spreadsheets and queries — stems from two not-incompatible growth opportunities: the need to wring incremental revenue from an expanding product line and the requirements of end users for friendlier front ends. As a result, vendors of financial modeling and planning systems face some competition from the likes of Information Builders (New



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York, N.Y.), Mathematica Products Group (Princeton, N.J.), D&B Computing Services (Wilton, Conn.) and Infodata Systems (Falls Curch, Va.). These four vendors dominate the marketplace for fourth-generation DBMS-based languages, which are now featuring a complement of statistical and analytical tools.

In spite of marketing literature to the contrary, the financial modeling and planning system is distinguishable from the fourth-generation DBMS-based language. Financial modeling and planning systems analyze alternatives using conditions set up in models. These systems typically perform complex operations on relatively small sets of data. The fourth-generation DBMS-based language optimizes inquiry, management, validation and especially reporting of large amounts of data.

As users confront requirements in 1985 and beyond, they will find they need to both manipulate *and* manage data. Two factors make this issue more urgent, especially in view of the rapid expansion of the user population. Those factors are the increasing acceptance of the information center and the distribution and sharing of corporate information resources, embodied for the time being by the micro-to-mainframe link.

The quantity and detail of data available for users of spreadsheets and modeling systems is skyrocketing. Users, looking to external sources like the on-line data base services vendors, are simultaneously expecting MIS to make available information residing on production systems.

Professionals supporting in-house clients have always been challenged by the need to control, coordinate and secure the corporate data resource. As a result, they have been very receptive to the strategies leading data base management systems (DBMS) vendors have evolved for developing and safekeeping the information center data base. More often than not, the information center is the organizational entity through which end-user requirements are managed at large sites. At yearend 1983, for example, almost 60% of U.S. sites supporting an IBM 3080 series had implemented or were in the process of establishing an information center, according to IDC data.

The impetus behind the DBMS shops' effort to exploit new opportunities in end-user markets is threefold: the commercial viability of relational data base technology; the long-term attraction to users of integrating the piecemeal solutions that have characterized the business environment in the early and mid-1980s; and the additional revenues they can generate from multiple DBMS licenses.

Vendors offering relational DBMS or software that supports relational views of data include IBM, Cullinet Software (Westwood, Mass.), Applied Data Research (Princeton, N.J.), Oracle Corp. (Menlo Park, Calif.), Relational Technology (Berkeley, Calif.), Data General, Cincom Systems (Cincinnati, Ohio) and a host of others.

Software shops are accommodating the requirements of end-user data base management in two different ways. Independents like Cullinet and Applied Data Research believe users are best served by one DBMS capable of supporting production and end-user applications. Others — IBM, for example — would have MIS support one type of DBMS for production systems and another for end-user and OA systems.

The introduction of DBMS technology into the information center and the demand of end users for organizational data have spawned the implementation of micro-to-mainframe links. These links allow host computers to support decision support applications on personal computers; quite frequently they provide the user with an alternative to mainframe- and mini-based planning or spreadsheet systems. The resounding success of companies like Lotus Development Corp. (Cambridge, Mass.) in corporate America has brought new opportunity to large systems software houses that are complementing their products with micro-based analytical tools.

By and large, two kinds of link products are available. The first — probably the one that will predominate over time — is the broad-based generic link that supports a wide variety of file structures. Informatics (Woodland Hills, Calif.), Cullinet and a host of new entrants like Carleton Corp.'s CQS-Infolink (Cambridge, Mass.) are representative examples of this type. Cullinet has gone so far as to strike up agreements with Data General and Digital Equipment which allow their customers access to data residing in end-user files on IBM mainframes for manipulation on (typically) DEC or DG workstations.

The second type of link is delivered by vertically niched companies like McCormack & Dodge (Natick, Mass.), Management Science America (Atlanta, Ga.) and Software International (Andover, Mass.). These products allow users access to the transaction data generated by the applications each software house has installed for downloading to the personal computer.

The implementation of micro-to-mainframe links has been slow, in part because of maintenance, security, and cost considerations. Their implementation over the next year will cement many advantages the micro has already brought to the development of the user interface. A large proportion of local computing resources will become dedicated to turning the workstation into a front-end unlike those that currently exist for decision support. Software developers constantly monitor the evolution of touch screen technology, the mouse, natural langauge queries and more sophisticated Help facilities.

Model	IBM Sites	Sites With Info Center	%	Sites With PC [illegible]	%
[illegible]	14	1	7.1	—	—
All 370	118	6	7.6	11	9.3
4331	118	6	[illegible]	[illegible]	12.6
4331-1	33	2	6.1	3	9.1
4331-11	2	—	—	—	—
4331-2	125	11	8.8	18	14.4
Subtotal	[illegible]	20	[illegible]	37	13.3
4341	202	31	15.3	35	17.6
4341-10	13	1	7.7	2	15.4
4341-1	86	16	18.6	11	12.8
4341-11	13	3	23.1	7	53.8
4341-2	141	36	25.5	33	23.4
4341-9	7	1	14.3	—	—
4341-12	23	5	21.7	4	17.4
Subtotal	484	93	19.2	95	19.6
3031	34	11	32.4	9	26.5
3032	5	—	—	—	—
3033	64	29	45.3	24	37.5
3081	61	36	59.0	23	37.7
3083	48	28	58.3	19	39.6
Subtotal	212	104	49.1	75	35.4
Total	1,103	226	20.5	218	19.8

Sites defined by the primary CPU. Chart © IDC.

Use of information centers at IBM sites, year-end 1983

The major challenge faced by users grappling with the promise of decision support technology is the integration of discrete computer-based activities into an institutional information resource. As the above analysis makes clear, no single approach currently comes close to serving diverse user groups. Although tremendous strides have been taken by software vendors trying to marry new technologies with old, significant challenges remain. Management scientists, for instance, voice concerns about organizational productivity while software developers attempt to leverage advances in communications architectures and standards and the possibilities inherent in expert systems, portable operating systems and the like.

How these issues will be resolved for market consumption will be the subject of endless speculation. One thing, however, remains absolutely unquestioned: users have had a phenomenal impact on the economics of information processing. OA

Morley is senior software consultant in the Professional Services Group at International Data Corp. Statistical data in this article are from two of her more recent efforts: "Trends in Decision Support" and "The IBM Software Environment."

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INFORMATION CENTERS: SOLUTION OR PROBLEM?

BY NAOMI KARTEN

While information centers are busily attending to users' micro needs, programmers are feeling their security being pulled out from under them by rampant end-user computerism. And, at the same time they are becoming an increasingly potent user tool, personal computers seem to be accentuating the rift between users and data processing.

Given the exploding demand for user access to computerized information, DP senior management and information center planners had predicted that transferring some of the load to users would help relieve the burden on DP. This, in turn, would help reduce the adversarial nature of the user-DP relationship. Yet, if anything, the conflict is increasing. Information centers — intended to be part of the solution — may inadvertently be contributing to the problem. Expanding the information center scope to support both users and DP may be a worthwhile strategy.

In providing services to both users and DP, information centers could stay on top of the issues and concerns of both sides. Rather than contributing to the conflict, information centers would help improve overall data resource management through increased understanding of the data needs of users and DP.

Information centers thus far have been the key to fourth-generation and personal computer technology in many companies. Neither users nor DP can go it alone. Expanding the scope of the information center would permit a unified approach to training and support and might help ease DP into the new reality in which both users and DP have a piece of the technical action.

This approach would also help ease DP's antagonism toward information centers. Initially, DP departments largely ignored the single-minded orientation of centers toward the support of users in the newest technological tools. IBM recommended that information centers promote this concept to DP in order to gain acceptance, but many tended to forget DP in the eagerness to get users up and running.

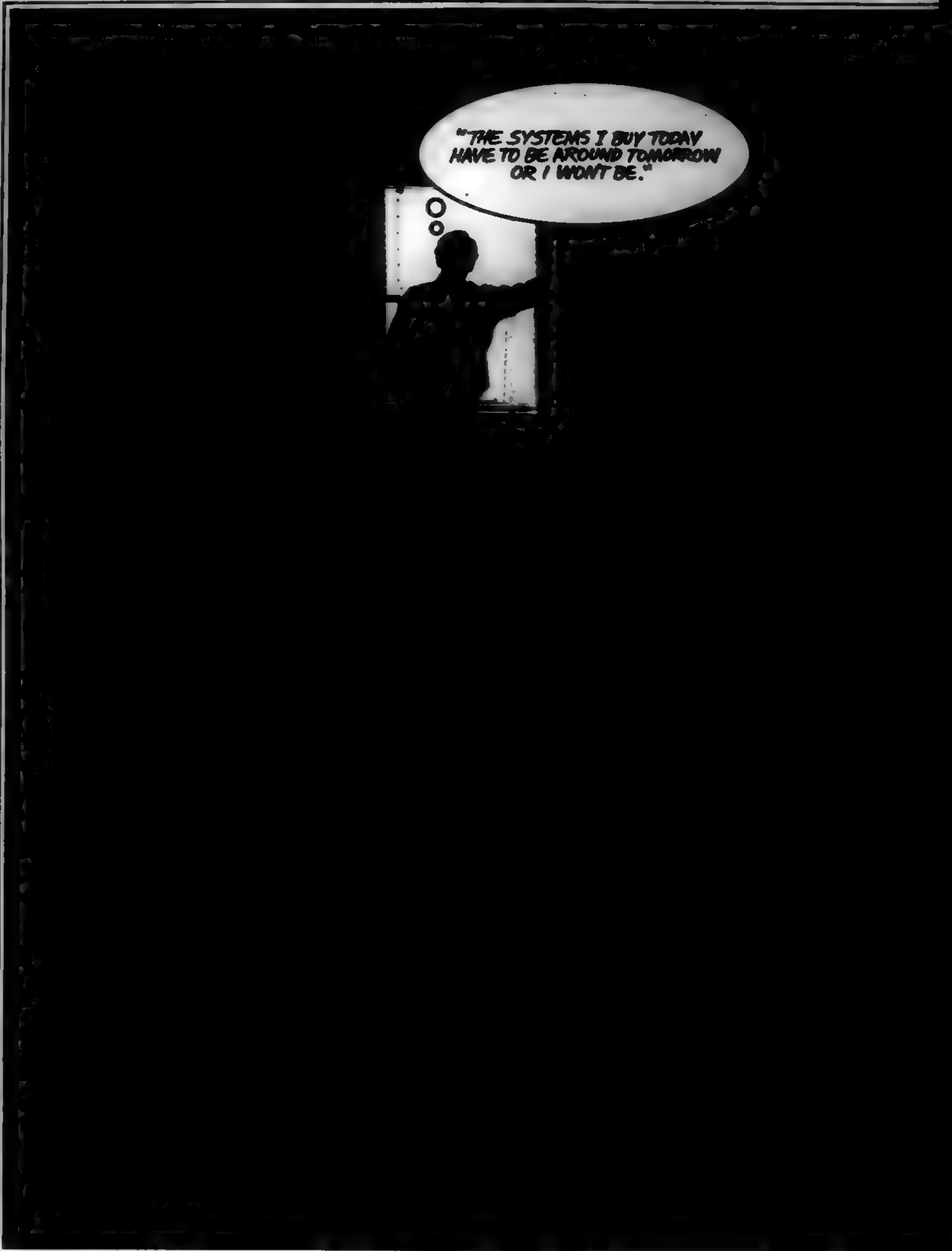
Information center personnel, selected for their service orientation and patience, tended to thrive on this dedication to users. Ask such personnel why their company has an information center. Most will talk about user needs for access to data. They'll describe user productivity. They'll refer to users' needs for decision support capabilities. And — not to be forgotten — they'll remind you of the ever-growing application backlog, which, at least in theory, users can help to reduce.

Ask these people whom they support, and they'll say the financial, or planning, or marketing people or whichever segments of the user community they've been working with. Rarely will they list DP as a recipient of their services, even if they do in fact provide a modicum of support to their DP peers.

It's not surprising that in pre-micro days this "pure user support" approach was successful. From the beginning, information centers attracted corporate users eager for computer skills. Users learned to prepare analyses and generate reports within hours and days, compared with typical DP timeframes of months, years — or never. In spite of mainframe software that, in its infancy, was often user-hostile at best, users demonstrated an ability to use fourth-generation languages to an extent unanticipated by DP user-watchers.

DP departments graciously accepted the fact that information centers were teaching users to do things DP didn't really want to do — boring reports and repetitive analyses of analyses. Centers took some heat off DP and reduced the interruptions in DP's day (incidentally making it more difficult for DP to blame project slips on user demands for ad hoc support). DP was able to get on with its business of developing and managing production systems and — overall — being in charge of computer technology and the use of computers in the corporation.

As more and more users took on mainframe programming responsibilities, however, it became apparent that DP was no longer completely in charge. Users were being encouraged to learn the newest mainframe languages, the graphics packages and the full range of micro spreadsheets, data managers and word crunchers — and DP


"THE SYSTEMS I BUY TODAY HAVE TO BE AROUND TOMORROW OR I WON'T BE."

wasn't. As DP's total responsibility for all things in corporate computerdom diminished, the user-DP relationship headed simultaneously in opposite directions.

In some DP departments, terms like "partnership" and "synergy" started to be heard. With information center training, users were able to describe their business needs to programmers in accurate technical terms. Programmers, in turn, were able to report on project status in terminology meaningful to users. Users and programmers were working together better than ever.

In other DP departments, the relationship worsened. Using fourth-generation languages, users were turning out programs faster than their third-generation Cobol-bound DP peers. Instead of a partnership, a strong sense of turf politics emerged. Many of these programmers — and their managers as well — began to perceive the information center as responsible. Included in that perception was a view of information centers as part of the DP organization, but working to aid and abet users to encroach on DP's territory.

As personal computers stormed onto the corporate scene, the situation took a plunge for the worse. Regardless of whether DP support has been generously offered, rigidly implemented or totally withheld, users have been able to become computer-savvy. No DP policy can prevent a user from using a home computer, reading a personal computer magazine or visiting the corner computer store for a demo of the latest dazzler.

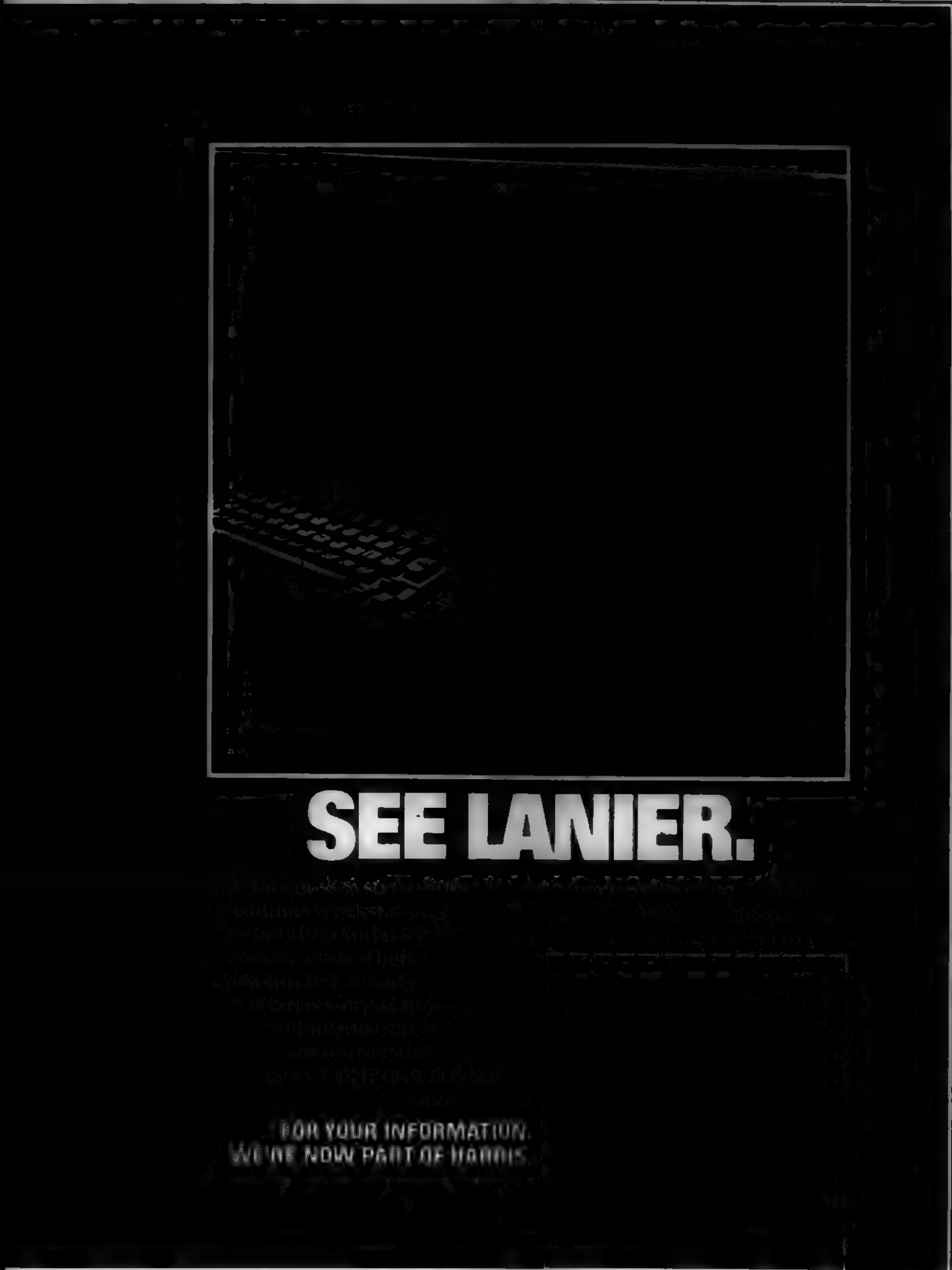
To make matters worse, users find personal computers exciting: a new, different and often better way of getting the job done. Many programmers, immersed in the development of mainframe systems, are either uninterested in "moving down" to personal computers or are prevented by their management from taking time to learn this new technology. Some programmers, amazingly enough, are intimidated by personal computers and anxious about their ability to use them properly. The result is that many programmers are less familiar than their users are with micro technology.

Of course, it's not personal computers per se that DP resents; rather, it's what this technology represents. Personal computers symbolize to DP the loss of power and authority and control over users. And this situation is absolutely irreversible: DP will never again be completely in charge of the use of computer technology in the corporation.

Given the fragile nature of the DP ego, this situation is difficult at best. But it can be turned into an opportunity by information centers. Information centers can expand the scope of their mission and their mode of operation to support both users and DP. The modifications in training, support, staffing and overall management are small, relative to the potential benefit in the user-DP relationship.

The first step is to examine the center's original mission, goals and objectives. A new term — referring to both users and DP — is needed. Almost every option seems sure to offend someone. An information center that can come up with an all-encompassing designation will be a step-and-a-half ahead. In one center implementing this expanded model, statements of mission, goals and objectives include the following:

Mission: to provide user and DP personnel with training and support in proven mainframe fourth-generation and micro technology which will aid them in carrying out their respective responsibilities.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Goal: to assess new hardware and software which provide productivity aids for business analysis or systems development and to make recommendations to management for acquisition and implementation.

Objective: to provide, during the first six months of operation, a formal overview of micro fundamentals to at least three representatives of each major functional area of the company.

Goals and objectives still revolve around tools, training, support and consultation, but they now explicitly take into account both user and DP needs and responsibilities. When objectives have been formulated, the impact on existing support activities and staffing requirements can be assessed.

The types of training generally offered to users — computer-based, classroom or one-on-one — are equally appropriate for DP. DPers also benefit from more technically oriented training, and many vendors offer courses geared specifically to DPers.

For group-oriented training, initially users and programmers can be trained separately. This prevents new users from being intimidated by "techies," and keeps programmers from feeling slowed down by users. Equally important, it spares programmers from embarrassment in the presence of users who may know the subject area better.

Staffing implications of extending services to DP are obvious. Just as no one understands a user's business problems better than a user, information center support to DP can be provided best by people technically experienced and familiar with the DP environment. Information centers that have drawn their staffs heavily from user areas may need to increase their technical strength. However, because most centers have been at least partially staffed by people from the DP ranks, the balance between representatives of DP and user areas may be able to remain exactly as is. A technically-oriented person capable of delivering training to programmers would be a major plus. Management of an information center supporting DP as well as users requires close contact with both DP and user management. The extensive overlap of the needs of both groups often exceeds what may be anticipated at the outset.

With computers of all sizes now in the corporate domain rather than under the exclusive responsibility of DP, several companies have found joint planning to be effective.

Under information center direction, a joint committee of user, DP and information center representatives meets regularly to work out the most effective approach to responding to the common needs of both groups, while ensuring that each gets adequate attention to its unique needs. This approach often results in a pooling of resources, resulting in a level of overall support beyond that generally feasible through information center resources alone.

The situation is absolutely irreversible: DP will never again be completely in charge of the use of computer technology in the corporation.

A benefit already emerging in some centers is the development of technical aids to improve the functioning of the tools in use. Programmers frequently complain about the CPU-intensive nature of fourth-generation software. Although users have developed workable — necessarily efficient — technical solutions to their business problems, programmers are eager to devise techniques to maximize efficiency.

A hoped-for benefit is that users and programmers will begin to view each other as peers. By jointly attending company user group meetings, product demonstrations and planning sessions, users and programmers can learn more about each others' responsibilities. In the days of second-generation technology, users and programmers shared a sense of mutual respect and worked closely to solve business problems with technical solutions. Perhaps, after a trying third generation, the fourth generation can once again experience this type of working relationship. **OA**

Karten is president of Karten Associates, a Randolph, Mass., management consulting firm active in information center planning and the management of end-user computing.

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leaving themselves open to disaster, and when trouble occurs, it will often be MIS that is called in to untangle the mess.

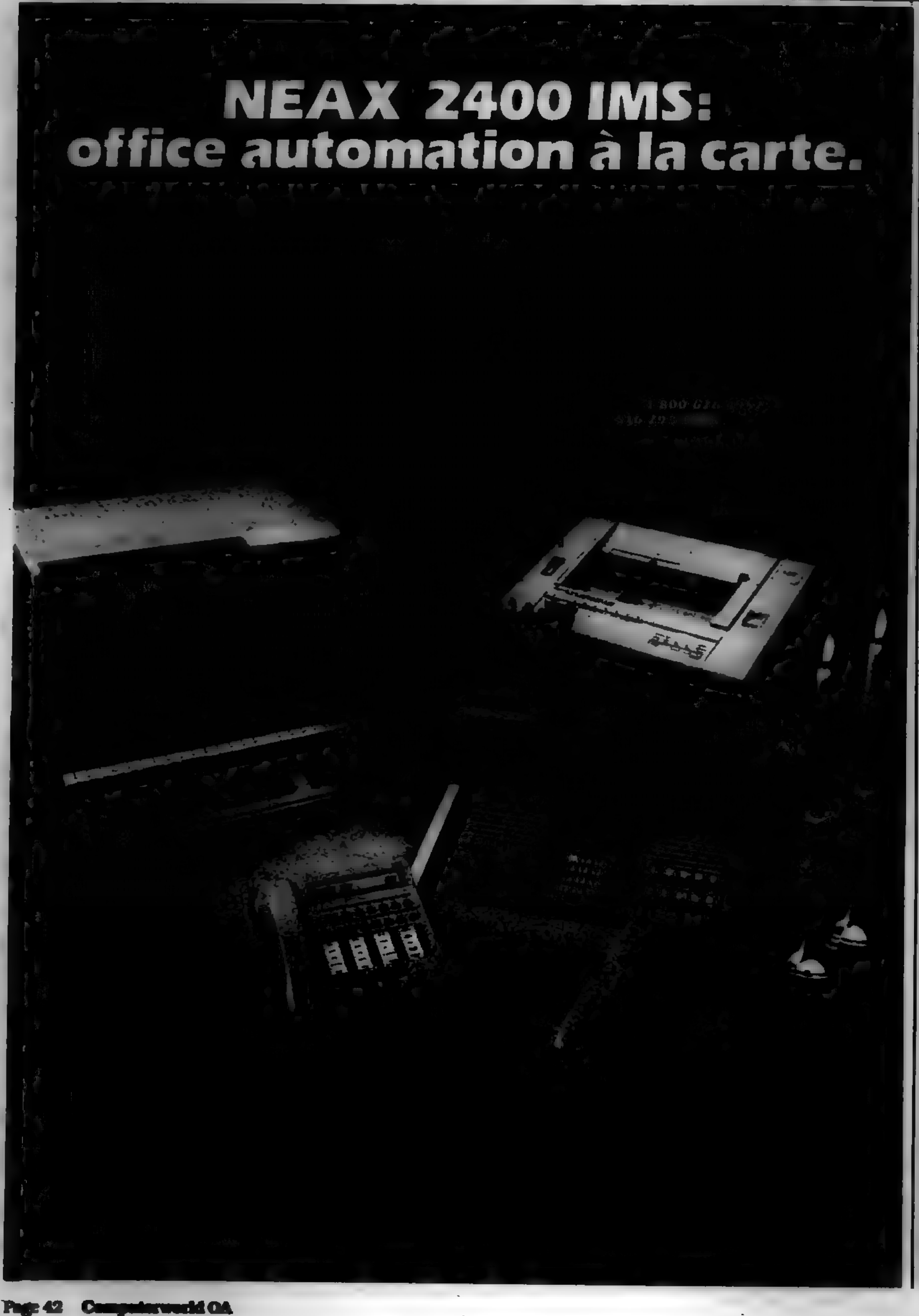
"Probably a majority of corporate PC users are quite lost in the use of DBMS [data base management systems]," said David Ferris, president of Ferrin Corp., a San Francisco-based personal computing consulting firm. "There's a whole class of important applications for which micros are not really appropriate. Data base systems are, in some cases, grotesquely misused. These small systems can evolve into rather insidious monsters."

Ron Ross, editor of the "Data Base Newsletter," added, "It's a very critical and highly dangerous problem. It represents a real dilemma for people planning the data resources within an organization. Do we keep hands off and let people discover their own limits or do we try to help them with standards, training and other areas?"

Experts agree there is probably little MIS can do to deal with mistakes that have already been made. It can, however, be aware of the most common flaws with end-user developed programs and the steps that can be taken to avoid them.

For one thing, most applications that become critical do not start out that way. As a result, they are rarely designed with the idea of widespread use in mind. "The users may just start using [the application] themselves," Ferris said. "Then they start their bookkeepers using it and maybe later their sales people, and it follows from there. The data base becomes embedded into the operations of the department."

As the program grows in scope and importance, it is often modified with little regard for the future. "Like a newspaper, it's a lot of information thrown together with no systematic organization," said Chris Rivers, president of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WHEN SHOULD YOU WORRY?

How can a nontechnical end-user know if he is over his head when setting out to develop an application? David Ferris, president of Ferrin Corp., a San Francisco-based personal computing consulting firm, recommends five questions you can ask before you begin writing a program.

1. Will more than one person use the program? If so, you have to consider issues of documentation, training and verification of data.

2. Will people need concurrent access? This is especially critical on multiuser machines such as Unix-based systems and the new IBM Personal Computer AT. Concurrency presents the delicate issue of record locking and backup.

3. Does a lot of money ride on this application? Critical programs should be written more carefully than ad hoc programs.

4. If the system were to stop working for any reason, would it force several people to stop working? Such applications must be debugged thoroughly to prevent snags.

5. Does the application involve transaction processing or formatted screens? If so, it requires structured implementation.

Ron Ross, editor of the "Data Base Newsletter," commented, "If the data supports a kind of decision making, then the application is not particularly dangerous. But if the data and systems work on a bread-and-butter level of data, then you had better stop and think twice about how you develop it."

Software Synthesis, Inc., a consulting firm in Oakland, Calif. "When it's time to add on to it, [the user] simply tacks on pre- or post-processing until it becomes unmaintainable. And this doesn't show itself until two or three years later."

Most experts agree users make two other common mistakes: they rarely document and they don't back up data and programs. Of these, the documentation and its related training problem is the worst. "It's the number one problem," Rivers said. "When a system has evolved from nothing, it is usually completely undocumented. I see enough problems in a mainframe shop and they have manuals three inches thick."

Some companies face the spectre of users' demanding the leeway to maintain departmental data bases separate from corporate information. This could lead to duplicate data bases and incompatible data.

The issue often becomes apparent only when staff turns over, noted John M. Thompson, a vice-president at the consulting company of Index Systems, Inc. in Cambridge, Mass. "A program quite often becomes an integral part of how a function works," he said. "You get to rely on something and then the person leaves and nobody knows what the heck he did."

Even those who were using the system often know little else about it. "Users sort of teach everybody in the office, and that's how they get others using it," said Nunzio Guarnieri, vice-president of systems planning and product design at Chase Manhattan Bank in New York. "We ask what happens if somebody new comes in and it turns out they're being taught by the department secretary."

Backup is also sloppy with most user-developed applications. Whereas DP departments are accustomed to copying their entire disk library weekly, departmental users often forget or ignore the need for backup. Like Dr. Johnson's noose, the need for such procedures rarely becomes apparent until it is too late. "When they've got a scratched diskette and you tell them there's no way you can read that data for them, then they start thinking about backup," Guarnieri said.

Ferris added that inattention to backup can lead to making decisions on the basis of wrong data. "On systems that don't have adequate backup, there are all kinds of problems with data getting out of date," he said. "The manager winds up using that data for critical company operations."

Most experts agree that, although the situation is increasingly coming under control, the problems presented by hidden applications have not yet begun to manifest themselves. An unscheduled new player in the game is the micro-mainframe link, an emerging technology that allows users to access the corporate data base and, in some cases, maintain data locally for uploading to central files.

Whereas critical reports have long been produced on the mainframe by applications written under rigid standards, users are now asking that they be allowed to download data to their spreadsheets or data base managers and create those same essential reports. Even if the data contained in the documents is wrong, it is generally accepted as accurate because it is produced on a computer, Thompson noted.

Furthermore, some companies face the spectre of their users' demanding the leeway to maintain departmental data bases separate from corporate information. "If we allow people to write on the corporate data base we've got a whole new set of problems," Thompson said. "You're asking for duplicate data bases and incompatible data and who knows what else. This is a mess that is about to hit and it's one I haven't got too many answers to yet."

In situations in which data is being entered locally for uploading later, overlap and contention issues will arise before the data even gets to corporate headquarters, Rivers said. "You'll get multiple information from the same data and you'll run into conflicts where the data doesn't balance," he said. "It's not pulling the data down that's a problem. It's putting it back together that creates chaos."

What can MIS do to get a grip on these emerging problems before they get worse? The first step is to find out where the critical applica-

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USERS TRY THEIR HANDS AT STANDARDS

HARTFORD, Conn. — Sometimes it is the microcomputer users themselves who enforce standards for reliability and maintainability of programs. At United Technologies Corp. headquarters here, Bill Johnston, manager of the corporate reporting department, has set up a system that imitates those of many DP development functions.

Johnston manages a department of six accountants, all of whom work on IBM Personal Computers. The department's procedures help to ensure against duplication of effort and provide a library of available applications upon which the accountants can draw.

Before an accountant starts building an application, he meets with the manager and discusses what he wants to do and why. "If they can use something else that's already been built we try to identify that to avoid duplication of effort," Johnston said. He also keeps an eye out for programs that will actually create work, such as those that merely replicate on the computer reports that are easily produced manually.

Accountants are free to build programs as they like. When the application is ready to enter production, however, the user is required to prepare a written document showing what the application is for, why it was written, what environment it uses, a description of procedural logic and macros and any other information that would be important to a new user, Johnston said. The documentation is submitted to Johnston's review.

"Upon approval, the program becomes a production diskette," Johnston said. "The diskettes are all backed up and stored centrally. We have a cross-reference book listing which applications are on which diskettes."

The department has employed these procedures for about eight months, with such success that other United Technologies groups have come from as far away as Fort Wayne, Ind., to observe the procedures. Johnston admitted that there was some initial resistance to the standards among the department's accountants, but said that as the scope and organization of the group's library has grown, so has acceptance.

Noting that the use of formal procedures is second nature to him, Johnston nevertheless added that he is somewhat of a maverick in this area. "Part of my review of different subsidiaries involves looking at how other accounting departments are doing this," he said. "I've been pretty shocked by it."

The major problems he sees are poor documentation and lack of backup. "The concept of backing up a disk is foreign to many people," he said. "In many cases, there's no documentation at all."

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tions are within the company and whether they need help. At United Technologies Corp. headquarters in Hartford, Conn., the corporate auditing staff is charged with identifying such applications in subsidiary companies and making sure that corporate standards for security and documentation are applied. "I don't think there are many department-critical applications and the really big ones we are aware of," said Jerry Kelly, manager of MIS.

The thornier issue is how to balance the demands of a data-hungry user audience with the security and integrity issues vital to corporate information. Data base authority Ross, who admits to teaching a "Machiavellian" approach to data base administration, believes users will eventually seek guidance of their own volition. "There's no question that these people sooner or later will bump up into the limits of unintegrated data base design," he said. "It's just [unfortunate] that with the more powerful machines they're going to bump up against these limits even harder."

Perhaps the most important issue is that MIS must learn to tap into the informal networks that have sprung up among users who are developing applications. "We need the kind of partnership such that the users will come to the MIS departments as coaches rather than as the controlling enemy," Thompson said. "What happens now is that some guy puts through a financial projection program and mentions it to some other guy in the canteen. They form their own little user club-type networks, and they don't call up the MIS department if they have a problem. They call up the guy who showed them the program in the first place."

For users writing really critical applications, Rivers recommended an even stronger approach. "I think that person should be transported to the main location and given an overview of how systems are developed in large shops," he said. "Show him how to document, organise and keep to schedules. It may take a month or two; it's going to cost a lot of money. But if the application is important, it's worth it." OA

Gillin is senior editor, software, for Computerworld.

NEWS, *Continued from Page 5*

plane ride is taking off. That's fine, but once you're up there, you really want to do things right."

NOT FADE AWAY

It seems that it is better to be a jack of all office trades than the master of one. According to a report published by International Data Corp. (IDC) of Framingham, Mass., dedicated word processors are being squeezed out of the office both by low-priced electronic typewriters with enhanced memory and by multifunctional micros with WP capabilities.

IDC reports that, especially in the managerial marketplace, the appeal of dedicated machines is fading. This is happening even though these machines still are better at text editing, are easier to use and have more extensive vendor-supplied training programs than micros with add-on WP software. The compound growth of shipments of clustered WP systems will slow from about 35% this year, to 13% in 1988. Shipments of stand-alone systems are expected to plummet by 1988.

Clustered systems can still be justified for paper-intensive departments in large organizations such as government and in the legal and insurance industries, according to Douglas Gold, a senior research analyst at IDC. He said that clustered WP systems are becoming more sophisticated in order to have a shot at the integrated office market. For smaller companies, however, a personal computer integrating WP as one application is the most cost-effective way to go. "Word processing is a software application now. It is no longer a box. People go out and buy a disk," Gold said.

IBM dominates the stand-alone market, with a 30% share of the shipments and 39% of the installed base. Companies such as Digital Equipment Corp., Exxon Corp., CPT Corp. and NBI, Inc. are nibbling away at that lead. Wang Laboratories, Inc. dominates the clustered market, controlling about 50% of the installed base; IBM is number two with 10%.

OA TURNAROUND

What a difference a year makes. In late 1983, both Data General Corp. and Digital Equipment Corp., the Massachusetts' minimakers and neighbors, were feeling the sting of a tightening market. Both had disappointing earnings figures as well as less than favorable reviews from industry analysts. DEC's fourth-quarter numbers were so bleak that the stock fell more than 30 points in a matter of days.

A little more than a year later, the picture for both companies is vastly brighter, with strong revenues and earnings figures for the year. Though the turnaround can be attributed to a number of factors (such as internal reorganizations and tighter controls), both DG and DEC point to successes in the OA market as the key.

Although DEC is much larger than DG, the companies have followed similar strategies to success in the office. Both have created umbrella office packages of software and communications capabilities (DEC's All-In-One and DG's CEO) based on their high-powered superminicomputer technologies.

David Lyons, vice-president and general manager of DG's Information Systems Division, pointed out that just as OA market was shifting its focus from word processing to integrated systems for the manager and professional, DG began shipping its CEO product. According to Lyons, DG was the first with such a package and it provided "a leadership position."

At DEC, the Office Information Systems Division has played a "key role" in the company's recent successes, according to Henry Ancona, product group manager of the division. Ancona echoed Lyons' picture of the OA market. He pointed to the strengthening of DEC's VAX supermini line as a key to the turnaround and said the recent introduction of the long-awaited VAX 8600, the company's new top of the line mini gives DEC strong positioning in that market.

Consultants are more willing to credit OA as the key factor at DG, but tend to be more hesitant to say the same about DEC. George Colony of Forrester Research credited DG with making a quick internal transition from being a strict OEM dealer to a strong marketing-oriented enterprise. He said DG has successfully leveraged its minicomputer positioning along with CEO to offer "a very homogenous solution" in the office.

According to Colony, "If you dug deeply at DEC, I don't think you'd find that the office has keyed the turnaround." He believes DEC's traditional OEM business, along with products like the Microvax and VT200 terminals, are fueling the new found successes. "All-In-One has helped, but not that much," Colony said. Though he wouldn't disclose figures, Ancona refuted Colony's analysis and stated that All-In-One sales have been "the largest in the industry, including IBM Profs offering, CEO and Wang's WPPlus." OA

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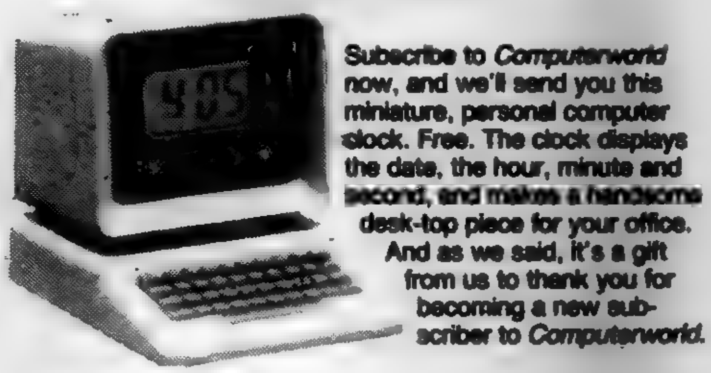

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TECHNOLOGY

DEC's LQP03

MAYNARD, Mass. — **Digital Equipment Corp.** introduced a series of software packages that link Decnet local and wide-area networks with IBM Systems Network Architecture networks and run on the full range of VAX-11 computer systems.

DDXF, a document exchange facility, costs $1,500 ($750 for a Microvax version). DHFC, a distributed host command facility, costs $1,500. A printer emulator, PRE, is available in VAX ($1,000) and Microvax ($200) versions. Micro VMS routines for remote job entry, 3270 terminal emulation, application program interface, and gateway network management are priced from $10 to $400. DEC also introduced a word processor that can function as an integrated office terminal, and a low-end letter-quality printer.

The $2,695 Decmate III comes with the same keyboard and monitor as the Decmate II Office Workstation, a smaller system unit including two 5.25 in. floppy diskette drives and WPS software. The software allows Decmates to communicate with other Decmates, Dec multiuser systems, and external data bases. Options include a $595 integral modem for communications at 300 or 1,200 baud, a $395 auxiliary Zilog Z-80A microprocessor for adding Decspell and CP/M-based office applications and foreign language versions of WPS software costing $500 for the Decmate II and included in the Decmate III.

The LQP03, a 130-petal daisywheel printer, is priced at $1,395, prints 24 char./sec in 10-pitch Shannon text and 34 char./sec in 12-pitch triple-A text. It is available with an optional $695 sheet feeder or $245 tractor feeder from Digital Equipment Corp., Maynard, Mass. 01754.

MOUNTAIN VIEW, Calif. — **Vitalink Communications Corp.** and **Digital Equipment Corp.** announced a joint agreement to market a hardware and software product that transparently connects local-area networks via satellites and/or terrestrial lines.

Transian connects several Ethernet or IEEE 802.3 local-area networks so that they appear as one large network providing transparent interconnection of all local-area network stations regardless of their specific higher level protocols. The product has eight satellite channels or terrestrial link ports and a port capacity of 224K bit/sec.

Transian will be serviced and supported by Vitalink and is available for $19,450 from Vitalink Communications Corp., 1350 Charleston Road, Mountain View, Calif. 94043.

PALO ALTO, Calif. — **Hewlett-Packard Co.** unveiled two enhanced versions of its 150 Touchscreen Personal Computer featuring double-sided 710K-byte microfloppy disk drives.

The $3,495 HP Touchscreen Personal Computer, with two double-sided 3.5-in. disk drives, provides 1.4M bytes of total storage. The HP Touchscreen Personal Computer Max comes with a single double-sided drive and a 15M-byte Winchester disk drive and costs $5,495.

HP's 150 Touchscreen

HP introduced a number of other storage devices as well as two software products, HP Advance-Link ($245) and HP Message ($300), which reportedly make it easier for HP and IBM personal computer users to exchange files and communicate via electronic mail.

HP also unveiled two entry-level bundled systems featuring the HP 3000 Series 37 computer and five software packs for the bundled systems. The four-user systems configured with 1M-byte memory and either one or two 55M-byte disk drives are priced from $45,310 to $57,615. The software packs are priced at $300 to $32,500.

For more information, contact HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

SAN JOSE, Calif. — **Keyword Office Technologies, Inc.** introduced a disk-to-disk conversion device that reportedly enables diskettes created on one word processor to be used on an incompatible word processing system.

The Keyword 7000, a menu-driven hardware and software system, works as a peripheral to IBM or IBM-compatible personal computers. The product reportedly can convert text processed by IBM's Displaywriter, Xerox Corp.'s 820 and Digital Equipment Corp.'s Decmate II and others. One page is converted in about 13 seconds, the vendor said. Keyword 7000 is available for $9,995 from Keyword Office Technologies, Inc., 2047 Hamilton Ave., San Jose, Calif. 95125.

LOWELL, Mass. — A multitasking computer specifically designed for secretaries was unveiled by **Wang Laboratories, Inc.**

Wang's Office Assistant

The $2,395 Wang Office Assistant features a 12-in. nonglare tilting monochrome monitor, detached keyboard, 256K bytes of random-access memory, a 5.25-in. 360K-byte diskette drive and software, including Wang's proprietary multitasking operating system, text editing, WP Plus and unique forms generation. Options include a second diskette drive and a print sharing device, from Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

RYE BROOK, NY — **IBM** introduced a series of office programs for IBM Personal Computers and System/36 and System 370 computers along with its most powerful 4300 series processor, an entry-level 3080 series machine and enhancements to the Personal Computer line.

The IBM Office Systems Family consists of enhanced Displaywrite text processing programs and programs that reportedly permit the exchange of documents and messages among networks of Personal Computers, System/36 and System 370 gear. The programs will be available in the second quarter of 1985 for $250 to $3,000.

IBM also announced 31 software packages aimed for small and medium-size offices. The IBM Business Management Series, an accounting system, enables users to maintain information on sales, inventory and vendor and financial status.

The IBM Personal Decision Series generates spreadsheets, models, graphs, calculations and text processing and allows Personal Computer users to share information with IBM System/370; 30 series, 4300 and System/36 processors.

The primary programs of the Business Management Series cost $695 each. Core packages of the Personal Decision Series cost from $150 to $300.

The 4381 model group 3 features dual central processors, 256K-bit dynamic random-accesss memory chips and an internal throughput rate of up to 1.7 times that of the model group 2. The 4381-3, with 8M bytes of main storage and 12 standard channels, will be available in the second quarter of 1985 for $825,000. A channel and memory upgrade from the 4381-2 costs $249,000.

The IBM 3205, a 14-in., 7-color display console for 4381 and 4361

FORUM, *Continued from Page 4*

the application and file levels. If a local-area network is to link different manufacturer's equipment to share peripherals, software and files, all operating systems on the network must interact. The most common way to accomplish this is to initiate an emulation task that allows one system on the network to emulate another system's operating system.

The process of emulating another operating system gives the user the ability to execute all functions of the system being emulated. His workstation looks like any other dumb terminal attached to the emulated system. Therefore, he can access the file manager, application software, printers and disk storage and can even send messages to other users on that system.

One disadvantage of terminal or task emulation is that when the user is in emulation mode, he must forfeit the functionality he has on his own system. In addition, when he creates a file in emulation mode, he cannot easily store that file in his own file system without first copying it or executing a conversion utility. Operating commands will also be different and system performance will sometimes be sacrificed.

Of course, what we are all waiting for are gateway developments to allow equipment from many manufacturers to coexist in one network. Transferring files from one operating system to another has to some degree been resolved. What is now lacking is the ability to access applications that are supported on one operating system on the network, but that may not be available from our system.

Integration is still in its infancy, and the important role it will play on all future product developments is just beginning to be understood. For some user organizations, it may mean the products they have installed may never evolve into an integrated system. For some vendors, it may mean that their only choice may be to declare obsolete a product line that was once profitable. - OA

Rossi is associate editor of the Seybold Report *and is a senior consultant at the Seybold Co., a major office automation consulting and publishing company based in Boston.*

TECHNOLOGY

processors, costs $2,895.

The 3083 model CX configured with central processing unit, 3082 processor controller, 3087 model 1 coolant distribution unit, 8M-bytes of main storage and 8 channels, will be available for $830,000 in the second quarter of 1985, the vendor said.

The IBM PC AT/370, with 1.2M-byte diskette drive, 20M-byte fixed disk drive and 512K bytes of main memory is priced at $9,795, and will be available in January, IBM said.

Enhancements to the 3270 PC include an application program interface allowing users to send data directly into a PC session without making programming changes in the host, and a $3,695 plasma display.

Two 3270 PC models with 5271 keyboard adapter and API are priced at $5,990 and $7,550 from IBM Information Systems Group, 900 King St., Rye Brook, New York 10573.

Banyan's Network Server

WESTBORO, Mass. — A virtual networking system, which handles file and peripherals management for up to four local-area networks, was unveiled by **Banyan Systems, Inc.**

Vines consists of the Banyan Network Server — a Motorola 68000-based, 32-bit computer running proprietary Unix-based system software. A low-end Vines system, with 512K bytes of main memory, 43M bytes of disk storage, a 60M-byte tape drive and software costs $16,900 from Banyan Systems, Inc., 135 Flanders Road, Westboro, Mass. 01581.

BILLERICA, Mass. — **Davox Corp.** introduced four color workstations and enhancements to its Davoxnet local-area network.

The 2900 and 3900 series workstations feature multiprotocol capability, seven-color graphics and APL/Text capability. The 2911 and 3911 data-only workstations cost $5,600 and $5,915 and the 2921 and 3921 feature integrated telephones and are priced at $5,700 and $6,015.

Davox also announced software options for Davoxnet. A $995 PC file server makes an IBM PC-XT the repository for all software in the network, allowing multiple users to run the same software simultaneously. A $600 to $800 PC file transfer package expands cross-controller transfer capabilities for the net and is available from Davox Corp., 4 Federal St., Billerica, Mass. 01821.

BOULDER, Colo. — **Vianetix, Inc.** announced a local-area network software product that reportedly links all MS-DOS, PC-DOS and Unix-based microcomputers together.

Vianet offers a fully distributed architecture, application software compatibility and hardware independence, according to the vendor, and allows users access to all resources on the network. It is available for $125 from Vianet, Inc., 5766 Central Ave., Boulder, Colo. 80301.

BILLERICA, Mass. — **Honeywell, Inc.** unveiled a Unix-based workstation targeted at engineering administration and support environments and a family of packaged office systems.

The Microsystem NX runs the Uniplus operating system, a licensed port of the Unix System III, with Berkeley 4.1 extensions. The 12M-byte version costs $8,895; the 18M-byte model costs $9,495.

The Office Management System 40, based on Honeywell's 16-bit mini, and the OMS 90, based on their 32-bit superminis, run under the Gcos 6 operating system and are compatible with the DPS 6 line. The systems feature the company's menu-driven Office Automation Systems software and support from four to 34 users.

An OMS 40 configuration with eight terminals, four letter-quality printers and software costs $80,000. An OMS system with 34 terminals and 14 printers is priced at $222,200 from Honeywell, Inc., 300 Concord Road, Billerica, Mass. 01821.

WESTBORO, Mass. — **Data General Corp.** unveiled the Data General/One, a 10-lb portable that is reportedly compatible with the IBM Personal Computer and that runs MS-DOS, CP/M-86 and Venix operating systems.

The DG/One

The DG/One features a liquid-crystal, bit-mapped 25 line by 80 col flat display, up to 512K bytes of user memory and up to two 3.5-in. micro-floppy disk drives of 737K bytes each and a full-size keyboard with 79 keys. The base system with 128K bytes of memory and a single disk drive costs $2,995. The CEO Connection software package which allows users of the portable to access DG's Comprenaive Electronic Office system costs $295 from DG Corp., 4400 Computer Drive, Westboro, Mass. 01580.

FOLSOM, Calif. — A voice mail system targeted for small and medium-size businesses was introduced by **Genesis Electronics Corp.** The Cindi 400 series consists of four models offering from four to eight ports, four to 16 hours of message storage and 128 to 512 user mailboxes.

The system is accessed via any Touchtone phone and gives offices with 50 to 500 telephones voice mail capabilities starting at $83 per user, the vendor said.

More information is available from Genesis Electronics Corp., 103 Woodmere Road, Folsom, Calif. 95630.

DALLAS, Texas — **Uniplex Integration Systems** introduced an integrated software package for Unix-based systems consisting of WP, spreadsheet, relational data base and electronic mail.

Uniplex II, aimed for both OEMs and end users, is a menu-driven system written in C; it reportedly has been ported to most major Unix hardware. The product also includes print spooling and a screen builder and costs from $600 to $4,000, depending on the processor, Uniplex Integration Systems said from Suite 500, No. 1 Galleria Tower, 13355 Noel Road, Dallas, Texas 75240.

NEW YORK — **RCA Global Communications, Inc.** unveiled an electronic mail service with access to the firm's Globcom domestic and international telex network.

Reportedly operating on almost any type of computer, RCA Mail uses simple one-word English commands and allows users to be assigned different security levels. Charges for the system include a 5 cent per kilo-character transmission fee; a $4 to $14 per-hour usage fee (depending on the time of day) and a $140 monthly fee for each user organization, RCA Global Communications, Inc. said from 60 Broad St., New York, N.Y. 10004.

ROCKVILLE, Md. — **General Electric Information Services Co.** announced its Disaster Recovery Services, aimed to protect Fortune 500 companies whose own computer facilities have been destroyed or disabled.

The Schenectady, N.Y., service facility contains Honeywell, Inc., IBM and Hewlett-Packard Co. mainframes, peripherals, telecommunications links and office space. Subscribers can use the facility within 24 hours of notification of a disaster, the vendor said.

Monthly fees range from $1,000 to $12,000 from General Electric Information Services Co., 401 N. Washington St., Rockville, Md. 20850.

Net/One Local Bridge

SANTA CLARA, Calif. — **Ungermann-Bass, Inc.** introduced a network bridge that reportedly increases the rate of data transfer between Net/One communications systems in the same geographical location by more than 600%. The Net/One Local Bridge forwards information from network to network or channel to channel on a per-packet basis at rates in excess of 1,000 packets per second, according to the vendor. The product consists of network access hardware, a Motorola M68000 microprocessor and is priced at $9,850.

Software costs $1,000 per bridge from Ungermann-Bass, Inc., 2560 Mission College Blvd., Santa Clara, Calif. 95050.

Kodak's CRT Print Imager

ROCHESTER, N.Y. — A full line of 8-in., 5.25-in. and 3.5-in flexible disks was introduced by **Eastman Kodak Co.**

The 8-in. disks will sell for $6 single-sided and $5.80 double-sided. The 5.25-in. disks cost $3.85 single-sided, $4.85 double-sided and $6.60 double-sided with quadruple density. The 3.5-in. microfloppies cost $8.25.

Kodak also announced a line of instant slide products allowing users to make color slides from most CRT terminals. The Slide Cat line includes a $339 slide film back, adapter cones for 9-, 12-, 13- and 19-in. monitors ($40 to $50), and a $75 slide mounter. The 35mm, Instagraphic color slide film can be processed and mounted in 15 minutes and costs about $1.30 per frame from Eastman Kodak Co., 343 State St., Rochester, N.Y. 14650. OA

CALENDAR

Dec. 3-4, Tulsa, Okla. — **Managing Information Centers Effectively.** Contact: Thomas J. Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Dec. 3-5, Boston — **Conference On Control, Audit & Security Of DEC Systems.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

Dec. 3-5, San Francisco — **Data Base: A Manager's Guide.** Also, Feb. 4-6, Atlanta. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Dec. 4-5, New York — **New Technologies, New Solutions.** Also, Dec. 11-12, Palo Alto, Calif. Contact: The Yankee Group, 89 Broad St., 14th Floor, Boston, Mass. 02110.

Dec. 4-6, New York — **Computer Networking Seminars.** Also, Dec. 11-13, Boston. Contact: Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

Dec. 5-7, Boston — **Office Automation and the Technology Revolution.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110.

Dec. 6-7, Boston — **Software Configuration Management.** Also, Dec. 10-11, Orlando, Fla. and Dec 13-14, Washington, D.C. Contact: Education Foundations of the Data Processing Management Association, c/o Technology Training Corp., Department SCM, P.O. Box 3608 (3420 Kashiwa St.), Torrance, Calif. 90510-3608.

Dec. 10, Gaithersburg, Md. — **Local Network Technology Tutorial.** Contact: The Institute Of Electrical and Electronics Engineers, Inc., Box 639, Silver Springs, Md. 20901.

Dec. 10-12, New York — **Personal Computers in Business: The Micro-Mainframe Connection.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 10-12, Toronto, Ont. — **A Workshop for the Newly Appointed Data Security Officer.** Contact: Computer Security Institute Educational Resource Center, 43 Boston Post Road, Northborough, Mass. 01532.

Dec. 10-12, New York — **Personal Computers in Business.** Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 10-12, New York — **Automating The Office: A Tactical Guide For Success.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Dec. 11, Gaitherburg, Md. — **Computer Networking Symposium.** Contact: The Institute Of Electrical and Electronics Engineers, Inc., Box 639, Silver Springs, Md. 20901.

Dec. 12-13, Washington, D.C. — **National Office Automation Conference.** Contact: National Conference on People, Organizations and Office Technology, 572 Grand Ave., Englewood, N.J. 07631.

Dec. 13, Los Angeles — **Linking Microcomputers with Mainframes: Opportunities and Issues.** Also, Jan. 22, New York and Feb. 26, Chicago. Contact: Datamation Institute, Suite 603, 331 Madison Ave., New York, N.Y. 10017.

Dec. 13-14, Toronto, Ontario — **Security In The Electronic Office: Micros, Word Processors and Workstations.** Contact: Educational Resource Center of Computer Security Institute, 43 Boston Post Road, Northborough, Mass. 01532.

Dec. 17-19, New Orleans — **Advanced Program IEEE First International Conference on Office Automation.** Contact: The Institute of Electrical and Electronics Engineers, Inc., P.O. Box 639, Silver Springs, Md. 20901.

Dec. 17-21, Washington, D.C. — **Internet Systems and Protocols.** Contact: Continuing Engineering Education, The George Washington University, Washington, D.C. 20052.

Jan. 21-25, Dallas — **Uniforum.** Contact: Uniforum, Suite 205, 2400 E. Devon Ave., Des Plains, Ill. 60018.

Jan. 23-25, Washington, D.C. — **Reducing Telecommunications Costs Using Distributed Networks.** Contact: Continuing Engineering Education, The George Washington University, Washington, D.C. 20052.

Jan. 29-31, Washington, D.C. — **Communications Network.** Contact: Nancy Hedges, C.W. Communications, 375 Cochituate Road, Framingham, Mass. 01701.

Feb. 4-6, Atlanta — **Office Automation Conference.** Contact: Afips, 1899 Preston White Drive, Reston, Va. 22091.

Feb. 16-20, Kauai, Hawaii — **International Software Update II.** Contact: International Microcomputer Industries Association, Suite 175, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

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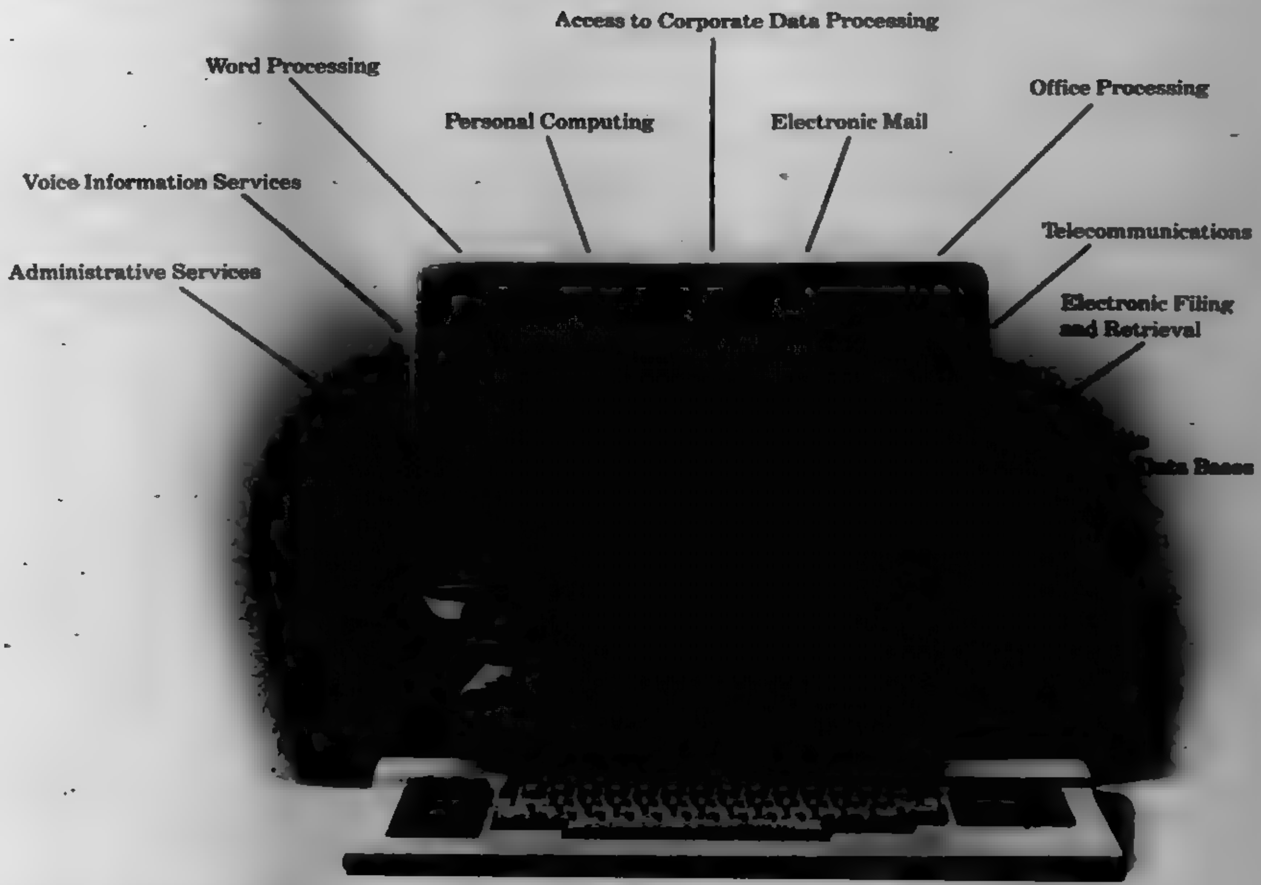

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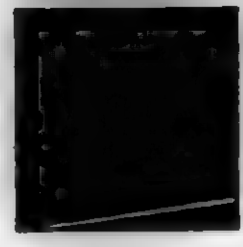

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Cobol-micro barrier falling

Speedier application development, superior screen-handling facilities cited as advantages

By Paul Korzeniowski
CW Staff

When business microcomputers evolved in the late 1970s, corporations drew a dividing line for application development: Microcomputer programs were written in Basic and Ashton-Tate's Dbase II; Cobol was reserved for mainframe program development.

A few corporations have crossed this dividing line and have designed Cobol applications for microcomputers. "The application development system we use now is far superior to writing programs with Cobol and [IBM's] MVS on mainframes," said Jerry Purcell, system manager for Fluor Corp. in Irvine, Calif. "We can develop an application in one-fifth the time it previously required. Our present screen-handling facilities are much better than those with CICS."

Purcell supervises a staff of 10 people who have worked with Micro Focus, Inc.'s Cobol on IBM Personal Computer XTs and ATs to develop a number of in-house applications, including payroll, labor distribution and construction programs.

Most applications are new, made possible by the micro's performance abilities and low cost.

These applications are used primarily in stand-alone mode at various Fluor construction sites. Once a week, the payroll information is sent to an IBM 3033 mainframe, and other application data is transmitted monthly. "We consolidate so little data that we use modems rather than direct connections to the mainframe," Purcell noted.

While a few of these applications have replaced mainframe applications, most are new, made possible by the performance capabilities and low cost of microcomputers.

Purcell's group began searching for the best method of utilizing microcomputer tech-

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TOP OF THE NEWS

Not everyone was pleased with M. Bryce & Associates, Inc.'s decision to stop supporting the Pride User Association, Inc., although M. Bryce said it had good reason for doing so. **Page 4.

•

Bring in the micros! That is the battle cry at J. C. Penney Co., where a self-paced video program has been adopted to bring 1,400 employees up to speed on a mainframe-based purchasing system. **Page 6.**

•

No busman's holiday. The DP manager for New York's Surface Transit Information Division computerized bus repair records and used the results to defend a decision to mothball part of the fleet of buses. **Page 8.**

•

Massachusetts saved $56 million in Medicaid payments by switching from manual to computer-generated payment processing. **Page 31.**

•

Perkin-Elmer Corp. unveiled an AT&T Unix-based micro said to support five users and to target graphics, computer-aided design and Unix applications. **Page 107.**

Persistence is her key to success

DP MANAGER PROFILE

By Paul Korzeniowski
CW Staff

CLEVELAND — Vivian Wilson, Input System Output manager at Ohio Bell Telephone Co., is not afraid to knock on a second door when she is turned away from the first.

In 1967, she was an AT&T central office reporting clerk here, taking steps to enter the data processing field. Wilson had enrolled in a technical school after reading an advertisement on a bus on her way home from work. "The industry was very young and rapidly growing," she said. "I also thought I could make a lot of money."

While she attended data processing classes, AT&T expanded and moved its DP department from downtown Cleveland to a suburb. The department needed additional workers, and Wilson applied for a job in computer operations. "I was told that no blacks were allowed," she said. "I was shocked. It was really the first time in my life that I felt my skin color made me different from other employees."

After she talked to a few of her friends, she reapplied for the position. The results remained the same, but the reason given for her rejection changed. "I was told that there wasn't any room in the new department for me," she stated. "I knew that a few of the people assigned to the new facility did not want to go. They were older women, set in their ways and afraid of working with computers. I was quite

See WILSON page 10

PRODUCT SPOTLIGHT

Do tools help find DP gold?

Users say application generators no cure-all for programming woes

"There comes a time when a programmer wants to spend more time with the user and less time coding and recoding the same programs. These [application development] systems shorten the coding process and get the user involved early on."

— **Donald Jones, manager of programming and procedures, Amana Refrigeration, Inc.**

"The users of the products are like the fat guy who is full of enthusiasm and spends a great deal of money on an exercise bike. He starts to use the bike, but he soon finds that it is lots of work to lose weight. After six months, the bike is unused and collecting dust — just like the productivity tools."

— **Vaughan Merlyn, vice-president and general manager of the systems software division of Walker Interactive Products, Inc.**

By John Gallant
CW Staff

In many ways, the often inexact science of application development today is similar to the ancient black art of alchemy. Analysts and programmers, laboring in the recesses of a corporation's computer facilities, must turn the lead of user requirements into the much-sought-after gold of high-quality, useful application systems for their end-user royalty. And, like their alchemy counterparts, application developers often fail in their quest for gold.

The development of efficient, effective computerized application systems, which have automated many formerly tedious manual tasks, remains a primarily manual, inefficient process. Hand coding programs is still the norm in the majority of development houses, and designing and maintaining applications continues to be a time-consuming and costly undertaking.

Most in-house development organizations share a number of nagging and increasingly worrisome problems — growing backlogs, user dissatisfaction over poorly designed and implemented systems and a staggering maintenance work load. Despite the adoption by many shops of advanced design methodologies and structured programming techniques, the problems show little sign of abat-

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NEWSPAPER

FCC begins tariff review

Commission to consider local telephone companies' revised proposals for private-line user charges

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission has begun what could be the final review of special-access charges that will be faced by private-line users in January if the rates submitted by the local telephone companies last week are approved.

Special access is a class of local exchange access service that will be provided by local telephone companies to connect interstate, private-line customers with long-distance carriers and will heavily affect large-volume communications users of private lines.

Earlier this year the FCC twice rejected proposed special-access tariffs filed by the local exchange telephone companies, saying the companies did not apply a "consistent, building block tariff" approach to users whom it wanted to assume the burden and discretion of assembling services that, in the past, were bundled by long-distance carriers.

Last month, the FCC ordered new special-access tariffs to be filed by Dec. 3 to take effect Jan. 17. The latest tariffs will have to meet the FCC's demand that they be reasonable, cost-justified and relatively uniform from one local telephone area to another.

In this regard, the National Exchange Carriers Association (Neca), representing the majority of local exchanges across the country, has complied with the special-access rate restructuring ordered by the FCC to disaggregate two- and four-wire communications channels, as well as voice-grade channels from telegraph-grade channels previously bundled together.

Additionally, the exchange carriers made adjustments in interoffice channel charges that connect to a private-line link to reflect direct differences in distances.

The Neca tariffs have proposed five rate elements of special access:

- First, a local channel, defined as a channel between two customer premises or between a customer and a local telephone company hub office where multiplexing is performed.
- Second, a connecting channel, defined as a channel between a customer and a telephone company hub where bridging or linking to three or more other sites in a multipoint, private-line network is accomplished.
- Third, channel mileage, reflective of the actual channel mileage for transmission between two customer facilities, a customer and the local telephone hub office or two telephone company offices.
- Fourth, channel interface, defining the technical characteristics associated with the type of signaling and type of facilities used at each point of termination.
- Fifth, optional functions and features that a special-access user requires, such as multiplexing, bridging and conditioning.

Additionally, the Neca tariffs have proposed eight different channel types: narrowband, voice grade, program audio, video, wideband analog, wideband digital, digital data and high capacity.

One of the major objections raised by the FCC to the special-access rates was the different charges for essentially similar rate elements: the local channel and the connecting channel.

To avoid the "rate shock" alleged by the competitive long-distance industry, which will also be covered by special access, the FCC has proposed a phase-in of the special-access tariff rates over a one-year period.

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Reagan sanctions U.S. satellite competition

WASHINGTON, D.C. — Competition in international satellite communications is in the nation's interest, President Ronald Reagan has concluded.

However, under new U.S. policy, private-sector competition to the International Telecommunications Satellite Organization (Intelsat), the global consortium of countries supporting satellite communications, will be limited to providing intracompany voice, data communications and video transmissions.

The private-sector satellite firms will be barred from offering public-switched communications and will be required to consult with Intelsat on their business plans.

A second condition facing private-sector satellites will be foreign administration authorization, which will ensure technical compatibility with Intelsat.

Intelsat has strenuously opposed private-sector competition, particularly in the North Atlantic region, where current service proposals before the Federal Communications Commission are still under consideration.

Reagan's statement of national interest also instructed the U.S. Department of Commerce and the Department of State to formulate new satellite communications policies that are supportive of the Intelsat agreement, to which the U.S. is currently bound.

Five firms have announced plans to construct private-sector satellite communications routes — Orion Satellite Corp. in New York; International Satellite, Inc., based in Alexandria, Va.; Pan American Satellite Corp., located in Washington, D.C.; Cygnus Satellite Corp. in Rockville, Md.; and RCA Americom, which is a subsidiary of RCA Corp., in Washington, D.C.

CORRECTIONS

The correct address for Management Control Systems, Inc. [CW, Nov. 12] is P.O. Box 723597, 2400 Lake Park Drive, Atlanta, Ga. 30339.

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M. Bryce withdraws support of Pride users group

By Maura McEnaney
CW Staff

CINCINNATI — M. Bryce & Associates, Inc., vendors of the Pride product line of systems design methodology, has discontinued its support of the Pride User Association, Inc. (PUA) and plans to rely on "user weeks," similar to those conducted by other large software companies, as the medium for product discussion.

M. Bryce President Milt Bryce said the move to abandon support of the 10-year-old PUA was the result of an evolving difference in philosophy over the function of the users group and of what he termed was a deteriorating interest on the part of PUA members.

In a letter to PUA President Peter Burtch last month, about four months after the company officially severed its relationship with the independent users group, M. Bryce rescinded a 1975 agreement that reportedly allowed the PUA to discuss Pride and other proprietary information belonging to the software company. Tim Bryce, director of customer services and former PUA liaison, said the move essentially blocks the approximately 50 PUA members from discussing Pride products.

'Know-how, not software'

"Pride is know-how, not software," hence, it is proprietary, he said. "They can talk about whatever they want within the PUA, but they can't talk about Pride." According to Tim Bryce, because each Pride purchaser signs a proprietary information purchase agreement with the vendor and because the group is no longer permitted to discuss that proprietary information, group members who discuss the product will be in violation of their agreement.

While "I can't sit behind every rock and every corner" to enforce the contracts, Bryce said blatant contract violations could result in M. Bryce revoking the product license and removing product materials from the premises.

PUA members, both past and present, said problems with the group began when M. Bryce executives, who perceive their users as managers, objected to the technical direction that the group was taking. Others put the blame on the poor planning of meetings.

Burtch told *Computerworld* that the vendor was often critical of users at PUA meetings, and as a result, "[PUA] could never get discussions going." Criticism was often steered away from the product and toward the organization, he said.

The vendor was also involved in selecting speakers for the users group meetings, Burtch said. Sometimes this type of support was very welcome, but, he said, "lots of times they took responsibility upon themselves."

According to Milt Bryce, that was not the case. "We no longer want to support the organization because we were doing all the work," he said. "The users group did not do [its] homework. We didn't want to get into the position of running it for them, but we were forced to do it."

> *'We no longer want to support the organization because we were doing all the work. The users group did not do [its] homework.'*
>
> — Milt Bryce, M. Bryce and Associates, Inc.

Bryce also said that the sessions became too technical. "The people we were addressing our product to were no longer attending," he said.

Russ Travis, a Pride manager at the Compuware Corp. in Birmingham, Mich., joined the PUA in February. As a new data manager working with the Pride products, Travis attended his first PUA meeting in May. "I went to make contacts and get exposure," he said. At that meeting, Travis said he was recruited and subsequently elected treasurer of the board of directors. Two months after that meeting, the PUA was notified that vendor support was being withdrawn.

In September, a PUA board of directors meeting in Cleveland addressed the PUA's future. "We felt there was still some value in users getting together to share ideas, and we went ahead and planned the next meeting," Travis said. But when he returned from that meeting, he said, he changed his mind.

Strong vendor relationship needed

"I needed a strong relationship with the vendor," said Travis, whose company has served as a beta test site for an M. Bryce project management software package. "I didn't feel I could spend my time being on a board that didn't have the support of the vendor." He added that he has volunteered advisory services in the past for M. Bryce users weeks.

Bill Enright, assistant director for administrative systems at the University of Western Ontario in London, Ontario, served as PUA president from 1982 to 1983. "The vendor has always felt that the association wasn't that effective," Enright said. "He [Milt Bryce] felt maybe it wasn't servicing his best interests."

PUA membership consisted of a variety of users, Enright said, including systems analysts, program analysts and, "to a certain extent, managers." While he was involved with the users group, several suggestions on product enhancements were forwarded to M. Bryce. As a result of those suggestions, data entry methods were improved, he noted. However, without the independent users group, "open discussion doesn't occur."

Since Burtch received Milt Bryce's letter rescinding the proprietary information authorization, it is unclear whether the group will continue operation. "It's pretty hard to have a users conference and have people afraid to talk about the product," Burtch said.

Questions unanswered

But the legal limitations of exactly what the group is prohibited from discussing, and the basis on which Bryce can withdraw that authorization, are questions that remain unanswered. Burtch said he was forwarding Milt Bryce's letter to legal counsel for an interpretation.

Miles Gilburne, a Los Angeles-based attorney who specializes in high-tech companies, said part of the problem lies with exactly what aspects of the Pride products are considered proprietary.

Through an enforceable contract, a vendor can require a user to keep confidential the information on a product's source code, object code and functionality. However, the proprietary clause would not apply if information on the product was given out at a trade show, for example.

Despite these questions, Milt Bryce said the decision to withdraw PUA support is a good one, he maintained. "No company is a charitable business; if [the users group] does not promote our products, we do not want to be involved."

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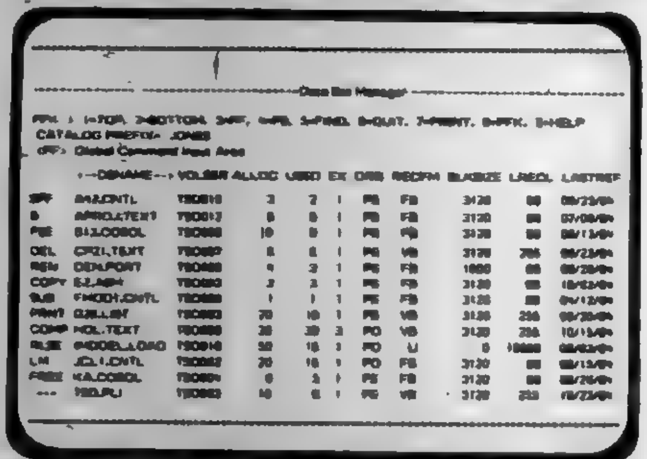

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Amdahl dual-system hardware runs to mixed reviews

Multiple Domain Feature sparks interest, but some users question option's purpose

By Jeffry Beeler
CW West Coast Bureau

Users and analysts appear sharply divided in their assessments of a recently announced hardware option that reportedly allows two operating systems to reside simultaneously in the same Amdahl Corp. mainframe.

Some industry professionals consider Amdahl's Multiple Domain Feature (MDF) conceptually interesting and expect it to find assorted applications, especially among customers planning to convert to IBM's Extended Architecture or wishing to combine time-sharing and batch jobs under one processor.

But others give the hardware feature lukewarm reviews, question the desirability of some of its target uses and wonder aloud about the product's ultimate purpose.

Support of like, unlike pairs

Introduced late last month [CW, Dec. 3], MDF consists of printed-circuit boards and microcode that reportedly enable Amdahl's 580 series mainframes to concurrently support IBM's MVS/370, MVS/XA and VM/HPO in any combination of like or unlike pairs.

Under MDF, each operating system occupies its own logically separate domain, which alternately turns on and off at intervals defined by the user.

When one domain shuts down, the other is automatically activated and gains full access to its resident mainframe's internal memory, channels and other processing resources. Although the constant switching between domains creates some overhead, each operating environment reportedly provides at least 95% of native-mode performance.

Relevance for users

But what does the product mean for users, and to what extent might MIS organizations find it useful?

Val Gremillion, manager of automation planning for the Federal Reserve System's Board of Governors, said that because it works solely with 580 series mainframes, MDF is currently inapplicable to the Federal Reserve Board, which uses no Amdahl CPU larger than a 470V/8.

But if the board someday were to upgrade to a 580 machine and convert to an Extended Architecture system, the hardware option and its ability to support two operating systems simultaneously might suddenly come in handy, he said. As an Extended Architecture conversion tool, MDF would probably merit consideration alongside IBM's VM Migration Aid, which basically does in software what the Amdahl product does in circuitry, he said.

MDF might also appeal to user organizations that would like to run their time-sharing applications under VM and their batch-production jobs under MVS. Such corporations, Gremillion said, "could support both environments on a single processor rather than having a separate machine for each."

Some users 'exceptionally nervous'

Not everyone, however, sees the consolidation of unlike operating environments as desirable or wise. Some users, fearful of putting all their eggs in one basket, would become "exceptionally nervous" if they placed their production and test systems on the same mainframe, according to Jack Hart, director of professional services at International Data Corp., a Framingham, Mass.-based research firm.

Hart also sees another potential disadvantage of having two dissimilar control programs running on the same processor.

If, for example, one of the operating environments in an MDF-equipped machine was running time-sharing applications under VM, users would periodically have their service interrupted as control shifted to the other domain, he said.

On the other hand, Hart added, users who now have different copies of the same operating system on separate machines might save "a significant piece of change" by using MDF to consolidate programs and eliminate redundant software licenses. If the mainframe supporting the dual environments has the capacity, a consolidation of like operating systems could also eliminate unnecessary hardware and its attendant costs.

In general, though, MDF appears to be "no big deal, no barn-burner," Hart said. "Unless we're overlooking something, we're not sure what problem Amdahl was trying to address with this product.

"My guess is that their intent is to persuade users to turn in their existing IBM systems and buy a big Amdahl machine instead of a second IBM processor."

William Easterbrook, vice-president of the brokerage firm Kidder-Peabody & Co., claimed to have little familiarity with MDF but described it as a potentially good feature for users who want to "unhook" and replace an existing system.

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Retailer opts for interactive system to train buyers

Inventory control specialists to use system to get quick order response, cut inventory

By Edward Warner
CW Staff

NEW YORK — With 1,400 employees to train on its mainframe-based Buycom merchandise purchasing program, the retailing giant J. C. Penney Co. could have hired a crew of teachers and cleared out an office at its headquarters here for classroom space.

It didn't.

Instead, it bought personal computers, laser disk players and touch-screen terminals, the key hardware ingredients in a self-paced instructional program developed for the Buycom program by Interactive Training Systems (ITS) of Cambridge, Mass. The hardware will run ITS software and laser disks to provide instruction in a system that J. C. Penney buyers and inventory control specialists will use to get what the retailing firm hopes will be quicker responses on orders and a reduction in inventories.

The training program, which is currently in pilot testing, is distinctive, ITS President David Barber said, because of its interactive features. It quizzes students as they use the system, records and graphs their answers and refers them to review lessons when their errors become too numerous. It even lets students run "what-if" simulations on Buycom itself, testing the potential outcomes of their buying strategies and recording their decisions on the training program. The students use a nonproduction portion of the system set aside for the simulation.

Full-scale training use

J. C. Penney will begin full-scale use of its Buycom training in April 1985, using 36 learning stations in the firm's newly established learning center at its headquarters here. Each learning station, which will run the program's training modules, consists of an IBM Personal Computer, ITS controller, touch-screen color monitor, laser disk player and Buycom terminal. Each of the program's 15 modules, a full 36 hours of study, is stored on a diskette and a companion laser disk.

Barber said the Buycom training program is the largest single program designed by ITS. His firm spent eighteen months studying the Buycom system and authoring the course's first three modules, he said. At the same time, however, ITS also trained several J. C. Penney employees, drawn from four departments, in Authority, the ITS courseware authoring language. The J. C. Penney employees eventually produced the remainder of the course.

Some 24 J. C. Penney employees were involved in the course's development, explained Ted Boggio, the retailer's manager of merchandise systems training. The Buycom system, which has dial-up connections to several J. C. Penney suppliers, took three years to develop and controls the purchase of about $13 billion worth of merchandise annually, Boggio noted.

It will be accessed via terminals by 1,400 J. C. Penney employees, 1,200 of them at headquarters.

Most Buycom users will be divisional merchandise managers, buyers and inventory control specialists, Boggio said. However, he noted, upper-echelon managers will not need to take the entire course; instead, they will learn about the portion of Buycom that is relevant to them. "The beauty of interactive training is [that] you can develop this huge, comprehensive course and tailor it to those who are to use it," he said.

Two other advantages of the training program, Boggio added, are that it "does not rely on whether the instructor is having a good day," and that it provides continual testing and feedback to students. The course administrator, meanwhile, can generate a bar graph based on a student's performance on different modules.

Though Boggio said that J. C. Penney has no plans to disseminate the Buycom training program to its 1,200 stores, ITS' Barber pointed out that J. C. Penney's new in-house program developers and ITS program development equipment could allow the firm to develop future training programs specifically for store employees.

"You've got the engine there," he said. "All you have to do is send out the video disks."

Training [illegible]s programs aim to manage [illegible]dent's attention

By [illegible]
CW Staff

CAMBRIDGE, Mass. — Video-based training programs should combine the best in television advertising and children's educational television, said David Lubin, one of the cofounders of Interactive Training Systems (ITS), a producer here of video-based learning programs in everything from Unix programming to landing jet fighters.

As an example of good educational television, Lubin cited *Sesame Street*, a program for which he and ITS partner Harry Lasker served as consultants. "The basic concept behind the *Sesame Street* adventure was that the attention issues were what you had to focus on," he explained in a recent interview. "Education had [traditionally] focused on content; [it had] forgotten that the real issue is 'How do I manage the attention of my students?'"

ITS programs combine color video scenes with instructional software running on an IBM Personal Computer.

To manage student attention, ITS programs combine color video scenes — a manager talking, a pilot landing a jet, a concept moving through a flowchart — with instructional software running on an IBM Personal Computer. The computer, which asks the questions and presents the lesson, and a laser disk player, which runs the video images, are linked using an ITS controller.

The student, meanwhile, interacts with the training program by touching the appropriate point on a touch-sensitive screen or by entering information — a line of Unix program code, for example — on the Personal Computer's keyboard.

So far, [illegible] the U.S. Army and Bell Laboratories have contracted with ITS for custom-designed training programs.

Most recently, ITS signed its biggest contract ever for a computer-based training program with the J.C. Penney Co. in order to bring that firm's employees up to speed on a nationwide computerized merchandise buying system.

ITS, however, is hoping to expand out of the custom-designed world and become a supplier of packaged off-the-shelf products for self-paced training, according to ITS President David Barber. The firm has a 27-module introduction to Unix, which has been sold to both Perkin-Elmer Corp. and IBM for training their sales and marketing staffs. A multimodule course in basic computer literacy is under development.

What may be the most exciting ITS program to date, however, is its training course on flying a U.S. Navy reconnaissance plane. The course familiarizes Navy fliers with the instrument panel and flight characteristics of the aircraft before the pilots begin flight simulation training.

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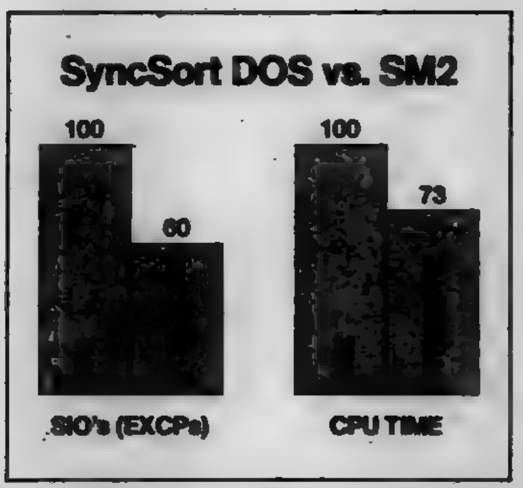

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Manager's on-line design keeps New Yorkers rolling

By Charles Babcock
CW New York Bureau

NEW YORK — If you were responsible for the bus fleet here and had 850 buses that were prone to catch fire or suffer cracked frames, what would you do?

Computerize the repair records, said William C. Fortunato, mainframe manager for the New York Transit Authority's Surface Transit Information Division, and fortunately, that is what his department began to do in August 1980. Those records now serve as a frontline defense for the authority's decision to mothball its fleet of Grumman Flxible buses. (Grumman sold its Flxible division in 1983 to General Automotive Corp. in Ann Arbor, Mich.)

The federal Urban Mass Transit Administration, which helped purchase the buses, challenged the mothballing. The buses have been sitting in the Brooklyn Navy Yard since one of them caught fire in midtown Manhattan in February. The case is still in litigation, spokesmen said.

The Flxible incident helped justify the effort to create an on-line record structure for the bus fleet, said Cary B. Peskin, deputy director of the bus division of the Transit Authority and Fortunato's supervisor.

Regular maintenance intervals

Maintenance intervals for each bus are now part of an extensive fact-collecting process. If a bus breaks down, maintenance supervisors can go to the system and find out when the bus was last serviced and inspected, who did the previous repairs and what the problem was, Peskin said.

Through terminals hooked to an IBM System/38 minicomputer, mechanics in the Transit Authority's 22 service depots can find out when the engine coolant was last changed in each bus and how many miles have been put on each tire, he added.

Fortunato and his staff of 20 programmers frequently joke about the mundane details that are the objects of their programming efforts, but they are part of the support system that allows 1.5 million people to ride city buses each day.

'Learned to love diesel fumes'

Fortunato, 29, said he "just happened to be in the right place at the right time" for the post, and as for his qualifications, he said, "I rode the buses to school when I was five" and "learned to love diesel fumes", while working in a programming job at a bus repair depot.

He was a computer methodology major at Baruch College in Manhattan and joined the Transit Authority when he graduated in 1978. He recently finished a master's degree in business administration at the same school.

In Fortunato's Brooklyn office, light from a lamp floods his desk while the windowless surroundings remain in semidarkness. His big ceiling lights are too bright for the small space, so he keeps them off. From this place he supervises the collection of information on the 4,500 buses that make up the city fleet. It is fed into IBM 3081 and 3032 mainframes in Manhattan.

Analyzing records for manufacturer liability

By analyzing records, his staff can determine whether there is any pattern to repairs that might indicate the manufacturer should be held responsible. If 20% of the dome lights break on a shipment of new buses, for example, the problem might constitute a fleet defect, he said, which the manufacturer would have to correct.

"The city is pretty big. . . . We have millions of records out there. In the past, things would get fixed [on an individual basis], and no one would be the wiser," he said.

The computerized record system also allows the use of spectrochemical analysis. Samples of fluids are taken from a bus and burned, and measurement of the resulting light waves indicate what elements are in the fluids; if engine coolant is detected in the engine oil, it is a sign of a broken seal. Metal particles in transmission fluid indicate a working part is deteriorating.

Fifty percent gain in fluid life

Without the spectrochemical analysis and computerized records, the maintenance crews had to replace engine oil and coolant every 6,000 miles. With them, the two fluids are replaced in most buses every 9,000 miles — a 50% gain in fluid life.

Each bus requires 32 quarts of oil and 36 quarts of coolant per change, so the savings have been considerable, but transit officials cannot say how much yet.

Mainly, however, the estimated 100-program record system helps system reliability, Fortunato said. When a bus breaks down, six months of service records are available quickly on a screen at the repair depot.

"The people who really need the information are getting it," he said.

Nynex, DG join forces to integrate voice/data switches with OA systems

NEW YORK — Data General Corp. and Nynex Corp. last week announced a $65 million agreement calling for Nynex to integrate voice/data switches with DG office automation systems.

Under the agreement, Nynex's unregulated subsidiary, Nynex Business Information Systems, will package DG Eclipse MV superminicomputers running DG's Comprehensive Electronic Office (CEO) with various switches already marketed by Nynex. CEO is an OA package that includes spreadsheet, filing, calendar, word processing, decision support and calculator applications.

A Nynex spokesman said the systems, which will be tailored to the individual customer's needs, are intended to provide a complete OA and voice/data communications package.

Customers can choose from a line of switches now marketed by Nynex, including those made by GTE Business Communications Systems, Inc. and Tie Communications, Inc, according to the Nynex spokesman. He added that packages can be configured to provide all communications services except Inter-Local Access and Transport Areas service.

Nynex to use DG equipment

Nynex, which serves a market area of six million businesses in New England and New York, also will install the DG equipment and CEO software in its own sales and business offices.

The Nynex spokesman said pricing will be set this week and will vary according to the Eclipse system chosen. The Eclipse series supports up to 128 users but allows for interconnection of multiple Eclipse systems.

Nynex also will sell DG's 16-bit Desktop Generation microcomputers and DG/One portable computers.

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Are you lost in a forest of hardware or tangled networks? Let Computerworld's February Special Report on communications networks update you on network architectures, communications software and industry standards.

The Special Report will focus on corporate networking choices including the feasibility of satellite bypass and private line networks.

Contributions to the Special Report should take one of two forms: tutorial articles discussing issues or trends or applications stories outlining a particular user firm's experience.

Articles may range from four to six typed, double-spaced pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a brief biography and a telephone number at which they can be reached.

The submission deadline for the February Special Report is Dec. 28.

If you have a story you would like to tell, an issue you would like to speak out on or any questions you would like to ask, contact Janet Fiderio, Special Reports Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

MCI Mail to adjust prices

WASHINGTON, D.C. — MCI Mail, a service of MCI Digital Information Services Corp., announced pricing changes and discounts for its electronic mail customers effective Jan. 1, 1985. An annual fee of $18 will be charged to MCI Mail subscribers — the first time such a fee has been assessed.

Prices for MCI Mail letters sent short distances will be reduced 55% to 45 cents for up to 500 characters. New prices and a higher capacity will be applied to MCI Mail courier deliveries.

New volume discounts, ranging between 10% and 30%, will take effect for MCI letters and overnight mail. A new Executive 50 discount package for customers with more than $50 per month in charges will provide a 5% discount as well as a free Advanced Mailbox that provides all MCI Mail services.

COBOL

from page 1

nology a few years ago. "We looked at some canned packages, but they were not flexible enough for us," he said. "They could not provide us with features such as a 22-digit cost center."

The group experimented with and rejected three application development options: Basic, Dbase II and Microsoft Corp.'s Cobol. The system manager said that Basic and Dbase II did not possess powerful features. "Microsoft Cobol was not compatible with Ansi 74 standards, so it was difficult to determine what features were available," the system manager [illegible]

A major computer manufacturer, which did not want to be identified, has been teaming Cobol and micros for more than four years. The company's central programming department develops and tests applications on the micro and uses a Ryan-McFarland Corp. cross-compiler to send the applications to an IBM 3083 mainframe, where they are compiled.

A system analyst at the company listed two reasons why programs are compiled on its mainframe: speed and data integrity. "To compile a 4,000-line program on a microcomputer can take as long as 45 minutes," he claimed. "To be productive, a person would need two or three microcomputers. That would be ridiculous."

> *'We can develop an application in one-fifth the time it previously required.'* — Jerry Purcell, Fluor Corp.

Fluor alleviates response time problems by limiting most programs to approximately 1,000 lines of code and through the use of a syntax checking program. "We do most of our debugging with a syntax verification program," Purcell said. "Whenever a programmer compiles a program, he is fairly certain that it will run to completion."

Consequentially, response time is not a major problem at Fluor. "With an [IBM Personal Computer] XT, four to six minutes are needed to compile a program, and 30 to 60 seconds are used for the syntax check," he noted. "With an [IBM Personal Computer] AT, this time is cut significantly."

The manufacturer stores Cobol source and object code on the mainframe. "There are control and security procedures available on the mainframe that the microcomputer does not have," the analyst said. "With the micro, one has to work with 150 floppy diskettes as backup."

The computer manufacturer has written a number of applications, including a program for its manufacturing plants. "Microcomputers control a number of activities at our plants, which are located throughout the world," the analyst said. "We wrote a general program for all our plants. Since it was written in Cobol, it can be altered in each country."

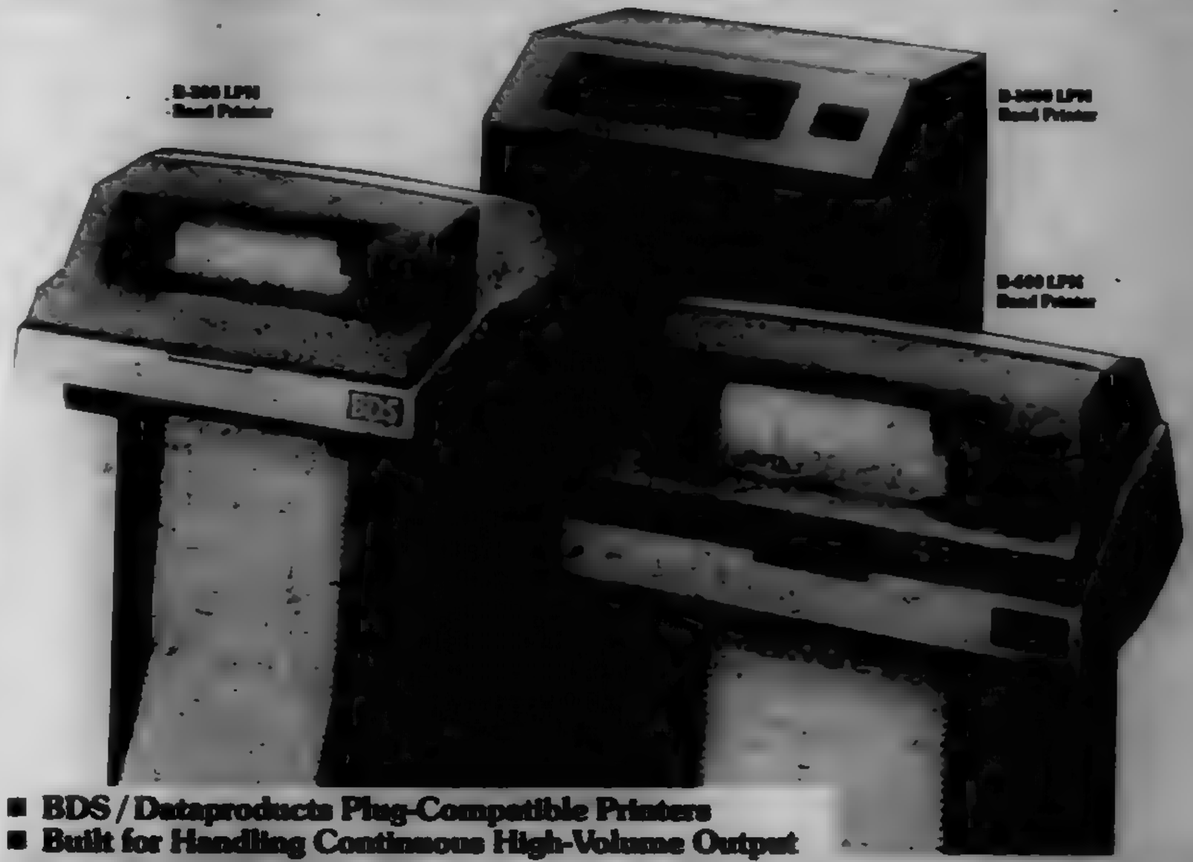
The next step at Fluor will be running the Cobol programs on a local-area network. "We would like to be able to have one person entering data while a second is testing a program," Purcell said.

[illegible] a multilingual effort

[illegible]

[illegible] development is catching on. [illegible]

[illegible] 40% faster and more portable."



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WILSON

from page 1

willing to take their place, yet I couldn't. That rejection really hurt."

The pain was so great that she asked for a transfer from AT&T to Ohio Bell. "Initially, I was told that transfers were not allowed, but in three weeks I went to work for Ohio Bell," Wilson said.

Her first position was as a third-shift computer operator. Although interested in computer technology, she aspired to a management position. "I have always been more interested in people than machines," Wilson said.

To increase her knowledge of Ohio Bell's system and hone her managerial skills, she studied. "I am the type of person who always has her head in a book," Wilson claimed. As she advanced in her studies, she was given more responsibility. In 1973, Wilson became an assistant manager, with four people reporting to her.

Wilson

Her management style has been marked by a willingness to change policies even when change creates problems. "The operations function grew so that it was difficult to complete the work in six days," she said. "There was talk of a seven-day schedule that no one really wanted. I was assigned to implement it. As you might guess, that was not a popular change, but it was needed, and it was implemented."

As an Input Systems Output manager, Wilson also altered the company's training program for operations personnel. "My area was responsible for [Sperry Corp.] and [Honeywell, Inc.] equipment," Wilson said. "New employees were first trained on IBM equipment. We had to wait a few months before they would even begin to work with our system. I just did not see the rationale for that process, so I had the training department develop introductory Honeywell and Sperry courses."

Wilson's ability to communicate helped her accomplish tasks without alienating coworkers. "You always know where you stand with Vivian," said Richard W. Gostlin, assistant manager for site planning at Ohio Bell. "She defines what she wants and tells you point-blank when you don't deliver it."

Wilson credited her entry-level experience with aiding her managerial skills. "Some people go right into management and never understand the needs of nonmanagement employees," she said. "With my experience, I can find something in common with any employee."

Two years ago, she recalled, one of her workers retired from Ohio Bell. Upon retiring, the woman sent Wilson a card thanking her for always taking the time to communicate. The former employee claimed that Wilson's cheerful demeanor was more important to her than anything else at the company. "She signed the card 'P.S. I hated you when I first worked for you,' " Wilson related.

Another asset is the wealth of experience she gained during her tenure at Ohio Bell. "Whenever there was an obscure problem with the system, she would correctly analyze it," Gostlin noted.

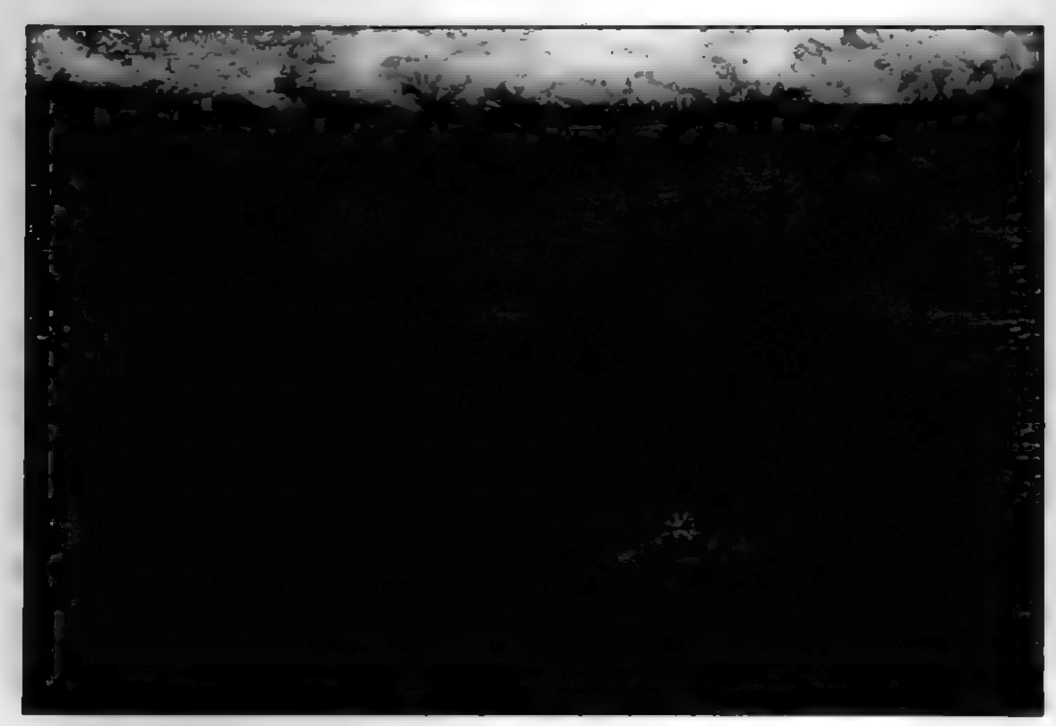
'I rely on her experience'

Her supervisor, Robert L. Windle, district manager of Input Systems Output, added, "I really rely on her experience. I would hate to think of working without her."

Wilson's experience and outgoing nature have landed her a job in which she now directs 71 employees and six managers responsible for the company's 2.5 million-bill-a-month billing system, billing data entry for the Northern Ohio area and the corporate microfiche system.

She has placed her unpleasant early AT&T experience behind her and reported only one minor problem at Ohio Bell. "There was tension between one supervisor and me," she said. "It reached the point where we had to have a closed-door meeting to air our feelings. The problem was not that I was black but that I was a woman. He didn't believe that women should work. Even though initially we had problems, I can't complain about the way he treated me. He gave me the best review I ever had."

Wilson has been active in the Cleveland chapter of the Black Data Processing Association, serving recently as its recording secretary. She has also found time to attend college, raise six children and work as bookkeeper for her husband's business.



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Data security topic of meet

LONDON — Experts in computer crime will speak here at the 1985 International Data Security Conference, Feb. 18-19. Sponsored by Open Computer Security Ltd., the conference is geared toward consultants, security system planners and senior executives of financial institutions.

Speakers will include Carl Meyer, Ph.D., codesigner of IBM's Data Encryption Standard, and Dorothy Denning, Ph.D., associate professor of computer sciences and specialist in cryptography and data security.

More information is available from Maxine Gordon, Open Computer Security Ltd., 31-32 High St., Brighton, East Sussex, England BN2 1RP.

Five-year Ansi effort yields data exchange standard

By Bryan Wilkins
CW Washington Bureau

BALTIMORE — Incompatibility of hardware and software is most familiar to system planners who are prone to exclaim, "I'm tired of this, and I'm not going to take it anymore." The electronic exchange of interindustry information regarding purchases and orders probably conjures up nightmares. If handshaking won't work within the industry, forget the external transactions.

However, with the publication this month of draft standards by the American National Standards Institute (Ansi) X12 committee, a five-year effort by users to establish peaceful coexistence in an incompatible hardware environment has borne fruit.

The draft standards for electronic business data interchange (BDI) were designed to facilitate order placements, the processing and receiving of information, shipment and receiving information, invoicing, payments and cash applications.

According to Ed Fischer, chairman of the Ansi X12 committee and director of 3M Corp.'s information center, the number of industry groups that have joined in the effort to develop BDI standards has increased as the work has neared completion. "It's been hard. How do you satisfy that many people who all want to keep their own formats and designs?" asked Fischer, who recently reported on the work to the annual convention of the Transportation Data Coordinating Committee (TDCC) here.

Fischer told the convention that support for the draft standards has been expressed by associations representing the metals, banking, electronics and computer industries.

The Ansi X12 committee work has centered primarily on following the structure of the International Standards Organization's (ISO) Open System Interconnect architecture with its seven-layer communications protocol.

Specifically, the BDI draft standards comply with ISO layers six and seven only, according to Fischer.

The standards consist of transaction-set standards to define the procedural format and data content requirements for specific business transactions, such as purchase orders, a data dictionary that defines the precise content for data elements in building a transaction set and the transmission control standards.

Fischer said the successful adoption of the draft standards would depend primarily on their use by suppliers and vendors of various products. He predicted, however, that third-party vendors, such as value-added communications companies, would probably be the logical choice for small businesses that want to perform data interchanges and avoid added costs of implementing hardware and software changes.

TDCC is acting as the secretariat of the X12 committee, and copies of the draft standard can be obtained for $85 by writing to TDCC at 1101 N.W. 17th St., Washington, D.C. 20036.

Delaware succeeds in second try at automating bond sales

By James Connolly
CW Staff

DOVER, Del. — The state of Delaware's second attempt at eliminating paper in state and municipal bond sales last month succeeded where the first try failed.

State Treasurer Janet C. Rzewnicki tried to eliminate paper bond certificates earlier this year [CW, Feb. 6] by assessing a $50,000 handling fee on bidders who did not agree to use book entry or electronic registration of bonds. In that $60 million sale, four of five bidders, including the low bidder, opted for paper and the surcharge.

But in the latest $50 million general revenue bond offering, where the surcharge was quadrupled to $200,000, three of the five bidders agreed to the book entry requirement. Those offers included a low bid of 8.69% annual interest by the winning bidder, Merrill Lynch & Co.

The sale was the largest book entry bond deal in the U.S., surpassing the $10 million sale by the state of Utah in July, and will help make book entry the standard for state and municipal bonds, according to Rzewnicki.

"It was an education process. There was a feeling that the individual wanted a paper certificate," Rzewnicki noted. She said she ordered a study of bond buying patterns and found that almost all bonds were being purchased by institutions such as banks and insurance companies, often on behalf of individuals who never received or desired certificates. She said she also found that the financial industry misunderstood state regulations on book entry bonds and that there was no requirement for paper.

Under the book entry system, sales will be recorded under a single certificate at a depository. Merrill Lynch and the depository will then keep electronic records of the institutional and individual purchases. She said courts will accept as proof of ownership records such as canceled checks and monthly statements.

According to Rzewnicki, the benefits of book entry go beyond the state's saving printing and processing costs for certificates. She said the customer benefits by interest being paid automatically and because the state can easily break down large bonds for several buyers.

"Because we are doing it through the computer, we can change denominations of bonds from $5,000 to $1,000, which means letting people get into the tax-exempt market for a lot less money," Rzewnicki said.

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NEWS

IBM readies to meet predicted large systems demand

CW AT
IBM LARGE
COMPUTER MARKET

By John Desmond
CW Staff

TARPON SPRINGS, Fla. — IBM's own customer surveys show that host processing, or millions of instructions per second (Mips), rates will grow at a compound rate from 45% to 47% in 1984 instead of the 35% that IBM previously projected.

So said Daniel M. Culhane, IBM's manager of large systems in the national accounts marketing division, who spoke last week to an IBM Large Computer Market Conference sponsored by the Gartner Group, Inc., a market research and consulting firm.

Since IBM began the customer surveys in 1979, actual Mips installed have consistently outstripped projections, Culhane said. Among the application areas most strongly driving growth today are graphics and image processing and engineering and scientific markets, he added.

'Dramatic business case'

"Those areas are probably growing enough so that even IBM could make a very dramatic business case" for getting into them, said Culhane of markets traditionally dominated by IBM competitors.

Also driving the market are projections that, by 1990, 70% of the white-collar labor force will be dependent on computers to do their jobs and that 13% of the gross national product will be spent on data processing-related expenses, Culhane said. "An inexhaustible amount of corporate money will be spent on DP," he said.

Most DP-related spending was once on mainframe-class systems, he explained. In 1980, 60% of DP spending was for mainframes, vs. a projected 35% in 1985, Culhane said.

Spending for desktop processors and minicomputers is up; desktop spending is rising from 6% of DP budgets in 1980 to a projected 20% in 1985, and minis from 17% in 1980 to a projected 21% in 1985, Culhane said.

More sophisticated end users are fueling the change, and growing DP markets are concentrated outside the host processing area, he suggested. "Real growth is achieved by tying the external areas back to the host," Culhane said.

Addressing system design, Culhane said IBM is designing CPUs with more field-replaceable units that can be plugged in and out quickly for faster servicing.

Self-diagnostics will be increasingly used to indicate which components are not working, and the defective component can be simply replaced in the field and repaired elsewhere, Culhane said.

'Settle for someone in a white shirt'

With such designs, service in the field becomes simplified; "Maybe you don't need a graduate engineer anymore," Culhane said, adding, "Maybe you can settle for someone in a white shirt who can replace a card without getting electrocuted." He also added, "I'm not saying that field engineers are going to go away."

Another design feature for water-cooled systems that has helped control CPU maintenace costs is the Thermal Conduction Module (TCM), Culhane said.

Dissipating heat is critical in systems that operate with cycle times below 27 nsec, such as the 3080 series, since excess heat can affect cycle timing, he said. A total of 133 microprocessor chips together can generate 300W of heat, Culhane said, noting the TCM was designed to remove up to 1,400W of heat.

Other areas addressed by Culhane included:

- *Chip technology.* IBM's research arm recently announced a chip with 10,000 bipolar circuits. When used in a personal computer, the chip could push micro Mips ratings to 2.5, Culhane said. While it would not appear practical now for micros to have that much power, the excess power could be consumed by protocol conversion, especially for communicating between processors, he suggested.
- *The 1M-byte chip*, also recently announced by IBM. This could be used to increase main memory on CPUs in the field, he said, suggesting, "Productivity would go through the roof."
- *Market strategy*, in which IBM uses price to try to move users to the top of a CPU line. "We've developed what we consider a mousetrap. Once you buy one of these things, we're going to continue to try to adjust prices to get everyone to go all the way up . . . to the top of the line," Culhane said.

He noted that IBM saves money this way, because it is easier for salesmen to move customers up processor lines than to different processors.

- *Operating systems.* IBM is committed to MVS/XA, VM and DOS/VSE through 1989, Culhane said. OF MVS, Culhane said, "MVS isn't going to be functionally stabilized; it's going to be functionally stranglized. Less and less function, more and more to extended architecture," he said, noting

See SURVEY page 13

Who costs more ...a President or an MIS Director?

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IBM seen moving from 370 to System/38 architecture

CW AT IBM LARGE COMPUTER MARKET

By John Desmond
CW Staff

TARPON SPRINGS, Fla. — IBM will move away from the 370 architecture in a "gradual if not graceful transition toward the evolutionary target" architecture of the System/38.

That was the view of David L. R. Stein, general partner of Julian, Cole and Stein, who spoke at last week's IBM Large Computer Market conference here sponsored by the market research and consulting firm of the Gartner Group, Inc., of which Stein was a cofounder.

According to Stein, "the crystal ball is rather clouded" as to when this movement will occur in earnest. One reason is that the plug-compatible market has not performed well of late, he said.

"IBM now has some options it probably didn't expect to have; [the company is] not being forced to move as quickly," Stein said. Stein predicted that when IBM announces the Sierra, its so-named successor to the 3080 series of mainframes, certain features will be withheld at first since IBM has no pressing need to announce them. Sierra features announced in late 1985 could encompass fiber-optic channels and new channel protocols, Stein speculated.

IBM, Stein claimed, learned a lesson in the early 1970s after announcing the 370 to succeed the System/360, with the 370 being "the same machine for half the price," Stein said. IBM did not offer the block multiplexer channel feature of 370 on the 360, so plug-compatible manufacturers (PCM) developed a controller to keep the 360s current, he said. "The entire installed base of IBM was incompatible with IBM's new standard," he said. PCMs took advantage of that to sell more of its own disk drives. "In a sense, IBM abandoned its installed base" to the PCMs, Stein said.

IBM today tends to retrofit new system features to most recent systems, so the installed base can support the same peripherals, making it harder for PCMs to compete, Stein indicated. Beyond PCMs, the real issue in Stein's view is how IBM can continue to carry on with its 370 architecture. "No one would be so brash as to suggest that 370 architecture will be here forever, he said.

IBM learned a lesson in the early 1970s after announcing the System/370 to succeed the System/360, with the System/370 being the same machine for half the price.

In 370 architecture's evolution, Stein predicted, "DOS will die; it has no reason to exist. It was designed for small memory environments."

Quoting Gene Amdahl, the entrepeneur who started Sunnyvale, Calif.-based Amdahl Corp., Stein said end-user investment in software is "so enormous that it forces gradual architectural evolution."

If IBM made radical departures in architecture, it would benefit IBM's competitors by forcing unwanted conversions on IBM users, Stein suggested.

IBM instead will continue to rework its 370 architecture toward object-oriented architecture, in which the operating system generates I/O actions to handle transfers transparently to the user, as in System/38 architecture, Stein said. "That clearly has to be the objective for the 370." This process of evolving to System/38-type architecture may take two decades to reach completion, Stein said. The change requires a machine-independent interface between systems software and applications programs and abandoning device-dependent data, he stated. "The risk is enormous. If one makes too large an architectural change, the software can come down like a house of cards," he said.

To migrate customers to another architecture, IBM intends to support two environments simultaneously, Stein said.

SURVEY

from page 12

the transition would be slow.

■ *Sierra.* In an apparent reference to what the Gartner Group is calling a delay in the announcement of the Sierra series, the top-of-the-line IBM mainframes expected in early 1985, Culhane said, "The X models haven't been out there that long yet. You've got to recover that development expense before you can really make your profit numbers."

■ *Microcode.* The hardware, software integration called microcode is misunderstood because it is complex and engineering-oriented, Culhane suggested. Loaded on a mainframe via a floppy disk, microcode provides software assistance and better performance, he said. For an MVS function, according to one test, a CPU with software only required 56 instructions and 332 cycles to process. With microcode, that function required one instruction and 70 cycles.

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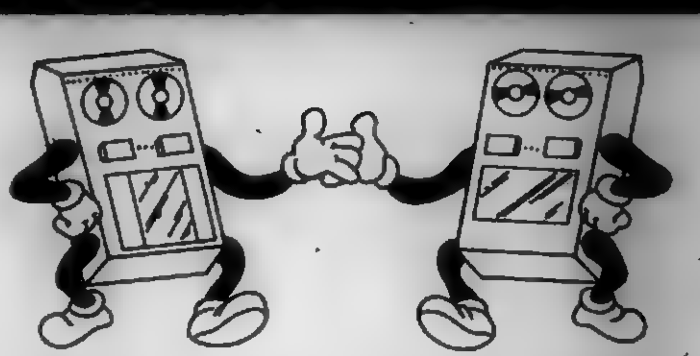

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Data base system plays cupid for business expansion

By David Gimes
CW Staff

In Durham, N.H., the creators of a computer "dating service" are bringing together lonely heart investors with entrepreneurs, hoping to attract more investment to the state.

In Atlanta, the Associated Builders & Contractors of Georgia, a trade association, is using a computer data base to match builders with contractors and to create more business for association members.

These are just two of the various organizations that have enlisted computers to promote business opportunities and improve their competitive advantage over rivals.

At the University of New Hampshire (UNH) in Durham, the directors of a nonprofit network are trying to match entrepreneurs with investors. Information about investors and applications for investment from entrepreneurs are being stored in a customized version of Ashton-Tate's Dbase II data base program running on an IBM Personal Computer.

Network to help attract business

The project, called the Venture Capital Network, is operated by the Small Business Development Program at the university. Organizers of the network hope it will help New Hampshire compete with other states in attracting new business.

"The level of activity has been well in excess of our expectations," said William Wetzel Jr., a UNH business professor and one of the network's directors. "It's been growing fairly rapidly."

Wetzel said about 100 investors throughout New England are participating in the project, which is centered on equity investment opportunities in the $50,000 to $750,000 range. Start-up investments of that size are usually too small to attract the attention of professional venture capital firms or the public equity market, he said.

Start-up companies have usually had to turn to the informal risk capital market to finance their ventures, Wetzel said. But entrepreneurs often have difficulty locating these "informal investors." In the past, he said, the two parties have usually met "through a series of random events or the 'old-boy network.' "

An entrepreneur fills out a questionnaire with basic information about his business plan. The computer is then used to match the entrepreneur's plan with the investors' requirements, Wetzel said.

Confidential process

When both parties' criteria match, the investor is provided with additional information about the plan. The process is confidential until such time as the investor asks to meet the entrepreneur, Wetzel said.

"We couldn't do this without computers," he noted.

Although the network has already matched a number of potential investors with entrepreneurs, only one deal has been consummated, Wetzel said. Although he declined to disclose the identities of those involved, he said the entrepreneur of the high-technology venture is receiving $100,000 to $200,000 in start-up funds.

The Associated Builders & Contractors computer service was begun in May 1984. One of its main purposes is to give association members a competitive edge over a rival AFL-CIO-affiliated construction union in winning building contracts, according to Robert Graham, executive director of the Atlanta association.

Graham said the Construction Buyers Service Center is an offshoot of a similar computerized data base kept by the association's national headquarters.

"We got a little more specific with it and tried to tailor it to our contractors, to the type of projects that typically are built in Georgia," Graham said.

The data base program, called Fileman, was custom-written for the association by Compuwork, an Atlanta software development firm specializing in insurance applications. The software runs on an Ohio Scientific, Inc. personal computer.

Association members complete questionnaires providing information about their firms, including the type of construction in which they specialize, their largest clients, recent projects and bonding capacity. That data is entered into the computer and matched with information about specific construction projects.

Matching builders with contractors

"What we try to do is match up the needs of builders who are looking for contractors with those contractors" who fit the builders' requirements, Graham said. Builders are sent a profile summary of potential contractors, and the rest is up to them.

"It doesn't do anyone any good to be talking to someone about a job that may involve $2 million to $3 million of electrical work on a project if all the contractor does is small residential electrical work," he noted.

The matching effort would have been impractical without the computer, Graham explained. "We would have had to keep [paper] records on every contractor, then when we got a request, manually go through each and every one of 370 companies to try and match them up."

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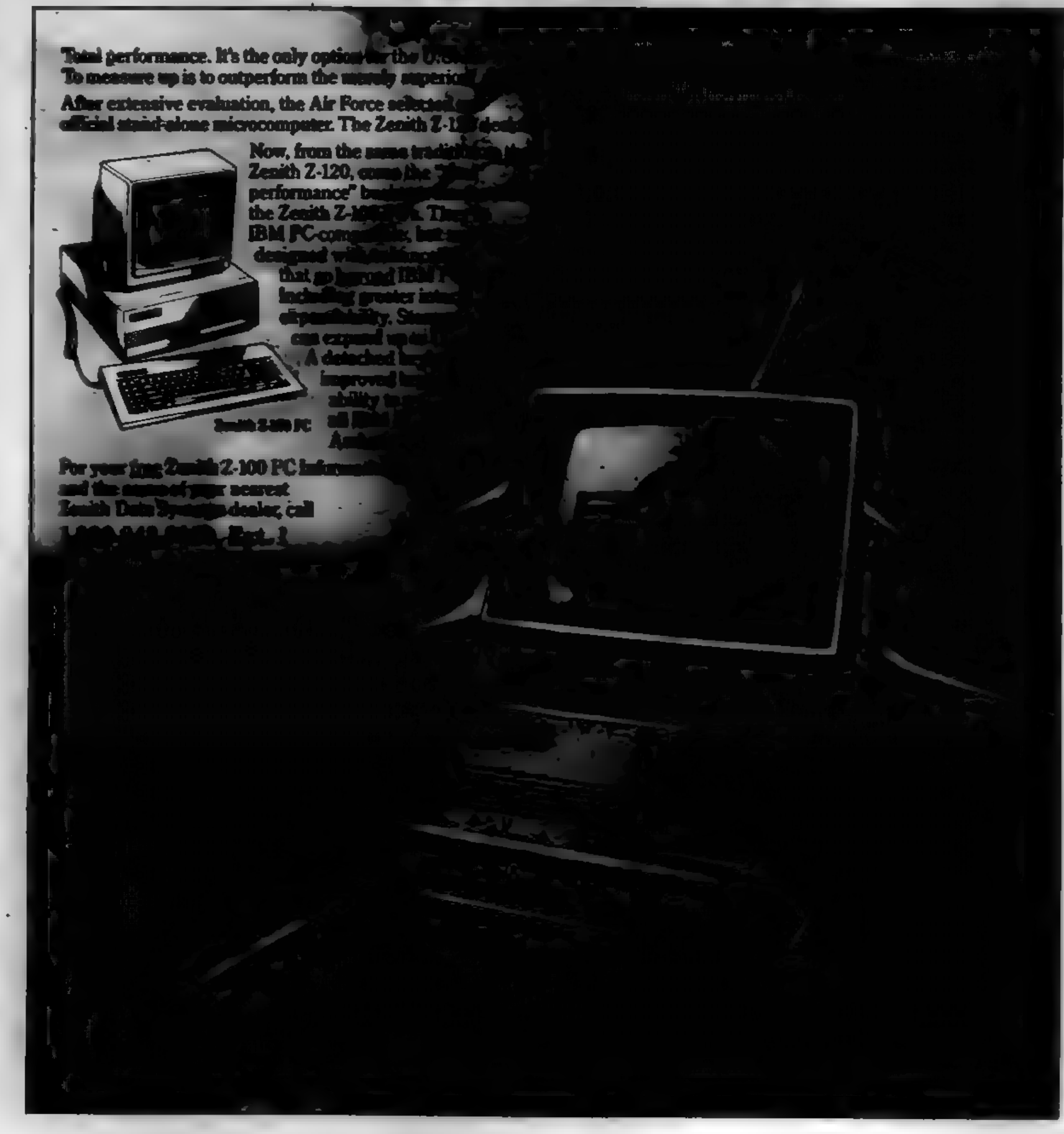

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IBM forms organization to handle Rolm acquisition

ARMONK, N.Y. — As part of a realignment of its three major business groups, IBM last week formed an organization to oversee recently acquired Rolm Corp. and related telecommunications businesses.

The new Telecommunications Products organization will be responsible for coordinating IBM's efforts in voice and private branch exchange (PBX) telecommunications and for marketing those products. The new group also will direct IBM's joint marketing program with Satellite Business Systems (SBS), a company in which IBM recently raised its ownership stake to 60%. Aetna Life & Casualty Co. owns the remaining 40% of [redacted]

IBM's $1.26 billion acquisition of Rolm was approved last month by Rolm shareholders and the U.S. Justice Department. IBM and Rolm have agreed to a Justice Department proviso requiring the divestiture of Rolm's military computer business [CW, Nov. 26].

In a statement, IBM Chairman John R. Opel said the changes "will enhance our focus on several key areas of the business and better position us for future growth."

IBM said it is realigning the Information Systems and Communications Group and forming an Information Systems and Products Group. The changes are effective Jan. 1.

Under the realignment, the Information Systems and Communications Group will oversee the Communications Products and Entry Systems divisions, the Industrial Systems organization and the new [redacted] sion. Its responsibilities include the Personal Computer line.

Stephen B. Schwartz, formerly president and chief executive officer of SBS, has been named assistant group executive in charge of the [redacted] Schwartz will be succeeded at the satellite company by Marvin L. Mann, an IBM vice-president and general manager at IBM's products business unit in Lexington, Ky.

However, the Information Systems and Communications Group will no longer be responsible for the Information Products and Systems Products divisions, which will now come under the wing of the new Information Systems and Products Group. This group will be responsible for low-end information processing systems, including the System/36 minicomputers, copiers, automated teller machines and typewriters.

Frank Metz Jr., an IBM vice-president, has been named group executive in charge of the Information Systems and Products Group.

MIS director role redefined

Spread of desktops, expansion of duties change function of information managers

By Charles Babcock
CW New York Bureau

NEW YORK — The year 1984 was a transitional year in which the role [redacted] mental changes, according to the executive director of the Yankee Group, [redacted] porate data base have spread far beyond the walls of the data processing center. The MIS director, instead of serving as the high priest of information systems, is now subject to multiple demands for information ser- [redacted] recent annual briefing of the Yankee Group here.

Kutnick emphasized service. The proliferation of desktop computers and end-user computing "forever changes the role of the MIS director," [redacted]

"We see MIS changing through the end of the decade. . . . We see management information services enabling end users to get access to the data that they need," he said.

Today's end users are "fundamentally different from the programmers and techies" that MIS departments tended to deal with in the past, he [redacted]

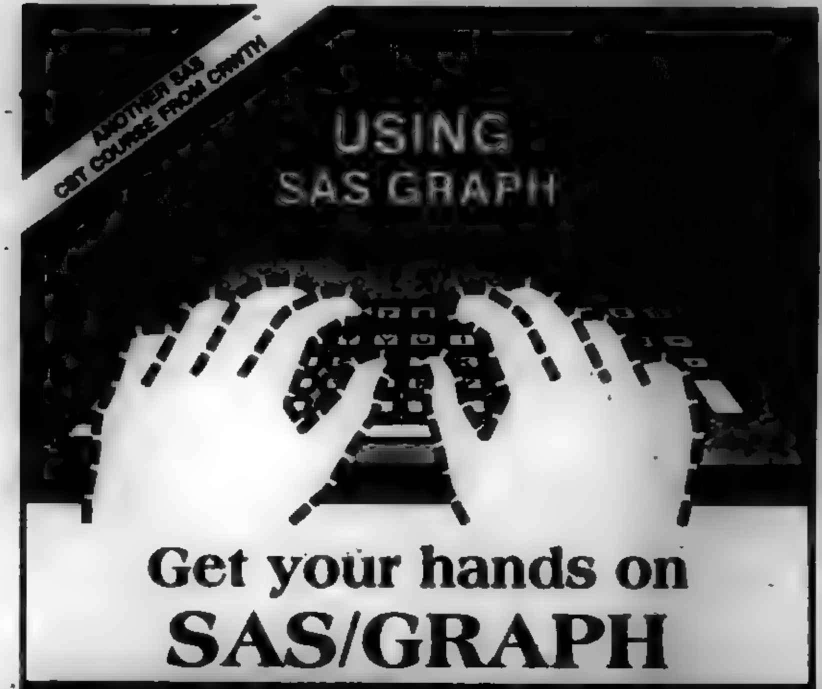
A second major responsibility that was passed on to many MIS departments in 1984 was overseeing the company's communications as a replacement for the broken-up AT&T. Kutnick said that as MIS departments assume a stronger role in communications, they will start building combined voice and data transmis- [redacted]

Growth of micros

The growth of microcomputers, departmental minicomputers and networks has increased, not lessened, the demands on the corporate mainframe, Kutnick said. A Yankee Group survey showed that users' large system millions of instructions per second (Mips) requirements are expanding at an annual rate of 35% to 45%, the equivalent of a new IBM 3081 mainframe every six months at a large site, Kutnick said.

The increase is being generated by use of information centers, fourth-generation languages, application generators, end-user data base management systems (DBMS), query facilities, more complex applications and networking. "Networking is not cheap," he noted.

The Yankee Group estimated that about 1 Mips of mainframe power is consumed for every seven to 10 concurrent personal computer users tied to it.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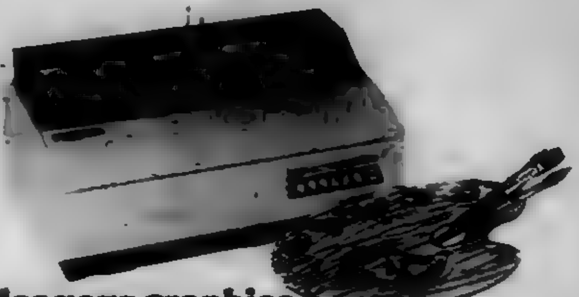

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Financial skills let DP execs speak corporate language

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — Why do computer professionals need to develop financial planning as well as data processing skills?

This question was the subject of a management tutorial at the 15th annual International Conference on the Management and Performance Evaluation of Computer Systems here last week.

According to Anthony M. Abowd, tutorial chairman and founder of Data Strategies, Inc., a financial consulting firm based in Chicago, many DP professionals are technically proficient but lack the basic financial skills and jargon necessary to bring their future hardware planning and computing needs to management's attention effectively. Consequently, management often fails to make effective business decisions based on the DP department's real needs.

Another problem, according to Abowd, is that computer managers are often isolated from the corporate mainstream. To change this, he said, computer managers must start speaking the language of corporate managers, rather than a confusing "Tower of Babel" computer jargon. This is especially important at budget decision-making time, Abowd said, when corporate managers are often inundated with myriad projects needing approval and often rank them quickly according to arbitrary financial measures.

Computer managers must speak the language of corporate managers.

Another factor for MIS managers to remember when pushing for project approval or additional equipment is understanding the corporate psyche, he said. Corporate managers are like owners of sports teams preparing to draft new talent, he said, with each new proposed project akin to a draftee's being considered for the prospects of corporate success next season.

Two basic questions

Abowd said there are two basic questions to answer when proposing increased DP needs to management, namely: How will the increased computer capacity fit in with the overall business of the company? And, how will it impact the company's bottom-line return on investment?

MIS professionals have become expert at measuring costs, but they are not strong at measuring bottom-line returns, added Hershel Pearl, a Data Strategies partner who cochaired the session.

DP professionals are also proficient at factoring in direct project costs, such as hardware, programmer requirements and software development charges, Pearl said, but are lacking in estimating trickle-down, indirect costs, such as unforseen overhead, support staff and electricity and air conditioning expenses. This serves to undermine the credibility of DP managers who, based on these omissions, often submit incorrect financial figures to upper management.

Two simple methods can turn computer proposals into financial proposals, Pearl said. The first method is to show how additional computing power can increase sales. The second method is to show how computing can reduce company expenses. Both methods, he said, talk about dollars, not computers, relate computing to the primary business and take into consideration the bottom-line company profits.

Appeals court refuses to throw out MCI case

CHICAGO — The U.S. Court of Appeals has refused to throw out the antitrust case won by MCI Telecommunications Corp. over AT&T four years ago, setting the stage for a trial on the extent of damages next month. The appellate court previously threw out a $1.8 billion award.

MCI has filed a new claim that it has suffered $5 billion in lost profits, which it said were the result of hindered connections to AT&T legally required by Federal Communications Commission policies. MCI said that due to the lost revenues, it was unable to expand its public-switched long-distance voice business that it was in the process of establishing.

MCI has stated in court documents that $2.5 billion of the damage claim is attributable to lost regular public-switched service and $2.5 billion attributable to lost private-line revenues.

MCI has completed an internal study that makes the case for the additonal lost revenues and has presented it to the court.

AT&T failed in an attempt to bar the new study.

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DP alchemists in quest for applications gold

PRODUCT SPOTLIGHT

DEVELOP from page 1

ing. For example, in the July issue of its monthly journal "System Development," Phoenix-based Applied Computer Research, Inc. (ACR) released the findings of a survey of 125 large development shops that showed an average applications backlog of more than 27 months. Similar shops surveyed three years ago indicated a backlog of only 19 months.

"So in spite of the rise of information centers and end-user computing, it appears that backlogs continue to get worse instead of better," the ACR report stated.

Into this environment, enter application development systems — those software tools designed to simplify and standardize application development and improve programmer productivity:

- Some application development systems work by actually generating code on the basis of input requirements.
- Others provide for the automated functional linkage of individual programs coded in traditional languages.
- Still another class provides a higher level language — so-called fourth-generation languages — housed in a development environment intended to speed the development process.

But defining what exactly constitutes an application development system is the rub. This article looks at the following three main product types:

- Program generators.
- Application generators.
- Fourth-generation language-based, production-quality application development tools, as opposed to the more end-user-oriented fourth-generation language products.

Not considered are the multitude of other productivity tools that address more specific and limited tasks in the development process.

Drawing a dividing line between program generators and application generators is not done without difficulty. A report prepared by Framingham, Mass.-based International Data Corp.'s (IDC) Information Systems Planning Service described program generators as products that produce standalone programs, typically in Cobol or PL/I.

Application generators, the study said, produce programs that continue to require software support from the generator, usually from a runtime monitor, to execute the programs. They generally interface with a data base management system (DBMS), often the vendor's own product, and a data dictionary and generally feature a fourth-generation language.

> *'In spite of the rise of information centers and end-user computing, it appears that backlogs continue to get worse instead of better.'*
> — Applied Computer Research, Inc. statement

"In general, program generators are more appropriate for an application that will consume a lot of computer power, the bread-and-butter applications that are run all the time. But a large portion of an organization's applications use a much smaller portion of computer resources — the one-time reports or ad hoc applications. The application generators are suited for those," said Ellen Staelin, senior software consultant for IDC's Information Systems Planning Service.

A problem many prospective users face is that a variety of products fall under the heading of application generators, a relatively new industry buzzword. "Within the mainframe world," Merlyn said, "I am not sure there are any true application generators. That is a term that covers a number of different products that assist in developing major application systems. The term may once have had a precise meaning, but you will find some very different solutions all under the application generator heading." Merlyn's firm, Walker Interactive Products, headquartered in San Francisco, expects to release its Strategic system application development system in approximately one year.

Even IDC's definition is not without opponents. Steven Pfrenzinger, president of Encino, Calif.-based IMS Consulting, Inc., said, "I cannot agree to [IDC's] delineation. It is just not workable. I know several products that do the same thing, but some have runtime monitors and others do not. I would call them all application generators. An application generator is a tool used by a programmer to develop applications. I understand the semantics problem, but I do not think that distinction is a proper one."

Thomas O'Flaherty, principal consultant for the market research firm Input, Inc. in Mountain View, Calif., echoed Pfrenzinger's dissatisfaction with IDC's product breakdown. "In reality, there is not all that much difference between program generators and application generators. The application generators, in principle, allow you to map out entire applications within the context of the generator, as opposed to individual programs. But I am not certain many users know how to utilize that aspect of the product in practice."

Whatever the definition, the market for professional programmer-oriented application development systems is certainly viable and growing. IDC estimated that large-scale systems users spent some $126 million on independent vendors' program design/development tools this year, an increase of nearly 50% over last year's expenditures

See DEVELOP page 2?

SELECTED APPLICATION DEVELOPMENT SYSTEMS FOR THE IBM MAINFRAME ENVIRONMENT*

	Applied Data Research, Inc. ADR/Ideal	Cincom Systems, Inc. Mantis	Cullinet Software, Inc. Application Development System/On-line (ADS/O)	Hogan Systems, Inc. Umbrella	IBM IMS Application Development Facility-II (IMSADF II)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mainframe software environment	OS, DOS, MVS, CICS, ADR/Datacom/DB	OS, MVS, DOS/VSE, CICS, TIS/DC, CMS, Environ/1, Vsam, DL/1, IMS, Total, TIS/LUV	OS, DOS, VM, CICS, TSO, IDMS/DC, IDMS/R	OS, MVS, DOS/VSE, CICS, IMS/DC, DL/1, IDMS, Vsam	OS, MVS, IMS/VS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Compiled or interpretive code generated	Compiled	Not applicable	Compiled	Not applicable	Interpretive
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Assembler code modules utilized for common routines	Yes	No	Yes	Yes	Not applicable
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Data query language provided	No (uses ADR/Data Query)	No (uses Cincom TIS)	No (uses Cullinet On-line Query)	No	No
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
On-line testing debugging facilities	Yes	Yes	Yes	Yes	Not applicable
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Documentation generated	Application components documented and linked in data dictionary	Automatic generation allows text to be inserted with program logic; prompter facility allows additional documentation creation	Full cross-referencing information and updates stored in data dictionary	On-line process control dictionary contains information in such areas as translation flow and data groups and structure	Rules documentation creates hard copy of contents of applications implemented
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Predefined commands/macros for data base calls and communications interfaces	Yes	Utilizes four-verb concept for all I/O. GET, INSERT, UPDATE and DELETE capabilities used for all data structures	Yes	Yes	Yes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Target user	Professional programmers and sophisticated end users	Professional programmers and end users with some programming experience	Professional programmers	Professional programmers; some facilities for end users	Professional programmers
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* The above list is intended to represent a sampling of the major application development systems available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available market research and interviews with industry consultants and researchers.

** For purposes of this report, a program generator is defined as an application development system that produces stand-alone programs. An application generator is defined as an application development system that produces programs that continue to require software support from the generator in order to execute the programs. A fourth-generation language application development system is defined as a development environment/methodology based on the vendor's fourth-generation programming language.

CW CHART

Tools aid appliance firm's applications development

PRODUCT SPOTLIGHT

Despite the fact that the application backlog continues to grow at Amana, Iowa-based Amana Refrigeration, Inc., Donald Jones feels that Pansophic Systems, Inc.'s Gener/OL has simplified much of the software development effort there.

"It seems that the backlog would keep growing no matter what type of tool we had," said Jones, who is manager of programming and procedures for the home appliance manufacturer. "Much of the backlog consists of batch programs, so Gener/OL won't help us. But it has helped us a great deal with our on-line applications development. In addition, it has speeded up debugging and testing. There are many on-line programs that we would otherwise have spent four or five days on that we can develop with Gener/OL in one day."

Jones said about half of his 13-member development staff works with the Gener/OL application development system, which runs with IBM's DL/I under DOS/VSE and CICS on an IBM 4381 Model 2 at Amana Refrigeration's headquarters in Amana. The firm brought Gener/OL in-house in early 1983 and has since used the product to develop several software systems that Jones described as production-quality applications. One is a marketing information system linked to a data base that provides terminal users with inquiry capabilities to sales information by such levels as product class and model.

"The marketing system application is a fairly large-scale one that includes a number of batch portions," Jones said. "I estimate that it would have taken us 20% more project time to complete the on-line portions without Gener/OL. There have also been no noticeable efficiency problems due to Gener/OL."

At John Hancock Mutual Life Insurance Co. in Boston, the use of Pansophic Systems' Telon for IBM's IMS/DC and CICS has also aided system development on the company's IBM 3080 series mainframes under MVS/XA. Telon was formerly a product of Christensen Systems, Inc., which was recently acquired by Pansophic [CW, Nov.19]. According to Robert Mongell, senior technical programmer in Hancock's Technical Services Division, Telon has reduced hand-coding requirements, facilitated high-level prototyping of applications and provided testing facilities that aid in debugging.

"Basically, we have used Telon to develop a number of standard insurance-industry-type applications.

See PANSOPHIC page 22

IBM maintains stronghold despite product weaknesses

By John Gallant
CW Staff

In a 1982 study of IBM CICS application development systems conducted by the Merlyn Corp. consulting firm [CW, Oct. 11, 1982], 33% of IBM Development Management System (DMS) users said they would not recommend that product to others. In addition, users queried by the Merlyn Corp. ranked DMS poorly in terms of overall capabilities. The study findings were supported by industry analysts interviewed by *Computerworld* who also criticized both DMS and IBM's ADF-II for lack of functionality. Yet both products continue to be leaders in rankings of installed application development systems.

"As the song goes, it's just three little words — International Business Machines," said Thomas O'Flaherty, principal consultant for Input, Inc., a Mountain View, Calif.-based market research firm. "The first thought of many users is to go with whatever IBM offers. They know IBM will never let them down completely, so it is a safe bet. However, despite the dominance of those products, IBM has not been as strong in this [productivity tools] area as it has been in some others, simply because its products are not that good."

Ann Morley, senior software consultant for International Data Corp., a market research firm based in Framingham, Mass., agreed with O'Flaherty. "People use a lot of IBM software simply because it comes from Big Blue. It has that *Good Housekeeping* seal of approval on it. In addition, their application development products have been on the market longer than many of those supplied by the independent vendors."

"To be fair," Morley continued, "many of the products we compare [DMS and ADF-II] to are newer and embrace more advanced architecture. That is not a fault of IBM. But IBM does not have to be the best to win market share, they just have to have something adequate. Many users know there are better tools out there, but they stick with IBM anyway."

That situation may be changing. Analysts agreed that independent vendors are gaining ground in the application development system marketplace, though not always at IBM's expense.

"I think the business is big enough so that there is room for everyone to gain ground," said T. Capers Jones III, manager of the application management practice at

See IBM page 19

SELECTED APPLICATION DEVELOPMENT SYSTEMS FOR THE IBM MAINFRAME ENVIRONMENT*

	IBM Development Management System/CICS/VS (DMS/CICS/VS)	Informatics General Corp. Mark V	Leading Software Technologies Corp. The Intelligent Assistant	McCormack & Dodge Corp. Millennium: System Development Tool (M:SDT)	Multiplications, Inc. Accolade
Product description** (type)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mainframe software environment	OS, DOS, CICS/VS, Vsam	OS/VS, DOS/VSE, CICS/VS, IMS/DC, IMS, Vsam, Isam	OS/VS, MVS, CICS; Vsam	OS, DOS, CICS, IMS, Vsam	OS, DOS, CICS, Vsam
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Compiled or interpretive code generated	Interpretive	Compiled	Compiled	Interpretive	Compiled
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Assembler code modules utilized for common routines	Not applicable	Yes	Yes	Yes	Yes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Data query language provided	No	No (uses Informatics Answer/DB)	Yes	Yes	No (uses Multiplications Imagine)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
On-line testing debugging facilities	Yes	No	Yes	Yes	Yes
Security	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Documentation generated	File and panel description forms, calculation and edit forms, data transfer forms	Design manual with cross-referencing information, file usage and screen-flow summary, screen data information, screen layouts, file formats and source listings	System description with DBMS interfaces, flowcharts, system narrative, I/O specifications, report facsimiles, program narratives, master file descriptions, screen layouts, CICS control table updates	Data dictionary updates, screen and procedural programs documentation	Screen documentation, program documentation with source code and comments, file layout reports
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Predefined commands/macros for data base calls and communications interfaces	Yes	Yes	Yes	Yes	Yes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Target user	Professional programmers	Professional programmers	Professional programmers	Professional programmers and end users	Professional programmers
Price	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* The above list is intended to represent a sampling of the major application development systems available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available market research and interviews with industry consultants and researchers.

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CW CHART

SELECTED APPLICATION DEVELOPMENT SYSTEMS FOR THE IBM MAINFRAME ENVIRONMENT*

	[illegible] Computer Software Co. [illegible]	Oxford Software Corp. UFO	Pansophic Systems, Inc. Gener/OL	Pansophic Systems, Inc. Telon	Sage Systems, Inc. Application Productivity System/IMS (APS/IMS)	Software AG of North America, Inc. Natural
[illegible]						
Mainframe software environment	DOS/VSE, OS/MVS, CICS DL/1, Vsam	DOS/VSE, OS/VSI, MVS, CICS, IMS/DC, DL/1, IMS, Total, SQL, Adabas, IDMS/R, ADR/Datacom/DB	DOS/VSE, OS/VSI, MVS, CICS, IMS, IDMS/R, Total	OS, MVS, MVS/XA, CICS, IMS/DC, TSO, IMS/DB, Vsam	OS, MVS, VM/CMS, CICS, IMS/DC, TSO/ISPF, IMS/DB, DL/1, Vsam	VM/CMS, DOS/VSE, OS/VSI, MVS, MVS/XA
[illegible]						
Compiled or interpretive code generated	Compiled	Interpretive (pseudo-code)	Compiled	Compiled	Compiled	Interpretive
[illegible]						
Assembler code modules utilized for common routines	No	Yes	Yes	Yes (optional)	Yes	Not applicable
[illegible]						
Data query language provided	No	Yes	Yes	No	No	Can be used for data query, per vendor
[illegible]						
On-line testing debugging facilities	No	Yes	Yes	Yes	Debugging only	Yes
[illegible]						
Documentation generated	Hard-copy screen layouts and file and element definitions; information extracted from data dictionary to produce user manuals	No automatic generation	Complete on-line documentation	Cross-reference reports with information on data access and exit points	Screen documentation; programmer reports with I/O information; screens, data base records and views and fields; session control reports	No automatic generation
[illegible]						
Predefined commands/macros for data base base calls and communications interfaces	No	Yes	Yes	Yes	Yes	Not applicable
[illegible]						
Target user	Professional programmers	Professional programmers; end users can utilize executive inquiry facility	Professional programmers	Professional programmers	Professional programmers	Professional programmers and sophisticated end users
[illegible]						

* The above list is intended to represent a sampling of the major application development systems available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available market research and interviews with industry consultants and researchers.

** For purposes of this report, a program generator is defined as an application development system that produces stand-alone programs. An application generator is defined as an application development system that produces programs that continue to require software support from the generator in order to execute the programs. A fourth-generation language application development system is defined as a development environment/methodology based on the vendor's fourth-generation programming language.

CW Chart

Micro as workstation queried

Most vendors do not support off-loading to micro

While microcomputer-based development — or programmer — workstations have become a hot topic in software organizations, whether or not the current generation of application development systems adequately supports the off-loading of development tasks to micros is debatable.

More than two-thirds of the vendors interviewed by *Computerworld* said they currently do not support micros as workstations. Some experts even wondered whether in-house software development centers are prepared to use micros as workstations.

"A lot of companies are betting that they can make use of workstations," said Steven Pfrenzinger, president of IMS Consulting, Inc. "It is an issue that is getting hotter, but it has not been addressed by most shops yet. . . . All the vendor companies are looking to micro versions of their products, and I have seen some functions moving out to the micro. But the actual generation portion of development still takes place at the host today."

Others complained that today's application development systems do not address the development of systems designed to operate across processor types.

"The [productivity] tools for the mainframe industry do not integrate the micro into the development scenario," said Vaughan Merlyn, vice-president and general manager of the systems software division of Walker Interactive Products, Inc.

"They also do not accommodate the reality of the future integration of mainframes, minicomputers and micros."

IBM from page 18

the industry research firm of Nolan, Norton & Co.

What is Big Blue planning for the future? Many insiders predict that IBM will announce an application development system to support its recently announced DB2 data base management system or at least extend the functionality of one of its products to service that environment. But the industry giant may have other moves in mind.

"I am anticipating that IBM will put its stamp of approval on one of the independents' products, as it did with [Artificial Intelligence Corp.'s] Intellect," said Steven Pfrenzinger, president of IMS Consulting, Inc.

"My suspicion," O'Flaherty said, "is that IBM may leapfrog the competition and come up with the first product that addresses applications that extend over microcomputers, minicomputers and mainframes. . . . Users are building these cross-machine applications, and they are asking for support."

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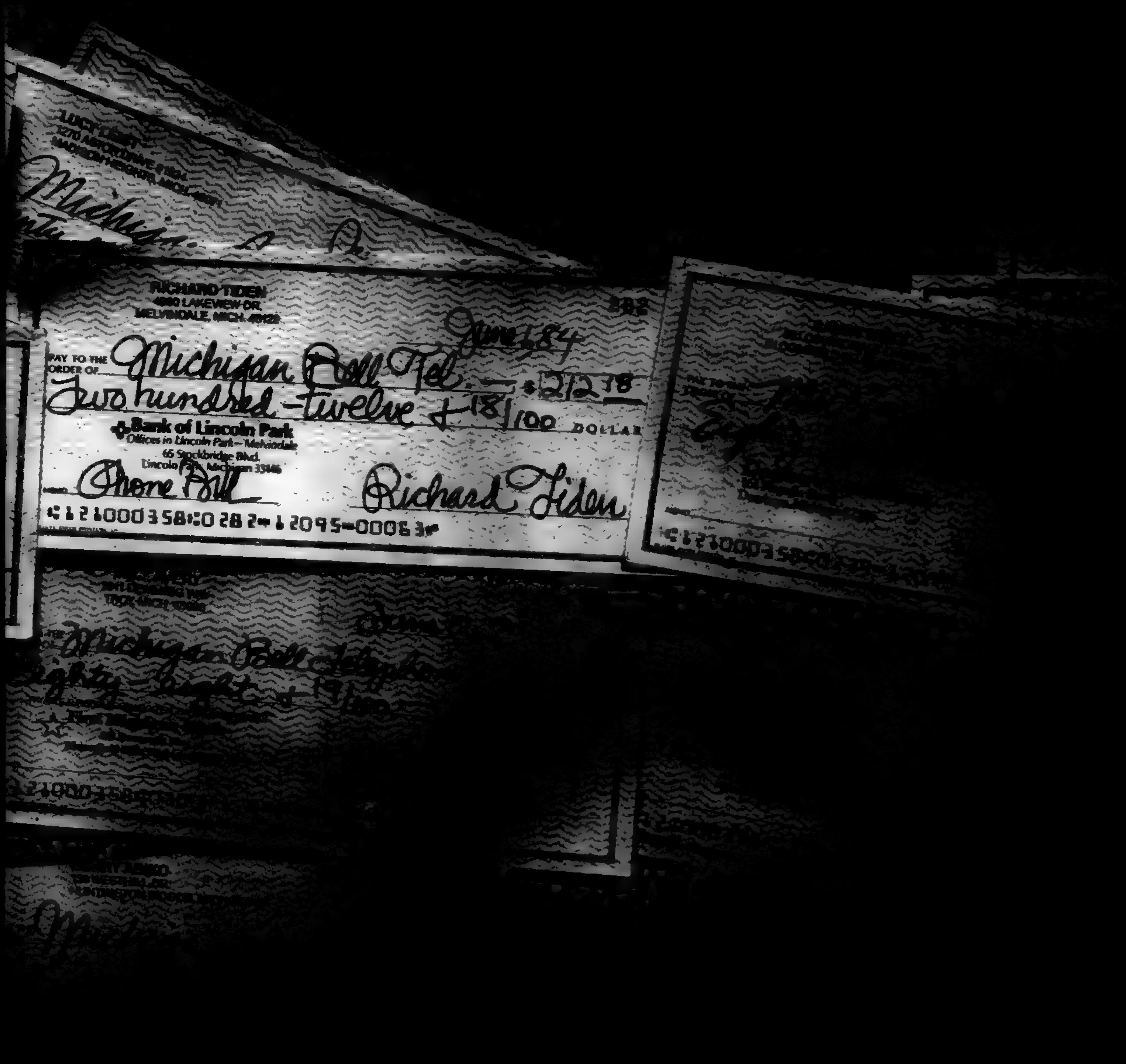

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DEVELOP

from page 17

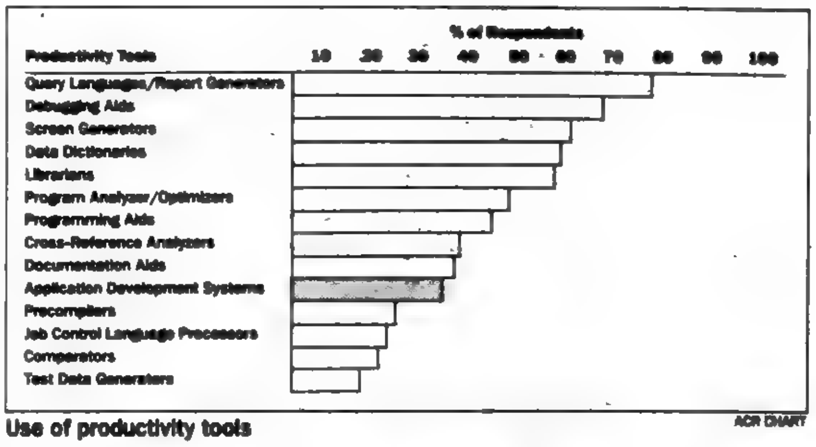
(see chart page 26). By 1986, that figure will more than double to $268 million, IDC predicted, and will reach more than half a billion dollars by 1988.

In a user survey conducted for its "IBM Software Environment" report, IDC found that approximately 28% of the 1,100 IBM sites polled use an application development system. That number correlates roughly to ACR's research, which indicates that nearly 35% of the shops studied use an application development system (see chart page 22).

"I think it is interesting to take note of how many shops are using these products," Staelin said. "There is not yet an accepted technology. It is clearly still in the adoption phase."

Despite the growing number of application development systems offered, users often face a very narrow range of options in adopting the technology. "Users don't have as wide a choice as it may appear, in the sense that the products are very environment-specific," said Ann Morley, senior software consultant for IDC. "If you are in a DBMS environment, you are pretty much confined to a product that supports the data types you have. There are more options available than last year, but users still face some real limitations of choice."

According to Morley, vendors are beginning to provide more general, less environment-specific tools as the application development technology gains user acceptance. But even as the products make inroads into DP shops, vendors must be cautious in targeting potential users.



Use of productivity tools

ACR CHART

Earlier this year [CW, March 12], Analysts International Corp. in Edina, Minn., pulled its Corvet application generator out of beta testing mainly because the company had failed to identify the final audience for the product. "We found," a spokesman said, "that although users were influencing the sales cycle, it was programmer/analysts . . . who would use it. That was unexpected." Corvet was intended to enable nonprogrammers to develop production applications.

As professional programmer tools, perhaps the single biggest reason application development systems are brought in-house is to improve productivity. Some products boast 10:1 improvements over coding in conventional languages, but whether users achieve such gains is questionable.

"The actual productivity gains with these systems, as far as I can tell, have been limited to relatively small applications. I do not know what the world record is for the largest application ever generated, but I am sure it is fairly small compared with the really large applications that have been conventionally developed," said T. Capers Jones, manager

See DEVELOP page 26

PANSOPHIC

from page 18

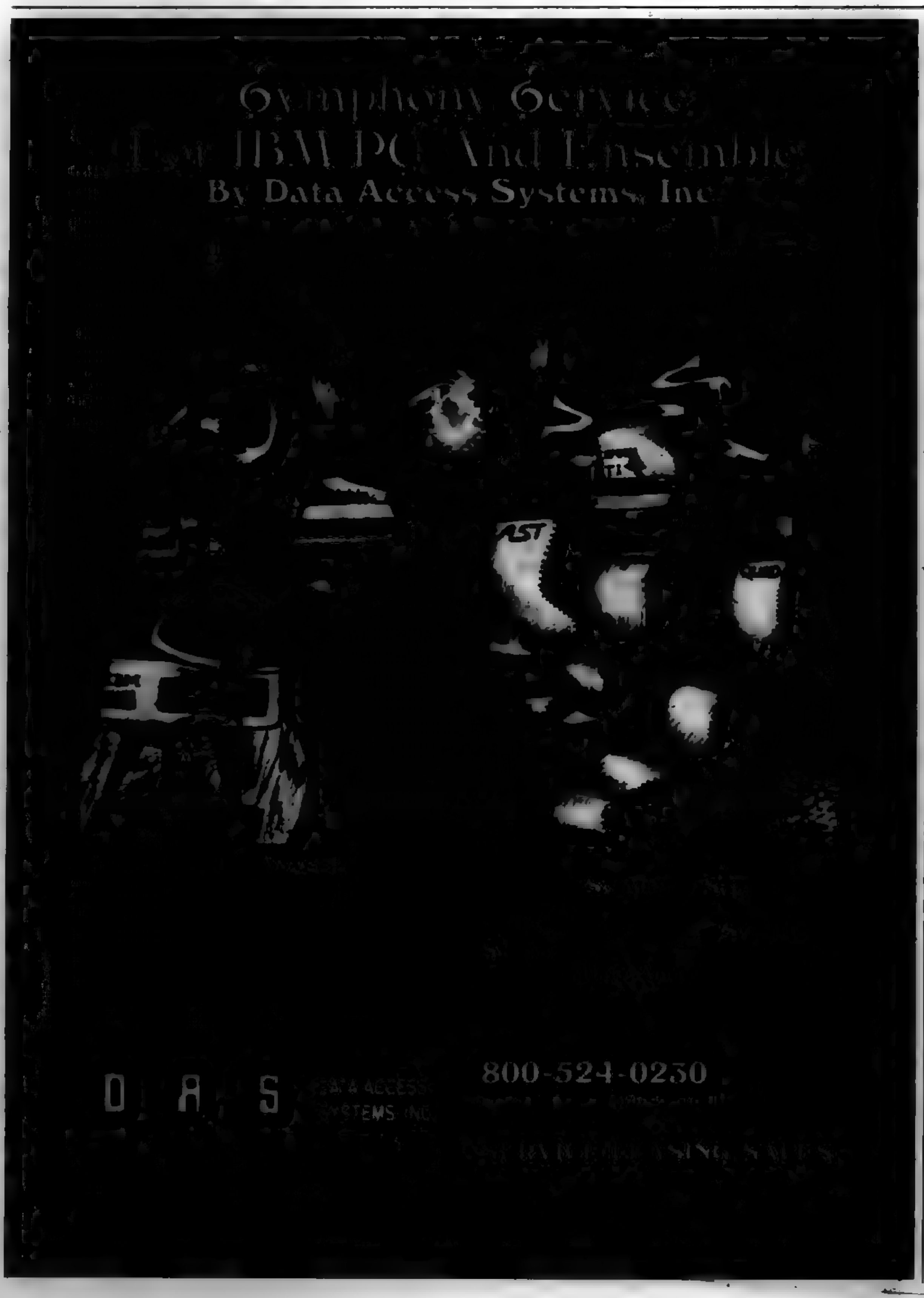
Also, we developed a corporatewide human resource system that maintains information on all employees. The product is definitely useful for constructing large-scale business applications," Mongell said.

About 20% of Hancock's approximately 450 applications programmers use Telon, although Mongell said the percentage of Telon users grows constantly. Hancock has used the application development system for nearly three years.

"Certain types of systems can be developed under Telon, but it is not a panacea," he said. "It is a simple online system that allows you to isolate complex processing. It has taken a lot of the detail work out of coding, and it allows you to concentrate more on design. But intricate, complex systems are not so suited to development with Telon."

Both Jones and Mongell said their shops faced no resistance from programmers when the products were acquired, although many experts said programmer rejection of productivity tools is a common problem (see story page 23). And, at both Amana Refrigeration and John Hancock, development management encourages the use of the development systems.

"We have a general policy here," Jones said. "Any native [IBM] CICS program will be written with Gener/OL unless someone can prove a very good reason why it should not be."



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Prototyping: Does use match investment?

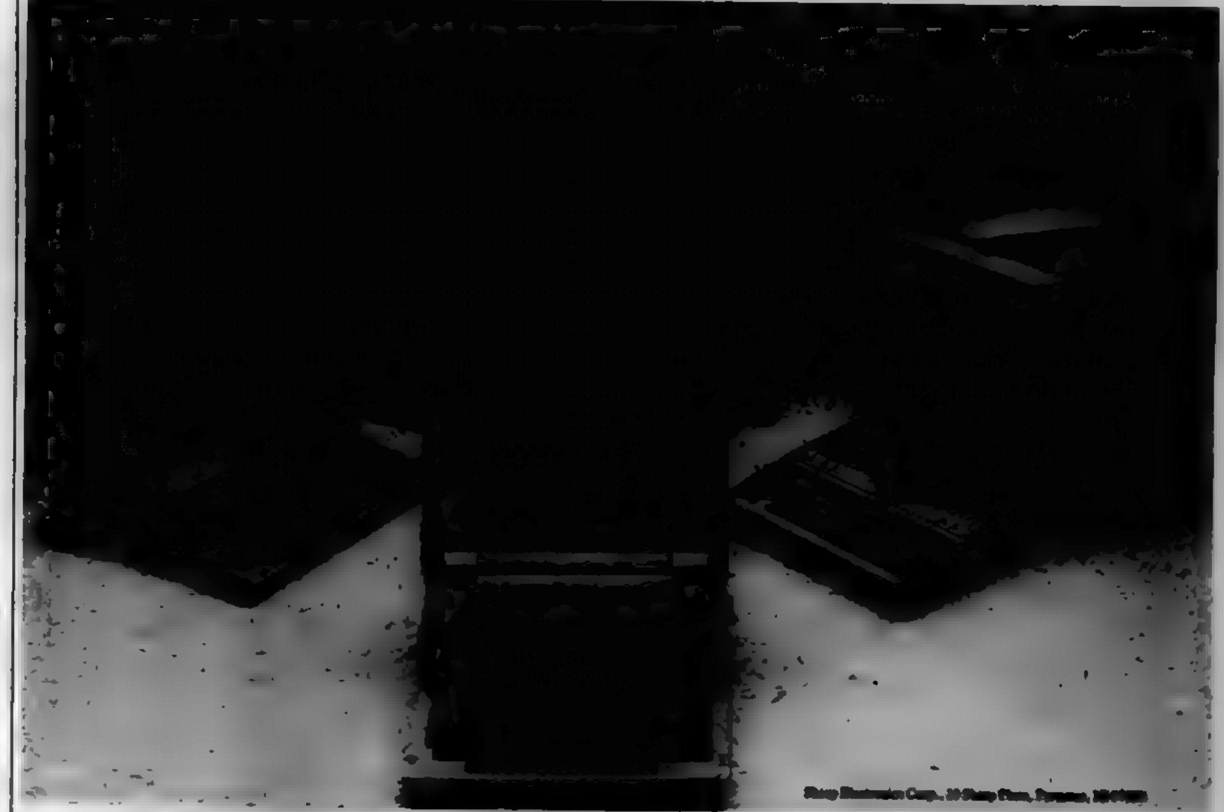
Using an application development system to prototype new applications — allowing analysts and programmers to work more closely with end users — is often one of the most important reasons an organization invests the considerable time and money needed to implement such a system. But to what extent are development systems being used for prototyping?

"Prototyping is probably one of the most common uses of application development systems today," said T. Capers Jones III, manager of the application management practice at Nolan, Norton & Co. "I also think it is one of the more important reasons for having one. The ability to do high-speed prototyping, even if that is all it does, usually makes the product valuable."

But Roger Philips, president of Iconics, Inc., disagreed. "I think that, in principle, the tools are good for prototyping, but the current products are not really supporting that. They help you write code faster, but it still takes quite a long time to design an application. They do not really provide for the rapid prototyping necessary during development."

And, said Thomas O'Flaherty, principal consultant for the market research firm Input, Inc., whether or not a development organization prototypes has little to do with the ownership of an application development system. "The value of prototyping lies along an independent path from the value of an application development system. "Prototyping has more to do with your design approach. [It] is more a state of mind; it is not tied to an application generator."

WHAT THEY CALL A PORTABLE, WE CALL A LOAD.



Today, almost everyone claims to have a portable computer. The problem is, almost no one does. Most portables have a separate data storage device, separate printer, separate modem, and some even require a separate monitor or bulky battery pack that can make them a liability on the road.

The Sharp PC-5000, on the other hand, is a true portable. It's a compact 16 bit microprocessor, 128K RAM (expandable to 320K) with 192K of ROM, an 80 character display screen, removable bubble memory storage, built-in rechargeable power source and bundled software. It's also available with options like an integrated modem that lets you connect with your mainframe and an integrated correspondence-quality printer which doesn't increase the size of the system. And even with all these features, the PC-5000 fits neatly into a briefcase and weighs under 14 pounds. Almost 25% less than its nearest major competitor. At a price that's lighter, too.

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Vendors discuss large-scale applications development,

In an effort to address the issues of operating efficiency and the usefulness of a particular application development system for production environment applications, Computerworld *asked each vendor to respond to the following questions.*

1). Do you recommend your product for the development of large-scale, transaction-oriented applications?

Applied Data Research, Inc.
Ideal

"Ideal is a functional replacement for Cobol. There is virtually nothing you can develop in Cobol that you cannot also develop with Ideal."

Cincom Systems, Inc.
Mantis

"The major problem in transaction-oriented applications is I/O, and Mantis handles data movement quite well. Our customers at nearly 2,000 sites worldwide are using Mantis to develop just such applications."

Cullinet Software, Inc.
Application Development System/ On-Line (ADS/O)

"ADS/O automatically generates pseudo-conversational, fully reentrant and fully compiled code that is ideal for a production environment."

Hogan Systems, Inc.
Umbrella

"Umbrella is the technology that we [Hogan Systems] used to develop all of our banking industry applications, some of which involve more than 600,000 lines of code. Each of those banking systems is a heavy transaction-oriented application."

IBM
IMS Application Development Facility II (IMSADF II)

"IMSADF II is recommended for most [IBM] IMS/VS applications. User experience indicates that IMSADF II can support a majority of applications in the typical IMS/VS installation." (product literature)

Development Management System/CICS/VS (DMS/CICS/VS)

"DMS/CICS/VS is an advanced application generator designed to improve productivity in the implementation of [IBM] CICS/VS applications. [It] can be used to develop on-line, interactive applications where terminal operators interact with files or data bases." (product literature)

Informatics General Corp.
Mark V

"Mark V automates all file access and allows you to go easily from one transaction to another with a simple building block approach. Our users' experience indicates that you can develop applications designed for heavy daily transaction volumes with Mark V."

Leading Software Technologies Corp.
The Intelligent Assistant

"The Intelligent Assistant was designed for the development of just such applications. In addition, CPU resource consumption during the generation process is almost negligible. The product can generate a system involving 50,000 lines of code and documentation in less than a CPU second."

McCormack & Dodge Corp.
Millenium System Development Tool (M:SDT)

"All of our [McCormack & Dodge] financial applications were developed with M:SDT. So, clearly the product is useful for developing heavy production applications."

Multiplications, Inc.
Accolade

"We [Multiplications] used Accolade to develop our mainframe Imagine [on-line query and report generator] system. Accolade is very efficient, and it significantly decreases the time required to implement a secure, reliable and efficient user-oriented application under [IBM's] CICS." (vendor spokesman and product literature)

Nixdorf Computer Software Co.
Hibol

"Any time savings during application development is critical. Thus, as a tool for productivity, Hibol is definitely applicable to the development of large-scale applications. If Hibol does not generate 100% of the code needed, the user must only insert whatever unique logic is required."

Oxford Software Corp.
UFO

"We have users running UFO-generated applications involving up to 400,000 transactions a day. I think on that basis we can recommend UFO for the development of production applications."

Pansophic Systems, Inc.
Gener/OL

"Gener/ol can be used for anything that you would normally develop with command-level Cobol. In dealing with our users, we have never encountered any problems with the development of large-scale applications."

Telon

"The performance of a Telon-generated application will be as good or better than a hand-coded system. Telon produces good-quality applications for a production environment. Our customers have developed numerous high-volume [IBM] IMS/CICS applications under Telon."

Sage Systems, Inc.
Application Productivity System/IMS (APS/IMS)

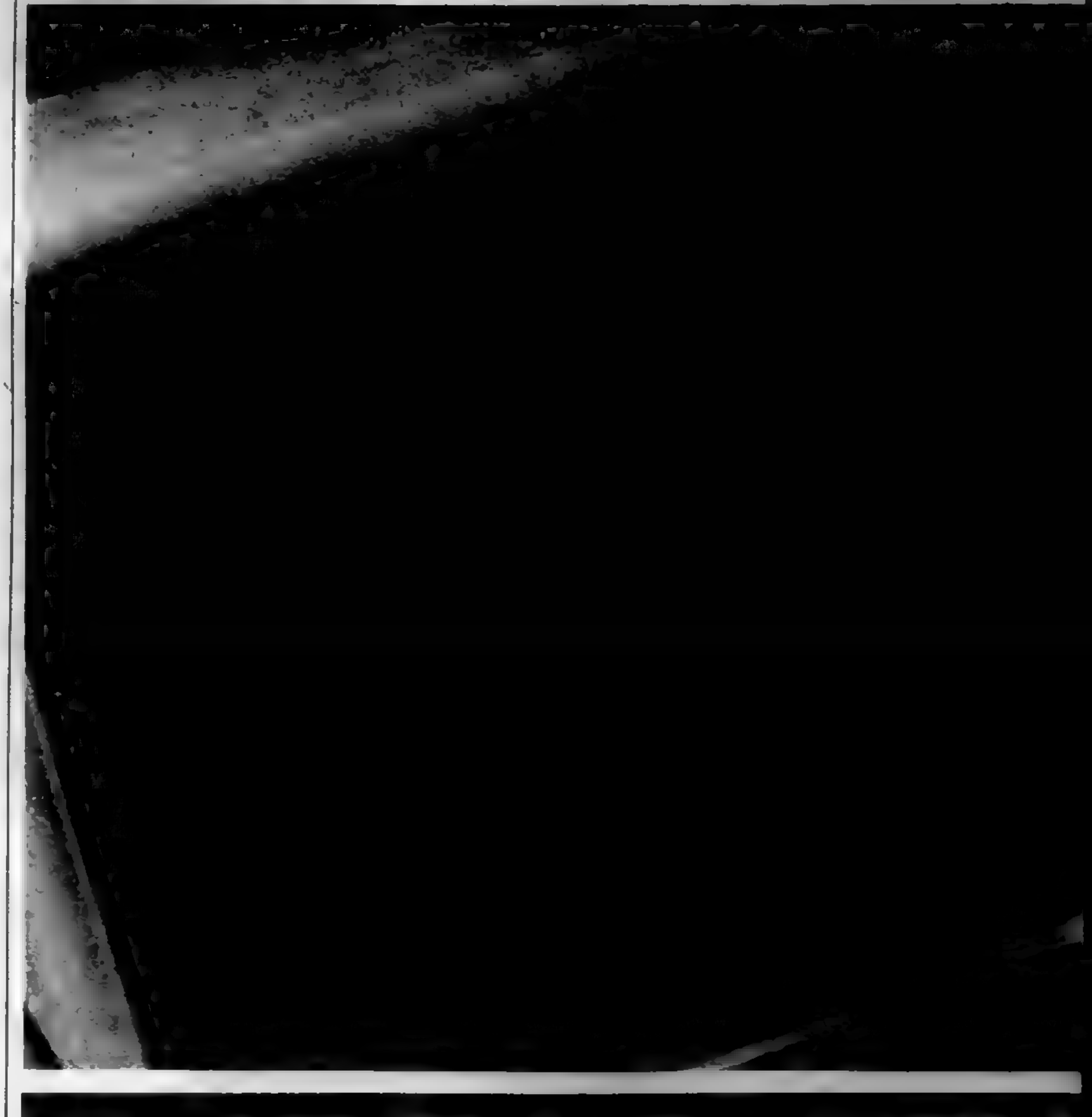
"The more complex the application, the more applicable our product is to the development of that application. Our product can leverage the skills of senior project leaders in areas such as building reusable code segments and program skeletons and allowing them to utilize fully the [IBM] IMS/DB/DC environment without a great deal of training."

Software AG of North America, Inc.
Natural

"We have users of our product who have developed applications that involve an extremely high number of data base calls daily. Some [development] shops have completely abolished the use of Cobol in favor of Natural."

James Martin gives you the method…now DDI gives you…

the tool for structured



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ADS/O is a trademark of Cullinet Software.

rate their products against Cobol-developed packages

8). How would you rate the efficiency of an application developed with your product to a similar application developed in Cobol by a programmer?

Applied Data Research, Inc.
Ideal

"Whenever you look at a high-level language, one of the considerations is efficiency. Cobol runs slower than assembler, but productivity during development is greater. Ideal is more productive than Cobol because it is a higher level language. Ideal may run slower than Cobol, but that loss is offset by the efficiencies of the underlying [ADR/Datacom/DB] data base environment."

Cincom Systems, Inc.
Mantis

"It's a matchup. Mantis uses fewer CPU cycles, but the I/O is a little higher. Mantis has outperformed similar applications in some cases and has not performed as well in others. Generally, it is a one-to-one comparison. In a large network, with a large number of users, you will see a difference in the sense that the Mantis application will require more resources. But we feel that the increase in productivity during development offsets that."

Cullinet Software, Inc.
ADS/O

"The ADS/O application would be comparable in resource usage efficiency. In some situations it is more efficient and in others it would be less. It is designed for multiuser applications, so in that environment it is very efficient. In a one-on-one, transaction-by-transaction comparison, a Cobol program may be more efficient. With ADS/O, there is a lot of overhead involved for just one user. But as you add users, the additional overhead, compared to a Cobol program, is minimal."

Hogan Systems, Inc.
Umbrella

"Our clients have found between zero and a less-than 4% increase in overhead. If the increase has been more than that, we have been able to help the user straighten out the problem involved — we find in those situations that they are usually doing something wrong. That is for a total application system. Individual programs are as efficient as the user writes them."

IBM

Vendor not available for comment.

Informatics General Corp.
Mark V

"If it is a one-to-one situation, a Mark V application would be comparable. In terms of execution time, the two programs would be equal. For the average program, our statistics have shown that CPU cycles would be similar to a hand-coded system. It depends on the type of program under development."

Leading Software Technologies Corp.
The Intelligent Assistant (TIA)

"A TIA-generated system will consume fewer resources to accomplish the same amount of work compared to a handwritten system. Depending on the application, the user should expect an improvement in resource usage efficiency in the range of 10% to 30%."

McCormack & Dodge Corp.
M:SDT

"The product is essentially as efficient as running Cobol."

Multiplications, Inc.
Accolade

"We have undertaken studies in this area. If you talk about an average program, we are identical. The average programmer doesn't do things as efficiently as possible. We estimate that a highly skilled programmer would write a program more efficiently by about 10%. But for an average program, we are about dead even."

Nixdorf Computer Software Co.
Hibol

"The difference would be very minute. Hibol generates only the code you request; it does not utilize a program skeleton. The difference in machine requirements would be unnoticeable compared to a handwritten program."

Oxford Software Corp.
UFO

"Any comparison such as this would vary with the complexity of the application being developed. On the average, however, a UFO program would utilize anywhere from 1.2 to 1.5 times the resources that an average Cobol program would."

Pansophic Systems, Inc.
Gener/OL

"A program developed with Gener/OL would be comparable in efficiency to a program developed in command-level [IBM] CICS. However, a Gener/ol program does not require a compile or table changes and additions."

Telon

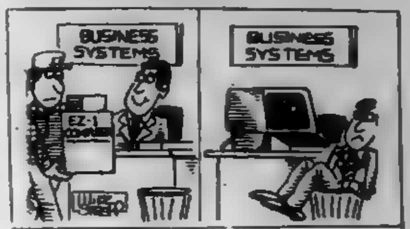
"The flexibility of the product and its use of Cobol and PL/I allows for performance as good as any hand-developed application. We have had comments from customers that their Telon-developed applications are the best in their shops in terms of performance monitoring. As with any application, an expert could come in and do a better job, but performance using Telon will be as good or better than with an average handwritten program."

Sage Systems, Inc.
APS/IMS

"In benchmarks conducted during Texas Instruments, Inc.'s product evaluations [of application development systems], results showed that APS/IMS-generated code was virtually identical in efficiency to handwritten code."

Software AG of North America, Inc.
Natural

"[Use of the product] is going to cost you something. You have to pay for the productivity gains you achieve during development. There may be up to 20% added CPU utilization, but you will get a 20% to 25% increase in productivity during development."



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programming.

While doing research for their recent book,* James Martin and Carma McClure reviewed seventeen diagramming techniques and came to one overwhelming conclusion:

Action diagrams are the simplest and best method of representing structured programs.

Action diagrams combine graphic and narrative notations in a rigorous but easy-to-understand technique. The method is applicable to any size program. In almost any language.

When used to sketch out program logic, action diagrams encourage correct structured thinking. Logic errors become more apparent. Communication improves among programmers, analysts, and end users. And top-down design is enhanced, because action diagrams handle any level of logic, from systems overview to detailed program code.

**Diagramming Techniques for Analysts and Programmers* Prentice-Hall, 1984

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With Action Diagrammer you can develop designs and programs faster, and with fewer errors. Maintenance is easier too, because Action Diagrammer enforces logic structure and provides excellent documentation.

The price is easy too — only $495

The Action Diagrammer software package sells for $495 and comes with a complete user guide, which includes a thorough overview of the action diagramming method. No serious programmer or analyst with access to an IBM PC or compatible should be without it.

Even more features

Represents logic hierarchy with nested brackets for all constructs such as sequence, selection, case, and repetition. Can also represent database actions and subprocedures

Automatically supplies control-structure syntax in English, COBOL, PL/I, FORTRAN, C, Pascal, and many 4th generation languages including FOCUS, RAMIS, NOMAD, MANTIS, IDEAL, NATURAL, and ADS/O

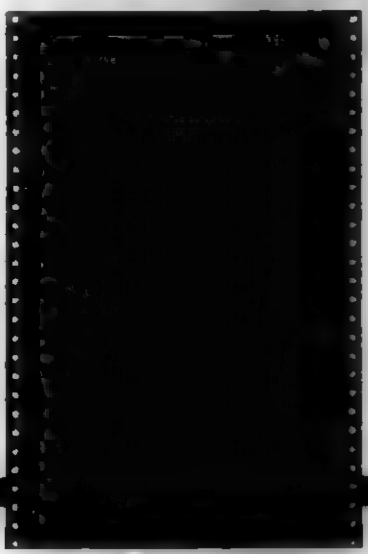
Offers one-stroke commands and user programmable function keys

Shifts mainframe software development to PC's

Allows color coding of diagram sections through user control of text and bracket colors (for users who have a color monitor)

Includes ample help messages and other on-line documentation

Produces hard copy of action diagrams on any IBM PC-compatible printer. Graphic output on IBM graphics printer or HP7470A plotter



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DEVELOP

from page 22

of the application management practice at Nolan, Norton & Co. a consulting firm in Lexington, Mass.

"According to research we have undertaken, developers on some application systems projects realized great productivity gains. But programmers on others didn't achieve similar increases. The projects that did not exhibit those gains seemed to be those where the developers did not understand how the [application development system] product worked or where they tried to undertake things that were too complex for the system," said Robert Mongell, a senior technical programmer in the Technical Services Division of Boston-based John Hancock Mutual Life Insurance Co., which uses Pansophic Systems, Inc.'s Telon system.

In a recent survey of sites using application development systems, IDC's Information Systems Planning Service found that users perceived the greatest strength of the products to be the increased programmer productivity they realized. But, according to Merlyn, the emphasis on improved productivity may be misguided.

"What problem are you really trying to solve? Programmer productivity is a very difficult thing to understand. The focus should be on application development productivity, not just programmer productivity. The time it takes to code in Cobol gets people searching for tools or higher level languages. But coding is only a minor phase in the development life cycle. Increased programmer productivity only means that we can generate the wrong application 10 times faster," he said.

While many products profess to aid in the entire development process — from design to maintenance — they often support only the actual coding portion of development, a portion that may comprise as little as 5% to 10% of the cycle. Considering that most problems with applications stem from poor design, and in light of the fact that maintenance now takes up more than 50% of staff time for most organizations, many experts feel the products fail to address two of the three major problems facing in-house development shops today.

Design mistakes

"Most of the bugs in large systems come out of mistakes in requirements and design," Jones said. "You can make the same mistakes with generated code that you can with conventional code. The probability that coding errors will not be as great is not critical because coding errors are not the main contributor of bugs. It is misunderstood requirements or poor design."

Richard Foudy, vice-president of the fourth-generation language consulting firm, National Decision Systems, Inc. in Monroe, Conn., agreed with Jones. "Very little, other than intelligence, can help in the design phase. These systems cannot really help you design better. If they claim to, they can get you into real trouble. No software product can help poor design."

But according to Pfrenzinger, the disciplined, structured methods some products impose on developers can improve application design and quality. "These tools can enforce structured, standardized techniques on programmers. That forces the creation of a maintainable product."

"A real problem with the current generation of application development products is that they don't really address maintenance. While you can generate applications more quickly, in the end, you are faced

See DEVELOP page 32

INDEPENDENT PROGRAM DESIGN/DEVELOPMENT SOFTWARE MARKET PROJECTIONS 1982-1988
(U.S. vendors, worldwide)
(Dollar amounts in millions)

System size	[illegible]	%	1983	%	[illegible]	%	1985	%	[illegible]	[illegible]	1987	%	[illegible]	[illegible]
Large-scale	$ 67	46	$ 83	52	$126	47	$185	45	[illegible]	[illegible]	$ 389	39	[illegible]	[illegible]
Mid-scale	$ 68	78	$121	64	$198	57	$311	60	[illegible]	[illegible]	$ 785	51	[illegible]	[illegible]
Micros	$ 5	120	$ 11	136	$ 26	88	$ 49	73	[illegible]	[illegible]	$ 144	54	[illegible]	[illegible]
Totals	[illegible]	[illegible]	$215	63	[illegible]	[illegible]	$545	56	[illegible]	[illegible]	$1,318	48	[illegible]	[illegible]

IDC CHART

From

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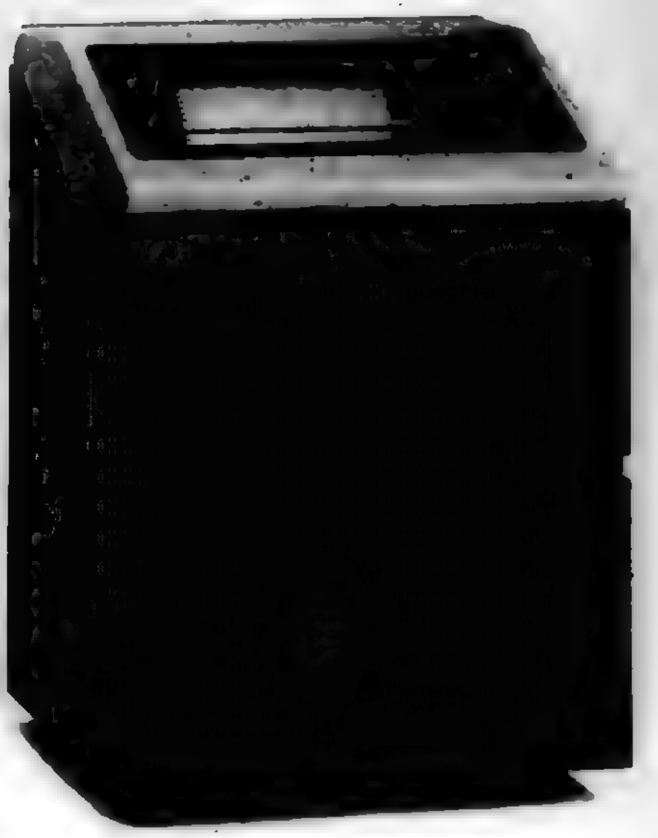

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Personnel costs make development tools worthwhile

By John Gallant
CW Staff

One of the weightiest charges leveled against application development systems is that the applications they produce are inefficient resource hogs — a claim most vendors deny. With personnel costs rising and hardware costs dropping, however, some insiders said the point may be moot.

"You generally give up some efficiency with these tools," said Thomas O'Flaherty, principal consultant with the market research firm Input, Inc. "But that should not be a primary concern with hardware costs falling compared to people costs. The benefit is good quality systems produced much more quickly."

But the performance vs. productivity trade-off may not be quite that simple, said Steven Pfrenzinger, president of IMS Consulting, Inc. "People used to say 'Oh, we'll just add another CPU.' But performance is back as a solid issue. A lot of products that fit into this category have to be doing something pretty inefficient to perform their magic. It won't be long before people see that the costs are just too heavy to pay for this magic."

People costs rising

Vaughan Merlyn, vice-president and general manager of the systems software division of Walker Interactive Products, Inc., echoed Pfrenzinger. "Everyone acknowledges that hardware costs are falling and people costs are rising. They say that applications on time and on budget justify additional machine requirements. But when it comes time to buy additional horsepower, people start asking questions and hedge about making purchases. There are a lot of response-critical applications, where throwing hardware at the problem would not alleviate the performance constraints."

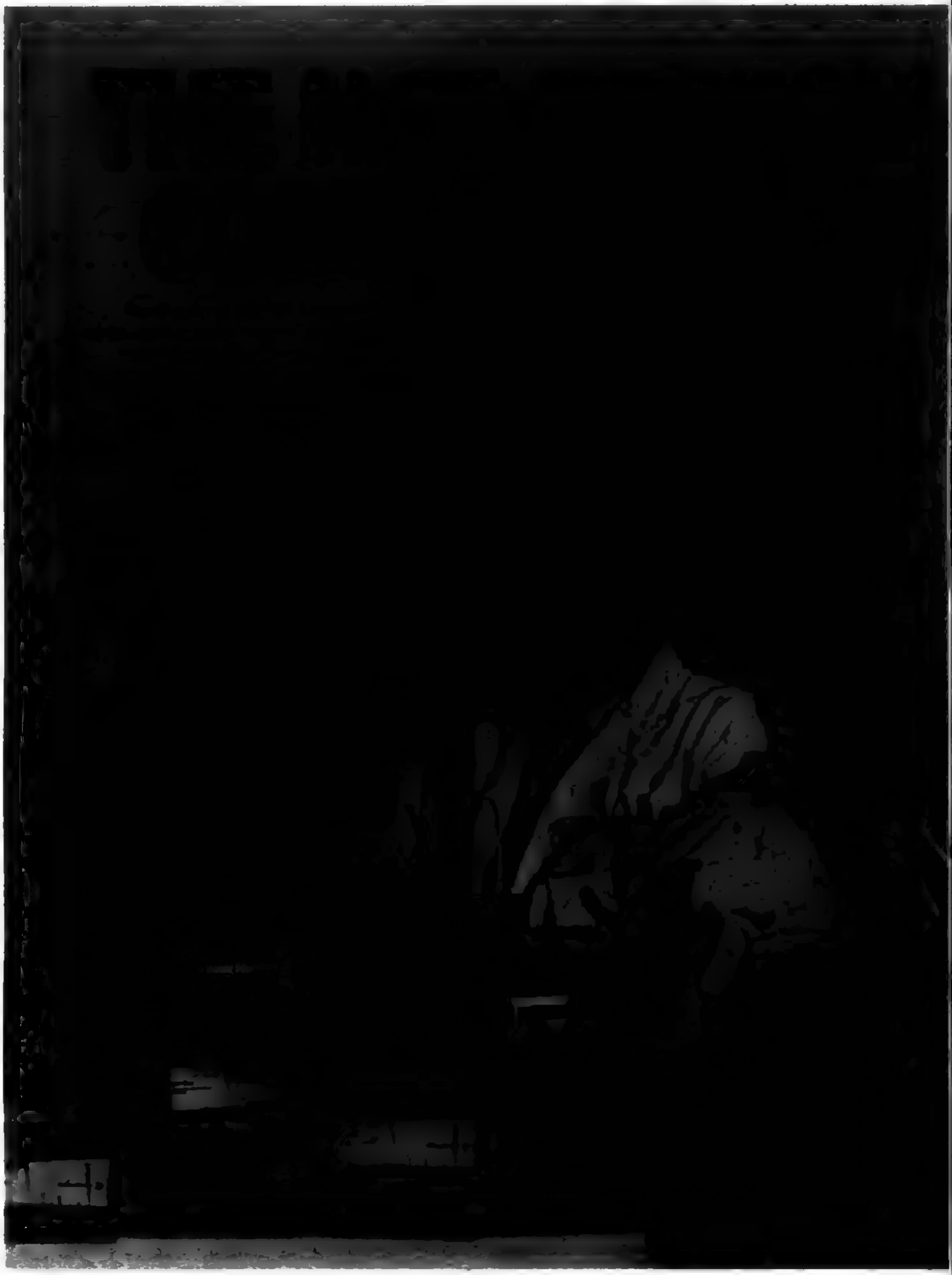
Performance problems and other complaints lead many to question whether today's application development systems are useful for the entire range of applications that a business needs to develop. Vendors of the systems certainly claim they are, but not everyone agrees.

"I think the products are applicable for classic, host-based applications," O'Flaherty said. "Vendors like [McCormack & Dodge Corp.], [Cullinet Software, Inc.] and [Hogan Systems, Inc.] have been using their products internally for years to develop applications for their customers. I see no reason why they cannot make the claim that the products are useful for developing traditional business applications."

But Jones said the application development systems may be better suited for smaller, peripheral applications rather than high-volume, transaction-oriented systems. "The performance of both application and program generators, on [the] average, is not up to customized coding. But for many applications, that does not even matter," he said. "Short-lived applications traditionally use more computer cycles during compilation than they do in execution mode during their whole lives. They pay for themselves with shorter development. But for high-volume production applications, the high use of [millions of instructions per second] and the slow response time of generated applications make them a less optimal choice."

Everyone, though, seems to agree that application development systems are becoming less environment-specific, more powerful and flexible and more attuned to application performance. They are also seen as becoming something of a necessity for cost- and quality-conscious development shops.

"Eventually," Merlyn said, "all applications will be developed with some or many forms of application development technology.



Microcomputer helps artificial heart keep its beat

By John Desmond
CW Staff

LOUISVILLE, Ky. — The mechanical heartbeat of William J. Schroeder, the 52-year-old artificial heart recipient at Humana Heart Institute here, has been monitored since the heart began its work with the help of a microcomputer from Compaq Computer Corp.

Computer technology from Hewlett-Packard Co. and Apple Computer, Inc. also played a role in the Nov. 25 operation, which was the second artificial heart implant ever performed.

According to Brent Mays, the assistant technical director at Humana, the Compaq micro sits atop the 323-lb, refrigerator-size unit that drives the artificial heart. "What we process with the Compaq is the air exhausted from the artificial heart," Mays said.

Electric signals measured

HP transducers in the artificial heart system convert air pulses, generated through air lines connected to the patient, to electrical signals that the Compaq can measure. "The signals tell us the rate of airflow exiting the heart as the heart fills with blood before the next beat," Mays said.

The Compaq, calibrated to the volume of air that should be present, multiplies the air volume by the heart rate to yield a cardiac output, a standard physiological measurement. The Compaq produces a flow curve of cardiac output based on every second or third beat of the artifical heart, Mays said.

Mays, who was present in the operating room during the 6½-hour operation, along with Humana technical director Larry Hastings and the medical team, estimated that the artificial heart drive would have to stay connected to Schroeder for approximately a month. But a portable drive weighing only 11 pounds may be substituted if Schroeder's recovery progresses.

Three days after the operation, the outlook was optimistic. One of Schroeder's doctors said he was amazed by his patient's progress.

Chosen for portability

The Compaq was chosen for its portability in the operating room and for its IBM compatibility, since Humana uses an IBM Personal Computer AT for data storage, Mays said.

"The micro made the operation more practical because it gives us a noninvasive measure of blood pumped," Mays said, meaning the measure can be taken without inserting a separate catheter into the patient.

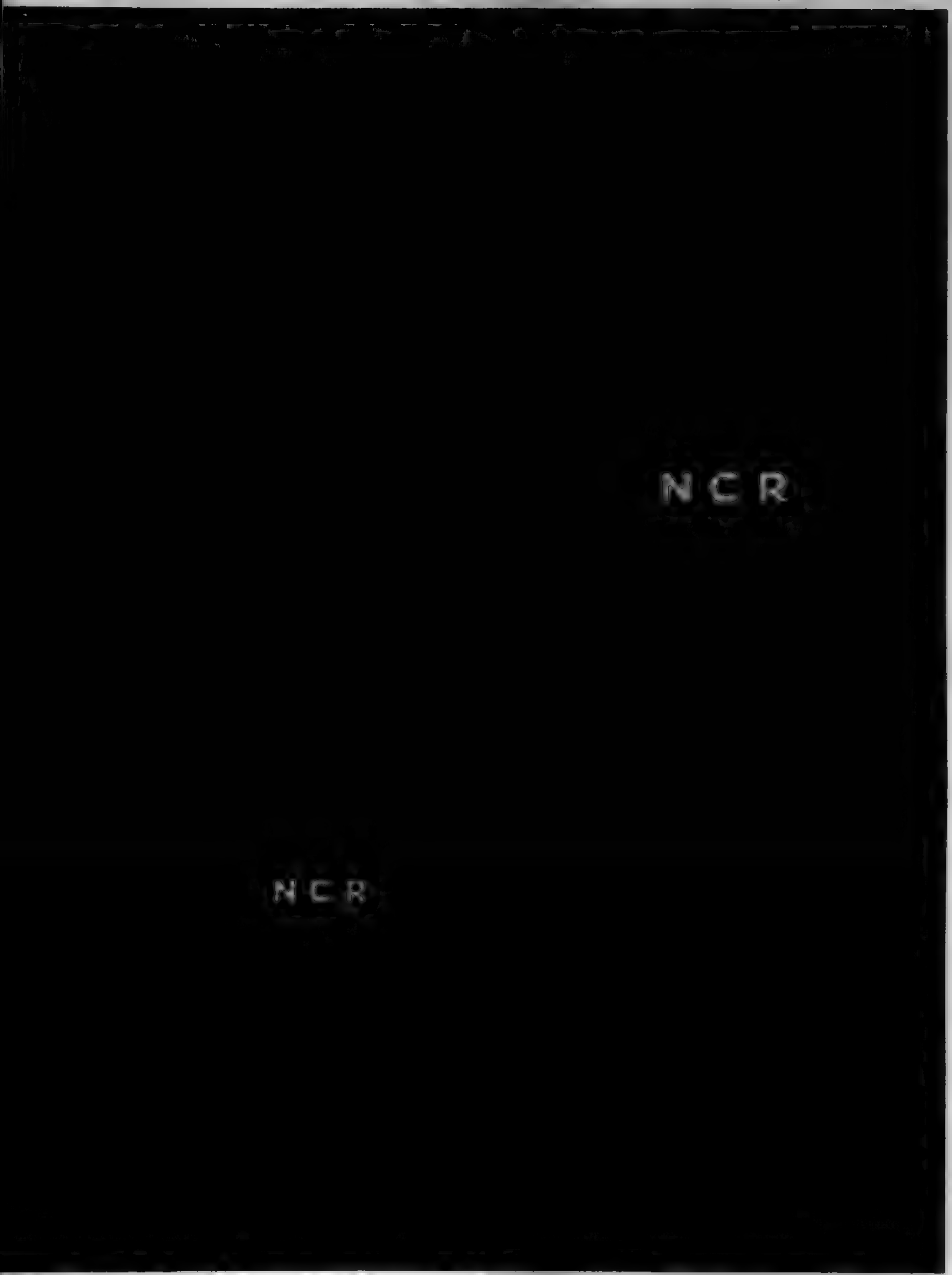
Software for the Compaq was developed by Symbion, Inc. of Salt Lake City, developers of the artificial heart. Laurence Bennet, artificial heart project manager at Symbion, said the software was written on an Apple IIe, but the Compaq was considered more convenient for the operating room.

Micro a needed diagnostic tool

Bennett described the microcomputer's role in the operation as "the thermometer of the artificial heart. It's a needed diagnostic tool."

HP had several products involved in the operation, including its Monitor terminal, Data Management Module, Universal Quartz Pressure Transducers, Patient Information Center, Pressure Modules and a hard-copy printer, according to HP spokesman Scott Marber. "Basically, what this instrumentation does is monitor vital signs," including the pulse rate, blood pressure and calculations on the pumping efficiency of the heart, he said.

"What's interesting is that the artificial heart does not give off electrical signals like the human heart, so we're not taking electrocardiograms," normally used to measure heart abnormalities. The HP instruments, when not being used in artificial heart implants, are used in hospital coronary care and intensive care units, Marber said.



Medicaid system recovering from painful conversion

By Donna Raimondi
CW Staff

ATLANTA — The State of Georgia overwhelmed its Medicaid payments system — leaving medical service suppliers unpaid, paid doubly or rejected for payment — as officials here learned the hard way that conversions should be kept as simple as possible.

When the expenses incurred by Georgia's Department of Medical Assistance (DMA) in processing Medicaid claims climbed too high and provided too little management information, the state decided that contracting the work out could save money, said Cal Calhoun of the Georgia Hospital Association. Georgia enlisted the Computer Co. of Richmond, Va. to develop and run the state's $650-million-a-year Medicaid program, he said.

Within four months of the new system's implementation, approximately 10 thousand eligible recipients were categorized as ineligible, communications breakdowns prevented hospitals from receiving clearances on eligibility and some categories previously kicked out of the old system for manual review — such as one-day hospital stays — were just plain kicked out, said Calhoun.

Routine management reports from the system were useless because of inaccuracies, Calhoun said. As of the first week in November, $20 million in back payments had stacked up, he said, and $6 million had been erroneously paid out.

Dale Groenenboom, director of patient financial services at the Medical College of Georgia hospital, said "We had a few thousand claims that we rushed to get in by June 15, and we thought the DMA would process them." The claims were submitted on forms using the old (UB16) federal reporting requirements, because the new (UB82) requirements did not become mandatory until July 1, he said. When the claims using UB16 were actually entered into the new system, they were rejected. "My impression was that all we submitted to DMA would be on the regular old program, and all that we would submit to [the Computer Co.] would have to be on UB82 forms. Some of the problems were the result of faulty software, Calhoun said, and others were related to providers' methods of filling out forms.

> *We decided to convert and make changes in the old system . . . we should have changed the old system as it stood and then converted."*
>
> —Aaron Johnson, Commissioner of Georgia's Department of Medical Assistance

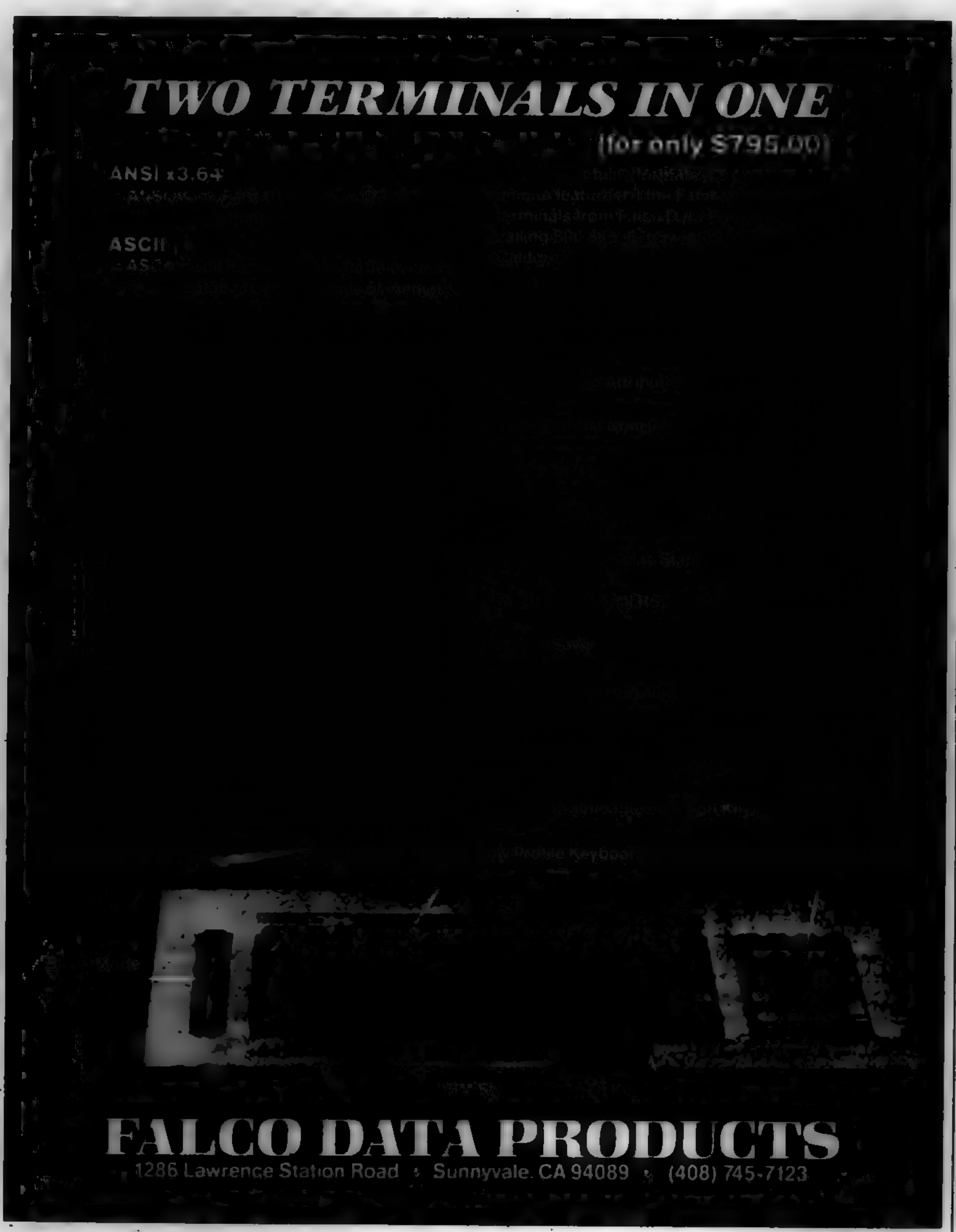
The state formerly had two systems that processed Medicaid claims: Paris, which stored eligibility information, and the Medicaid system, which picked out the recipients to pay, DMA Commissoner Aaron Johnson said.

There were files in Paris that did not exactly correspond with the Medicaid system files, he said. "When we converted, since the Medicaid system would not be needed for determining eligibility, we had to reconcile the two files and the two were out of sync," he said.

"We decided to convert and make changes in the old system at the same time. We should have changed the old system as it stood and then converted," Johnson said.

The Computer Co. was not responsible for the problems, according to Johnson. It was Georgia's poor conversion that caused the mess, Johnson said.

The company has sent all available staff to Georgia to clear up the glitches, and Johnson thinks it is "100% straightened out" as of the last week in November.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Medicaid system saves Massachusetts $56 million

By [illegible]
CW Staff

BOSTON — Computerized payments lopped $56 million off the commonwealth of Massachusetts' $1.2 billion worth of Medicaid payments in the past year.

Until October 1983, the state's Medicaid payments were processed manually — some out of shoe boxes in the overflowing files at the commonwealth Public Welfare Department's office here, a department spokesman said. The average payment time was 45 days, said Gene DeLucia, assistant for systems to the commissioner of the welfare agency. According to the agency, Massachusetts was the last state to computerize Medicaid payments.

The system processed 17 million Medicaid claims for hospitals, nursing homes, physicians, pharmacies and other medical services in the past year and completed 95% of the claims within 21 days, DeLucia said.

The Medicaid Management Information System (MMIS), designed and operated by Systems Development Corp. (SDC) of Somerville, Mass., comprises two IBM 4341 Model Group 2 machines running under IBM's OS and VS operating systems, DeLucia said. SDC receives, enters and processes all claims under its contract as fiscal agent for the welfare department.

On-line inquiry

Terminals in the main office allow for on-line inquiry by the department's staff. IBM's IMS data base controls recipient eligibility data, with all other data stored in Vsam files, he added. The system sends each claim through a series of more than 100 checks to detect incorrect or fraudulent claims. Because of MMIS, Massachusetts Medicaid expenditures rose only 3% this year, compared with an average of 10% for each of the previous five years and a 6% national growth rate last year, the welfare department said.

Information entered into the new system enables the MMIS to identify clients who have private insurance or other agencies responsible for payment, said Lee Chelminiak, director of communications for the commonwealth. This ensures that Medicaid is the payer of last resort, she said. Other large savings have resulted from a decrease in overbilling or duplicate billing, Chelminiak said. For example, the system rejects a chest X-ray charge on a bill for a broken finger, which gets checked manually, she said. The same is true for "gang visits," where a doctor might examine all four of the children a mother has with her on a visit for one sick child, she said. The system keeps records that show if a particular physician has a long record of such visits or if there is a valid reason for such treatment.

SDC designed two subsystems specifically for management information, DeLucia said. The Management and Administration Reporting Subsystem includes operations reports and financial information, and the Surveillance and Utilization Reporting Subsystem provides recipient profiles, utilization patterns, practice patterns by provider category and diagnosis-related patterns.

"We implemented UB82 [federal claims reporting requirements] right from the beginning," DeLucia said. The welfare department also changed dental and other reporting codes and ran intensive one-day training sessions for providers on a regular quarterly basis to ease providers into the new system, he said.

The biggest source of grief in implementing the MMIS has been related to Medicare/Medicaid crossover claims, DeLucia said. Medicare pays 80% of the bills of the eligible elderly, with Medicaid picking up the coinsurance and deductible portion (20% minus a $90 quarterly deductible). Miscommunication among the welfare department, SDC and Blue Cross/Blue Shield — the fiscal intermediary for Medicare — led to confusion about format and edits that apply to that data, he said. That problem has finally been resolved, DeLucia said.

The state expects to save another $36 million next year and $153 million by the end of fiscal 1986, the welfare department said.

Firms support IPI standard

ANAHEIM, Calif. — More than 40 firms announced recently their support for the Intelligent Peripheral Interface (IPI) standard being developed by the American National Standards Committee X3T9.

The standard would provide a common protocol for communications with peripherals such as magnetic and optical disk storage units, said a spokesman for AMP, Inc.

According to the spokesman, IPI provides for two types of command sets; the device-specific command is said to be geared to meet critical timing constraints, while the device-generic command set isolates the host from the timing-critical and device-unique considerations of a specific product.

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DP link next step in decision-support system growth

CHICAGO — The next growth step for decision-support systems will be a linkup with data processing, as the border between the two groups breaks down, according to a decision-support systems (DSS) specialist.

DSS and DP drifted apart throughout the 1970s, with DSS emphasizing user control and adaptive designs and DP focusing on architectures and large-scale projects, according to Peter G.W. Keen, Ph.D. and chairman of London-based Information Technology, Inc., during a speech here last month at the Worldwide Users Conference of the Evaluation and Planning Systems, Inc. (EPS) Users Group International.

Keen said DSS once was a warning signal to DP that the world was changing and that today, artificial intelligence provides the same warning to DSS.

"Those of us involved in the [DSS] field viewed DP as a sort of inferior form of blue-collar worker," Keen said, adding that such an attitude was inexcusable. "That split has taken a long time to fuse, and now what's coming through is that, surely, DP needs DSS as badly as DSS needs DP," he said.

Flood of new technologies seen

Keen predicted a flood of new technologies, presenting opportunities to apply decision-support methods to expert systems. "It's going to be the DSS people who build expert systems that work," he said, noting that the next two years will see DSS attacking the question of what being an expert manager means.

DSS software has been underexploited, partially because development has focused on small applications that react to immediate needs rather than to people building career paths and mandates, Keen said.

"DSS is in danger of getting blurred with end-user computing," he noted. "We've got to get away from personal computing and look at organizational computing, organizational productivity and organizational decision making. DSS should be a key part of the overall computing resource," he added.

Use of technology to improve creativity

"The old definition of DSS has always been to take any available and suitable technology and use it to help improve managerial decision making. I suggest that DSS is about the use of any technology — analytical, financial and computer — to help improve creativity in decisions that really matter."

Keen urged the 200 conference attendees to find a better target market. "Who are the people in your organization you would really like to influence?" he asked. "The next opportunity is to start thinking of DSS as a new style of corporate thinking and planning. That's what DSS is really about; [it's] a service, not a product."

He said the keys for DSS software were integrability; architecture — a blueprint for gradually integrating DSS, MIS and office technology; shareability of processes and data; communications connectability; and transportability, as applications are moved into new operating environments.

DEVELOP

from page 26

with the same maintenance requirements as with a hand-coded system. Maintenance remains tedious and error-riddled," Roger Philips said. Philips is president of Iconics, Inc., a Scottsdale, Ariz.-based firm that manufactures the Transform application development system.

However, according to IDC's Staelin, the application prototyping abilities that the products impart to users aid in design by involving users in an iterative relationship with analysts and programmers (see story page 23). In addition, the automatically generated documentation that many such products provide facilitates maintenance, she said.

"Many of these things completely automate documentation, which is the keystone of maintenance," Staelin said. "The products also enforce modularity, which simplifies subsequent maintenance. They allow users to use tried and true code [reusable code blocks or segments] that a programmer would have to rewrite, with the possibility for errors, for each application."

"Even if the application generated initially meets user needs," Merlyn said, "it won't for long. There are no static applications; needs change. Programmer productivity is not the problem, application architecture is. We need to change the way we develop systems. Today, applications are produced like cars with the spark plugs welded into the engine block. Any future change means complete reworking of the system. What we need are tools for earlier in the development life cycle that will help us in designing systems that can be adapted to changing requirements in the future."

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China looks to high-tech future

LONDON — China is a land of computer contradictions and extraordinary computing opportunities, according to Prof. C.S. Tang, one of that nation's most prestigious computer experts.

Speaking to the London branch of the British Computer Society recently, Tang announced that all of China's universities have been given permission to buy large computer systems in order to establish computer centers and promote computer literacy there.

"The universities are providing a unique marketing opportunity, opening the doors to something like 200 or 300 sites," remarked Tang, as he cautioned his audience that this presented a chance the UK cannot afford to miss.

Tang gave many examples of the existing cooperation between the UK and China, which serves as the foundation for a link between the two countries. He also noted that the UK's University of Edinburgh — alleged to have more Chinese computer students than Scottish ones — is expected to play an important, although as yet undefined, role in China's plans.

Many of China's plans call for both the implementation and wide-scale domestic production of computer technology, Tang continued. The majority of China's micros have been and continue to be imported, however, although a number of foreign companies have factories in specially zoned areas around Hong Kong, according to Tang.

Tang spoke highly of ICL Co.'s contribution to early Chinese computing efforts, which were, until recently, severely hampered by the country's comparative isolation.

The ICL/Chinese joint venture in many ways paved the way for other foreign vendors to work in China. "China is determined to continue building its own computers," Tang maintained, implying that joint ventures are China's hope for the future.

Major thrusts

The major thrusts of Chinese computing in the near future will be in the areas of Chinese character information processing, information systems, software tools, programming development environments, expert systems and logic programming, Tang said. The Japanese, equipped with a common written language with the Chinese, have the decided advantage in this marketplace, he added.

Tang also said that in the area of fifth-generation computers, it is likely that Japan will be China's main source for these machines, "partly because of proximity and partly because the Japanese Big Five — Hitachi Ltd., NEC Information Systems, Inc., Mitsubishi Electronics Corp., Fujitsu Ltd. and Okidata Corp. — have all made huge investments in Kanji character processing and voice input," he pointed out.

At the same time, U.S. Department of Trade figures indicate that China imported $71 million worth of computers in 1981 from the U.S. and an estimated $500 million worth of U.S. machines in [illegible]

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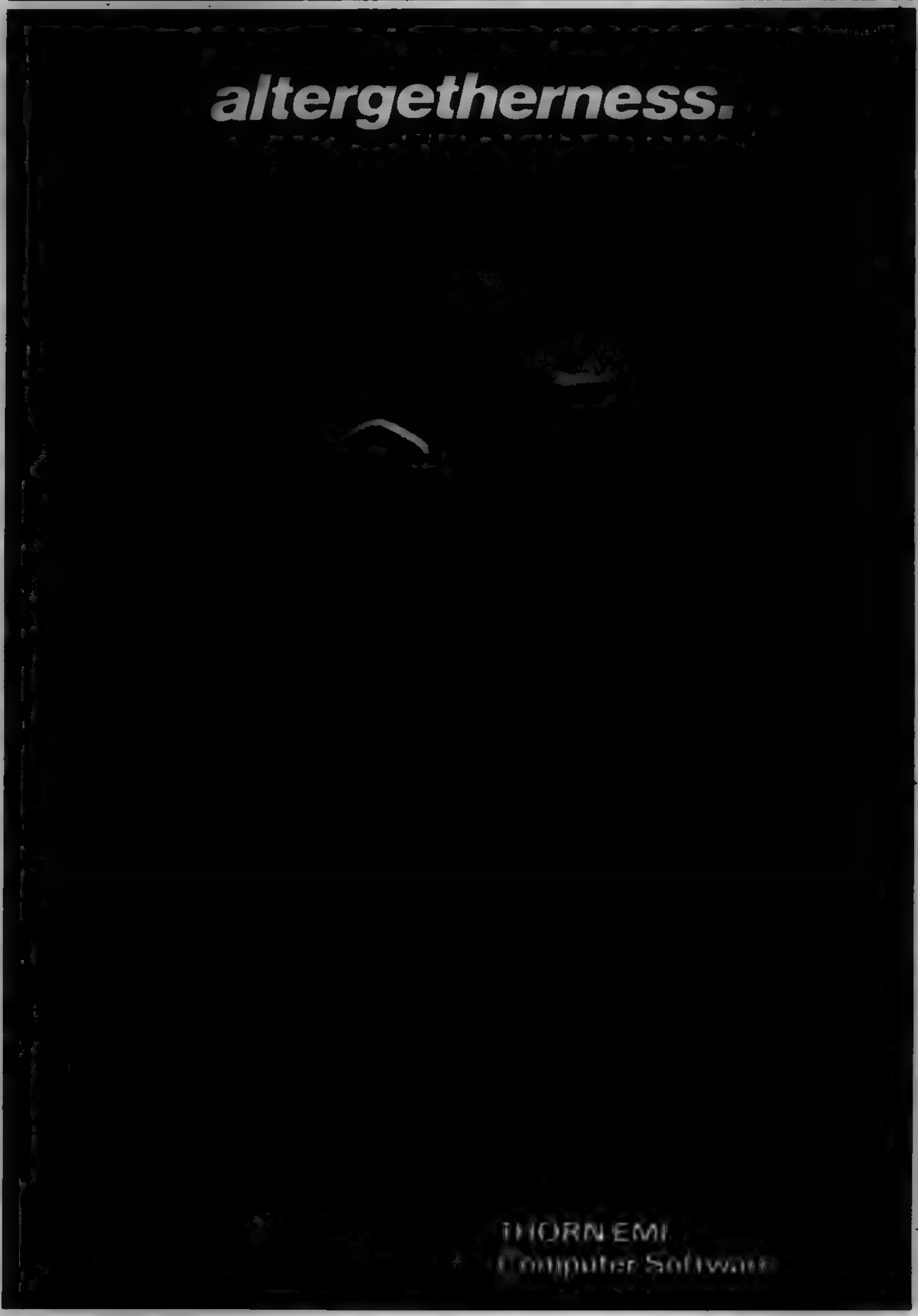

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UK users question value of donated OA equipment

By Lisa Israel
Special to CW

LONDON — Gordon Ross wonders whether $300,000 worth of free computer equipment was worth all the bother. Ross, data processing consultant with the UK's Department of Trade and Industry (DTI), recently spearheaded 21 separate office automation pilot projects with donated equipment.

"If the sites had known what they were letting themselves in for, I'm not sure they would have wanted to do the pilots," he confided. "Installing the systems always turned out to be much more difficult than anticipated."

The DTI's four-year pilot scheme got under way in 1982 and is now at the halfway mark. The initial plan was to identify the benefits of advanced integrated OA systems — the sort of systems that suppliers would be unlikely to attempt at commercial sites, Ross said. Twenty-one office automation suppliers were paired with a corresponding number of public sector users, and the results have been closely monitored over the past two years.

"Some suppliers saw the pilots as a chance to win an easy sale," said Ross, "but they have lived to regret that decision. In some instances, suppliers have been forced to learn about OA in spite of themselves."

For all the talk, Ross argued, OA is still an untested technology, and existing equipment is not always geared to support advanced office needs.

Many of Ross' pilot users were far from satisfied. Mike Bickers, who managed the pilot that relied on Systime equipment at the National Economic Development Office, has a long list of complaints with his system, which he thinks will take ages to resolve.

"We have still a pretty basic system. We have no filing apart from personal wastepaper bins, which our users dare not empty. We have no integration at all between word processing and spreadsheet and electronic mail," he said.

Chris Whiley, who managed the British Broadcasting Corp.'s (BBC) project with equipment from Racal-Milgo, Inc., maintained that computer manufacturers have not yet faced up to the different equipment requirements of inexperienced end users. He argued that while the data processing staff might be accustomed to computer breakdowns, with office workers, Whiley said, "anything other than total reliability is a problem." Unreliability became a "big barrier" to end-user acceptance of the new technology at the BBC, Whiley said.

Digital Research, Inc.'s CP/M operating system also gave Whiley trouble because, he claimed, "it is [not user-friendly]," a problem that was cited by another pilot project manager, David Marshall-Wright at the Brighton Health Authority in Brighton, England.

Although Brighton was paired with Allied Business Systems, Ltd., which is a smaller company than Racal, both manufacturers had offered CP/M as part of their solution.

Marshall-Wright said, "Most large organizations still think of office automation in terms of distributing large numbers of micros and CP/M applications packages." But CP/M can create networking problems, Marshall-Wright argued. CP/M software packages are not user-friendly, and some, he said, are so complicated that they turn off end users.

Delayed releases

A large number of users also complained about delayed product releases. At the Department of Transport, Philips Information Systems, Inc.'s inability to come up with networking software upset finely tuned plans for introducing end users to information technolology. By the time the intranode software to link workstations to central files appeared from Philips, users were so attached to their stand-alone floppy disk files that they were reluctant to access the central system.

British Gas had a similar experience. The utility was paired with videotex specialist Aregon International under the scheme and installed Digital Equipment Corp. VAX-based videotex software and graphics terminals from Aregon at offices scattered throughout London. But several bugs in the videotex software and delays in hardware and software deliveries put off some of the users that pilot project manager Peter Ashdown was introducing to the system.

Were the pilots worth the trouble?

According to some users, the answer is a resounding "no," from a financial viewpoint. Both the Department of Transport and the BBC admitted that cost justification over the two years of the pilot project was unlikely. Spokemen for both agencies said it would take at least three years for the savings to become apparent.

But for Ross and the DTI, the projects have not been failures. Ross said, "One could be disappointed with all the projects because of the gap between potential and reality. But the pilots have provided lessons for both users and suppliers."

Israel is a reporter at Computer News, *the British affiliate of* Computerworld, *headquartered in London.*

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INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

HOBART — The Island State Credit Union will beat the Commonwealth Bank to the punch with Australia's first home banking system this month, according to sources here.

The system is said to be fully operational, and its public release is only awaiting the implementation of an advertising campaign.

The credit union, which developed its banking system from scratch, will reportedly provide bank customers personal computers with such dial-up services as bank inquiry, bill payment, loan applications and other account services. Project leader Mark Ashton said the system will run on an Ultimate Corp. minicomputer under the Pick operating system from Pick and Associates, Inc.

■

SYDNEY — Users should demand superior solutions from vendors, and because of intense market competition, users should expect their demands to be met, said Joe Henson, president of Prime Computer, Inc., during the recent International Spectrum Pacific Conference here.

Henson maintained that users should ensure they get the systems they want, claiming that vendors must now be sensitive and responsive to users' growing, realistic concerns. "Our success lies in listening to you," he told his audience.

■

SYDNEY — Telecom Australia jumped on the computer bandwagon last week when it released its telephone/personal computer. The Computer Phone, which was designed in the UK by ICL and Sinclair Research Ltd., will be sold for $2,465.

FRANCE

PARIS — CII Honeywell-Bull-Sems has introduced a range of high-end 32-bit superminicomputers called the Bull SPS 9 systems. The products represent the joint development effort of Bull and Ridge Computers, Inc. of Santa Clara, Calif.

The product is intended to handle real-time industrial applications, scientific applications, computer-aided design and interactive image processing, according to a spokesman.

The Bull SPS 9 system, which is now being produced, will feature a reduced instruction set that enables extremely high processing performance, according to the vendor.

THE NETHERLANDS

AMSTERDAM — IBM Netherlands sent letters to Dutch universities last month, offering a 40% discount on all Personal Computers. IBM invited universities here to sponsor joint purchase policies to assure maximum discounts, much to the dismay of major local dealers, sources said. There appears to be only one catch: The universities will be responsible for installation, support and maintenance.

■

AMSTERDAM — Privacy legislation is still lacking here, despite a high level of public interest and activity on the subject. The Netherland's National Alert Foundation Chairman Jan Holvast has been publicly pleading for more decentralized control over individual privacy, which is largely controlled by the Dutch Minister of Justice's Register Chamber. Several proposals to decentralize this chamber have been offered to the Dutch parliament, but none have been acted upon to date.

ENGLAND

LONDON — Warren Werblow, chairman of the Computing Services Association, last week attacked British government plans to license software exports along with its moratorium on grant applications for software development. "We will push and shove and battle against the encroaching bureaucracy. We need to know what the rules are, how they are generated and how they can be modified," he said. Werblow expressed specific concern over the limits on technology exports to friendly countries, as well as those imposed on Eastern bloc nations.

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TURNAROUND TIME

Larry Long

Q What is the best way to teach integrated microcomputer software packages? We decided to standardize on a microcomputer and on an integrated software package. In support of our decision to standardize, we held three all-morning training sessions, each with about eight people (one to a micro). Using several predefined spreadsheet templates, we walked through two examples showing the major features of spreadsheet, word processing, data base and graphics.

A month later, the micros we purchased for the various departments, as well as those that already existed, are basically unused. The managers are blaming us for their lack of use. They contend that the material was covered too fast and that they forgot everything they learned. We had hoped that these sessions would have given them a good start and that they would continue to learn through their own initiative. Apparently, they made no further progress. Should we encourage them to learn on their own, or should we repeat the sessions?

Contrary to advertisements espousing the user friendliness of integrated microcomputer software, very few people, even computer specialists, can hope to gain much proficiency in a four-hour training session. Moreover, it is unlikely that they will retain much, if what they learn is not applied shortly thereafter.

Plan to conduct another round of training sessions; however, this time, allow more time. If your objective is to present these four software elements at a useful level of depth, plan on at least 16 hours, equally divided between formal presentation and supervised practice.

As a follow-up, set up an information center so that advice and assistance are just a question away. If no help, or motivation, is available, all of the training will go for naught, and your new micros and software will continue to be unused.

Q We have been debating whether to use the "of" convention or a prefix to qualify data elements, such as "JOB-LOCN of HISTORY-FILE" vs. "HF-JOB-LOCN." JOB-LOCN could be the same in many files. Which do you prefer? Why?

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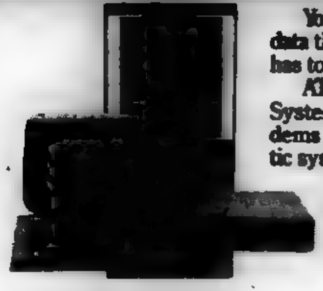

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Coors taps telephone data system to handle growth

GOLDEN, Colo. — Coors beer once was available only to beer drinkers in the Rocky Mountains and the West. Now, the brew is distributed throughout 39 states from coast to coast, with nationwide distribution a short-term goal for Adolph Coors Co.

Coors' products are shipped cold from a single brewery on the day of bottling. Therefore, Coors' distributor ordering system must be fast, reliable and accurate to ensure freshness as Coors expands.

When the brewer recently chose an ordering system for its distributors, it selected a telephone information processing (TIP) system developed by General Electric Information Services Co. (Geisco). The system connects the distributors with Coors headquarters here over Geisco's Mark III remote computing service.

"As we grew, we had to develop a faster ordering system. With more than 540 distributors, the old, less automated ordering systems would never be able to effectively handle the volume," said Don Van Buhler, director of physical distribution for Coors.

> *'We had to develop a faster ordering system. . . . The old systems would never be able to handle the volume.'*
>
> — Don Van Buhler, director of physical distribution for Coors

Coors initially collected distributor order data by mail, a system that was replaced by a TWX-based system as Coors' Western distributors grew in number. When the decision was made to market Coors' products nationally, the TWX system was examined closely.

"We needed a system that the distributors would accept and like. We also wanted a system that allowed distributor personnel to input data directly, but we couldn't count on all of our distributors having suitable terminals for this purpose," Van Buhler said. Another reason to switch was cost, as TIP was more cost-effective in collecting order data.

"Geisco had considerable experience with TIP systems, and it had a suitable network operation. It offered a package that fit our needs very closely," Van Buhler recalled.

Geisco also developed the order entry software with input from Coors on its specific order entry needs.

Automated data gatherer

The TIP system is an automated data gathering system that uses standard AT&T Touch-Tone telephones as input terminals. A synthesized voice from the Mark III service prompts the distributors and guides them through the order input sequence.

The distributor keys numbers into the telephone, such as identification numbers and commodity numbers, in response to user prompts. Distributors also can use an adapter attached to any rotary dial telephone.

The Coors TIP system is available to the distributors 24 hours a day, seven days a week. A typical report will take from five to 10 minutes to file, Van Buhler said.

The Coors TIP system tracks weekly sales and sales forecast information as well as weekly order data. For each Coors product the individual distributor carries, the TIP system asks a series of questions about sales, inventory, new order amount and sales forecast data for several weeks in advance.

Coors distributors, who order weekly rather than monthly because of Coors' freshness policy, call in their information on Monday or Tuesday each week. The information is stored in Geisco's host computers. Late Tuesday afternoon and again on Wednesday morning, Coors' in-house computer system picks up the information for processing.

To minimize errors, the system accepts only valid information. The computer voice tells distributors what information to enter and points out obvious errors. Each information field must be filled with the proper number of characters.

The system also automatically checks for arithmetic errors and allows distributors to compare batch totals to ensure further the accuracy of the data.

"The system works well for us because it doesn't require our distributors to purchase hardware, and it is easy for people unfamiliar with computer systems to learn to use," Van Buhler said.

Coors uses information from the system to schedule production, plan marketing and promotional efforts, track the success of advertising campaigns, project packaging and materials needs and schedule transportation.

"As we continue to expand and compete with other breweries, the level of service we provide becomes extremely important. The TIP system is part of Coors' commitment to service," Van Buhler said.

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Manufacturing system speeds GE's shop production

SCHENECTADY, N.Y. — At the world's largest manufacturer of steam turbine generators here, an extensive program has been under way to automate manufacturing operations.

Since 1980, General Electric Co. has been installing a computer integrated manufacturing system that has significantly increased efficiency at several manufacturing shops, said Robert Schmitz, manager of manufacturing systems applications.

According to Schmitz, GE's manufacturing system consists of six Data General Corp. Eclipse MV/10000 systems and two MV/8000 systems. The systems are said to provide approximately 6.4G bytes of data storage, using mostly 190M- and 354M-byte disk systems.

Additionally, GE has six DG Eclipse S1140 systems integrated into its Calma Corp. computer-aided design and manufacturing systems.

GE manufactures replacement parts for the turbine engines, filling more than 350,000 orders for studs, bolts, packing rings and spill strips.

Part of the project consists of a Factory Management System, which has cut down on production time at several of the company's large manufacturing shops. According to Schmitz, before GE implemented its system, job and parts information was input via punch cards and batch processed on a Honeywell, Inc. DPS 8 mainframe. "Several days to a week later you got a report back, and by that time it was out of date," he said.

With the Factory Management System, a customer's parts order is entered through a direct-order-entry system and converted on-line into an order, which is then transmitted to GE's mainframe computer.

An Automated Process Planning System running on a DG MV/10000 system receives the order from the mainframe and matches it to a Part Recognition Code. The system determines the most efficient routing of the part through the shop and selects the proper material.

At the company's Small-Parts Shop, the Factory Management System, residing on another MV/10000, consists of several modules: shop floor control, which monitors all phases of control between parts and operators; factory communications control; and distributed numerical control. According to Schmitz, the part is dispatched to the appropriate workstation via the shop floor control module.

When the machine tool finishes the part, the Factory Management System and then the operators enter labor vouchering details in real time. The factory communications module then notifies an inspector that the part is awaiting inspection at a specific station, Schmitz said.

The inspector, after approving the part, enters his certification at the terminal. Factory communications then notifies the materials handler that the part is ready to be moved from one machine tool area to another or to the shipping area. When the part is shipped, appropriate information is entered into the terminals.

Eliminating punch cards

"The shop floor communications module alone boosts our productivity substantially," Schmitz said. "Volume in the Small-Parts Shop is so heavy, with more than 15,000 orders a year, that the savings are substantial. For example, we eliminated the need for 500,000 punch cards with this system.

"Another thing we can't afford is excessive queue time — the time raw material sits around before an operator can get to it.

"This system not only solves those problems, but does it without using paper. Additionally, all of the information is automatically entered into the other elements of the system, keeping our data base current and precise.

"We also use the Factory Management System for other types of communications. Should a machine tool malfunction, the operator [goes] through a menu-type display to generate a service call. The operator can also talk to his foreman [or methods, quality control or other people who] he would otherwise have to physically track down."

Parts design is another area that the steam turbine generator business has integrated into its overall system. Engineers design parts at Calma CRT-based workstations, which are based on DG Eclipse S/140 computers. The designs are assigned a Part Recognition Code, and then they are entered into the data base.

When selecting the system, GE examined a range of minicomputer processors with the same capability, Schmitz said. To test each system, the company did "application runoffs," writing up transactions similar to those the company would use. DG performed best in the areas where GE was most interested: data base systems, data base recovery, future software and architectural upgrades and utility packages. According to Schmitz, the process took about six months.

With the system now in place in three major GE shops, the company hopes next year to begin installing it in its Rotor Generating Shop, and by 1987, to have the system installed in its Diaphragm Manufacturing Shop, Schmitz said.

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Office automation system propels Air Force research

ARNOLD AIR FORCE STATION, Tenn. — It is often said that an army travels on its stomach. But the Arnold Engineering Development Center (AEDC), a U.S. Air Force-managed research and test facility located here, appears to travel on its office automation system.

The AEDC consists of physicists, engineers, metallurgists and other aerospace scientists engaged in various research projects. For instance, when the organization's Aeropropulsion Systems Test Facility is completed in 1985, AEDC will be able to subject 100,000-lb thrust jet engines to simulated subsonic and supersonic flight conditions.

In addition, the AEDC has been involved in many aerospace programs ranging from Minuteman intercontinental ballistic missiles to the space shuttle. The organization's clients include the Air Force, the National Aeronautics and Space Administration, the U.S. Army, the U.S. Navy, private industry and other organizations.

But while AEDC's technical community wrestles with complexities such as simulating flight conditions at 1,000-mile altitudes and Mach 20 velocities or measuring temperatures of components superheated to 7,600 degrees Fahrenheit, the organization's management has been tackling communications and administrative challenges.

Each day, information must be shared inside AEDC on budgets, project schedules, tests and instrumentation advances. The AEDC community includes 180 Air Force officers and enlisted personnel and about 3,500 contractors and 190 civil service employees. Test results and other data on 200 to 300 annual test projects must be compiled and distributed to sponsors who need fast feedback to choose among competitive designs and to proceed with product development.

However, distributing information internally and externally is complicated by AEDC's organization, noted Jack Broerman, AEDC director of management systems for the Air Force.

Collaboration

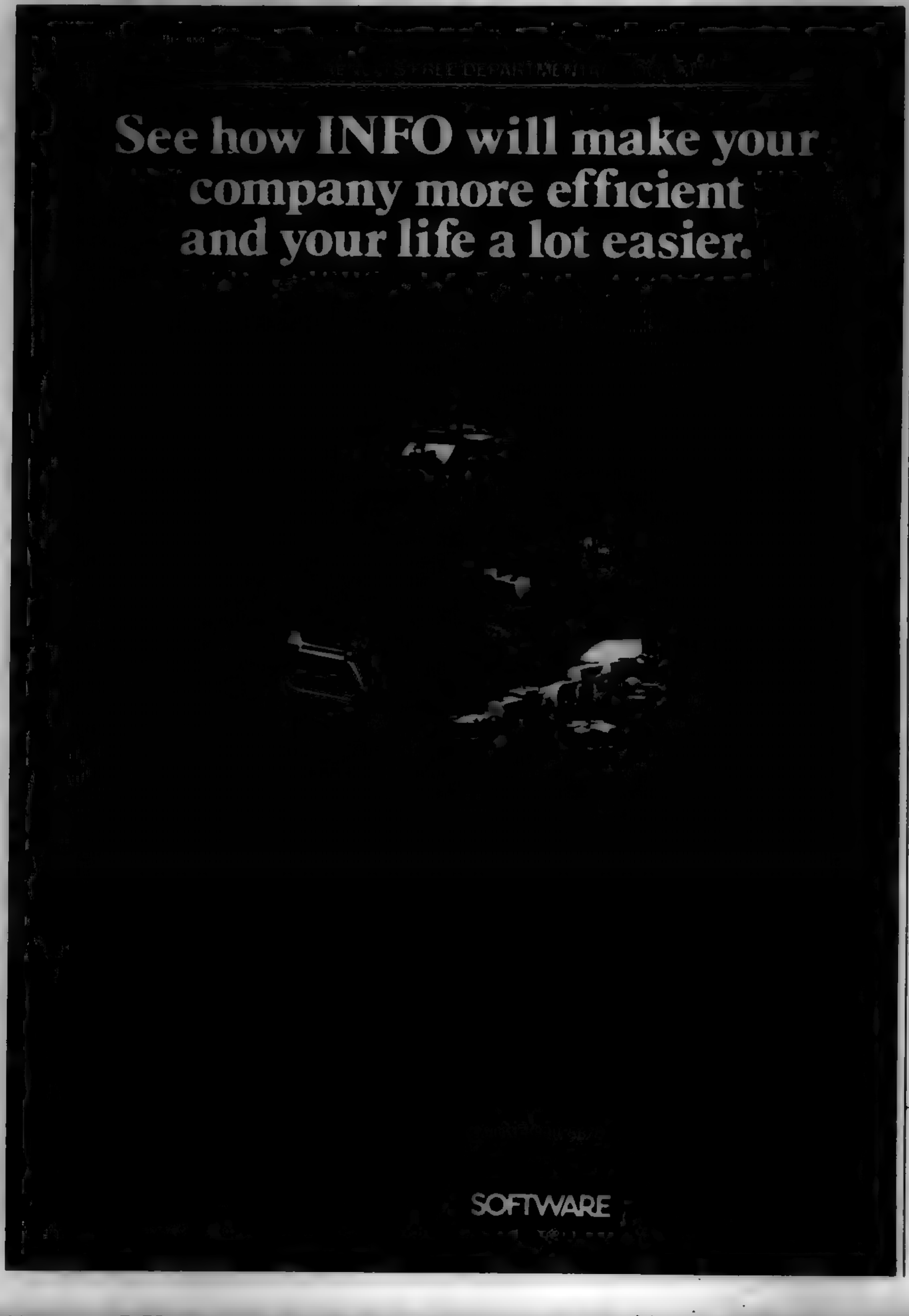
One reason the research unit's system works is the successful collaboration of the Air Force and contractors on an OA program, Broerman said. Solutions to common administrative headaches are now being implemented across the board, he added.

"As of May 1983, we had eight Ethernet communications systems in eight separate buildings," Broerman said. "These local communications networks are all interconnected by an underground 9,600 bit/sec interfacility cable that removes communications barriers from among people belonging to different organizations and located in scattered facilities.

"For example, it used to take two to three days for the model shop to mail an activity report to an administrative office three buildings away and get its revised and massaged copy back," he noted. "Now, it can be sent over Ethernet, reviewed, revised and returned in about six minutes."

Broerman pointed out that the eight Ethernet networks are viewed as AEDC resources rather than organizationally independent tools. When the final Ethernet interconnections were made, the networks linked approximately a dozen Xerox Corp. 8010 workstations, 50 Xerox 860 information processing systems, 25 Xerox 820-II and 16/8 microcomputers and two optical character readers, and they shared resources such as laser printers and file servers. Broerman noted, however, that each of the eight networks can support up to 1,000 devices, and more equipment is being added.

"We started our [OA] efforts at the clerical end. Then we addressed upper management needs. Now, we're closing the gap, bringing [OA] to the middle-management level," Broerman explained.



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SOFTWARE

Interactive system helps firm meet growth challenges

PARKERSBURG, W. Va. — Since its founding here in 1980, an equipment manufacturer for the life science industry has seen its sales steadily climb past the $5 million mark, with sales during the current year projected to grow at about 75%. Such rapid growth, however, has not been without its problems.

As Queue Systems, Inc. has expanded its business, its management has had to face challenges in scheduling, pricing, cash flow, employee record keeping and accounting. To meet these challenges, Queue relies on an on-line computer system that provides management with access to information such as the total cost of a product's bill of materials and the ability to schedule production runs automatically to fill orders.

In 1981, the company decided to enlist the aid of a computer system to help manage its growth. Chuck McKinney, a founder and secretary-treasurer of Queue Systems, said the firm seriously considered an IBM system but finally selected a system from NCR Corp. "We chose [the NCR] system because we thought it was a little easier to run for our novices," he recalled.

Queue Systems, Inc.'s Sammy L. Daly works on an NCR Corp. 9300 system.

The system the company chose was NCR's IMCS-II Interactive Manufacturing Control System inventory and bill of materials software modules running on an NCR [illegible] computer. Today, the company runs these IMCS-II modules and other interactive modules to handle accounts payable, sales analysis, order processing, purchasing and receiving and material requirement planning.

In addition, Queue Systems has upgraded to an NCR 9300 computer system that boasts 1M byte of main memory plus 162M bytes of memory on one removable and five fixed disks. Installed in December 1983, the 9300 system supports four on-line data display terminals and a 200 line/min printer, according to McKinney.

Queue Systems employs only one part-time programmer, who was hired recently to customize reports produced by IMCS-II for company executives. The absence of a large DP department at Queue Systems is no accident, the company said. When the firm began searching for computer solutions, management sought to buy rather than build sophisticated capabilities — even though management recognized that no off-the-shelf software would fulfill its needs.

"We also knew it would cost us several hundred thousand dollars and take a lot of years to actually design our own software for inventory and production control and other manufacturing activities," McKinney said, noting that time and spare development funds are items that most young firms find in short supply.

McKinney said that IMCS-II software appealed to Queue Systems because it operated on-line, offered a manufacturing package and was easy to use. "It wasn't one module that interested us but the fact that all the modules worked together," he said.

"Before the system was installed, we had shortages all the time," McKinney said. "We don't today. The on-line system lets us manage our inventories far more efficiently. Given the sheer volume of orders we're filling now and the complexity of product bills of materials, it would be impossible to manage inventory [manually] and meet production schedules efficiently."

The software package's accounts payable module works together with a purchasing module to help manage cash flow for the company, which deals with more than 500 vendors.

"The software helps us pay vendors in time to get discounts and automates check writing," McKinney said. "But, in addition, it lets us review how much is owed each vendor, the age of invoices and forward commitments for purchases in given time periods. All of this information has helped to improve cash flow."

McKinney also credited the interactive system with reducing Queue Systems' overall labor requirements. In such areas as bookkeeping and production control, he estimated that Queue Systems would need twice the number of workers it now has if it still relied on manual methods.

McKinney said the company has experienced no major problems with the system. He added, however, that the company recently had to replace a faulty NCR disk drive.

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Software helps retail shoe chain step up productivity

COLUMBUS, Ohio — A retail shoe chain here has used a series of software products to reduce applications backlog, providing faster access to more information.

When the Kobacker Co., a national self-service retail shoe chain headquartered here, brought its West Coast terminals on-line under IBM's CICS, it wanted remote and local access for program development, according to William Hart, senior telecommunications analyst.

To service its 320 retail shoe stores, Kobacker employs an IBM 4381 mainframe operating under Vtam and CICS, as well as two on-line automated warehouses.

In 1980, Hart selected Applied Data Research, Inc. (ADR) software products. Today, Kobacker uses five ADR products, including ADR/Roscoe, Roscoe/Extended Time Sharing Option (Etso), Roscoe Programming Facility, the Librarian and ADR/Look. All, he said, increased automation and monitored system performance in real-time while helping the end user become more self-reliant in working with applications development.

The central tool of Kobacker's information processing system, according to Hart, is ADR/Roscoe. Kobacker uses Roscoe Programming Facility (RPF) as an interactive procedural language, ADR/The Librarian in library control and management, Roscoe/Etso as an interactive applications development tool and ADR/Look in hardware and software measurement on a real-time basis.

Kobacker chose Roscoe/Etso in 1982 as a partial alternative to the RJE link between the IBM 4341 mainframe under VM and the company's West Coast warehouse. Hart said he wanted programmers to handle minor changes while they were on-site for user training, but this was not possible under VM.

Roscoe serves as an interactive application development system for IBM OS environments. It is said to provide immediate access to data during programming, extending the computer to the general user. Programmers at the West Coast warehouse call up Roscoe to produce reports, develop applications and generate spreadsheets.

From the start of the project, Kobacker's mainframe had been experiencing routine CPU crunches while operating under CMS. But, according to Hart, the problems disappeared when users were switched to Roscoe. "CMS was siphoning off 15% to 20% of our CPU cycles, which we recovered by shifting to Roscoe," Hart said.

In addition to the Librarian, Kobacker uses RPF, a high-level structured procedure language that can be executed interactively by the terminal user. Originally installed as a programmer productivity aid, RPF has been virtually taken over by end users, Hart said.

"We have several people in our accounting and general ledger areas who know Basic," he said. "Once they found out about RPF, they began to develop applications using RPF that many times completely took care of their requirements." Hart added, "I was also surprised that, working with only the Help function and without even manuals, the users could use RPF to write some fairly sophisticated programs." Some of the user-generated programs are over 600 lines in length, he said.

RPF can access Roscoe facilities for data entry and editing, library storage, syntax checking, job submission, output review and data set management.

Electronic spreadsheets

A growing requirement in almost every area of Kobacker operations is the capability to generate electronic spreadsheets for trial balances, but the process under CMS and APL was inefficient, Hart recalled. "We could support three or four APL users without problem," he said, "but when we put the fifth user on, everyone came to a screeching halt."

Not wanting to put IBM's TSO on the system because of its high overhead, Kobacker installed Roscoe/Etso. Terminal users can now execute interactive applications under Roscoe. Hart also selected a packaged electronic spreadsheet that runs under TSO as well as Roscoe/Etso. The spreadsheet capability has become one of the most widely used applications. Roscoe has a single address space, and as a result, other Roscoe users do not suffer poor response time, even when CPU-intensive tasks are being run. Batch response time has actually improved, Hart said.

With multiple jobs contending for shared resources, Kobacker selected ADR/Look, a performance management tool, to keep tabs on system operation. Look offered the information systems manager a combination of real-time displays, exception reporting, historical reports and statistical summaries. "The information Look collected was used to justify our ordering the IBM 4381," Hart said. By having accurate statistics on hardware utilization, Kobacker avoided upgrading its CPU.

Look supplements RMF, an IBM performance monitoring tool, but takes a more active role. "Look does a better job of displaying visual graphics and indicating trends than RMF," he said.

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DPMA chooses president

ANAHEIM, Calif. — Eddie M. Ashmore, director of information resources management at Southern Baptist Theological Seminary, was elected international president of the Data Processing Management Association (DPMA) during the association's recent annual business meeting.

Ashmore, the 33rd international president of DPMA, succeeds Carroll L. Lewis, the 1984 president and founder of Commercial Data Systems, Inc.

Ashmore has worked with the Louisville, Ky.-based seminary for 19 years and manages that institution's information resources, including data processing, word processing, telephone services, postal services, printing and duplication.

The DPMA business meeting preceded DPMA Anaheim '84, the 47,000-member association's annual computer conference and business exposition.

Systems management meeting set for April 21-24 in Nashville

NASHVILLE — The Association for Systems Management (ASM) will hold its 1985 annual conference April 21-24 at the Opryland Hotel here.

The conference will feature a two-day miniconference on managing information centers, a full-day program on communication skills and a one-day seminar entitled "Executive Support Systems."

The conference will also include a pair of study tracks titled "Managing Interpersonal Relationships" and "Integrating Systems Technologies — 1985."

Registrants can structure their own educational paths from seminars on office productivity, systems techniques, information resource management and personal development.

Cost of the program is $475 for ASM members and $575 for nonmembers.

More information is available from ASM International, which is located at 24587 Bagley Road, Cleveland, Ohio 44138.

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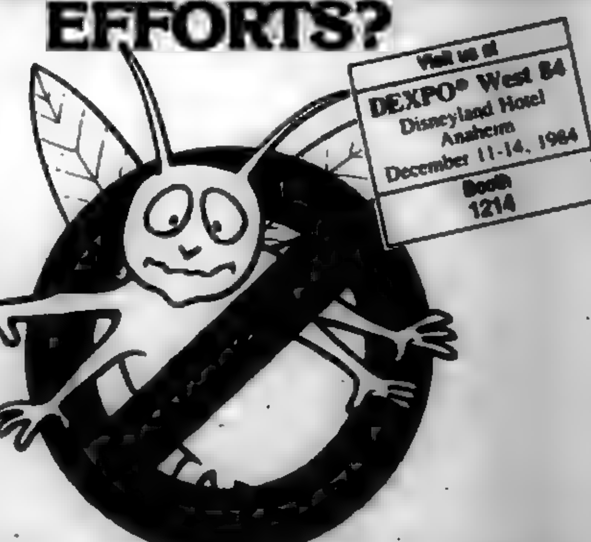

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Firm hits happy medium with electronic printer

SEATTLE — For a consulting actuary, the clarity of a printed page is an important aspect of business strategy.

The product of Milliman and Robertson, Inc., an actuarial consulting firm here, is information based on complex mathematical data and projections, said Marty McCune, data processing manager for M & R Services. M & R Services was formed in 1968 to provide computer services for Milliman and Robertson's national network of 19 offices, as well as to service outside clients, McCune said. M & R Services also develops and sells software for life insurance companies to use in their own DP operations, he said.

"Anything we can do to improve [continually] the quality of our hardcopy output is to our advantage," McCune explained. "And page printing — 8½ by 11 in. — offers a look that's superior to continuous form." McCune said.

McCune's problem during his year-and-a-half search for an appropriate page printer was to find one with a capacity of 200,000 pages per month, he said. He was stepping up in quality by replacing his 1,000 line per minute impact printer with a nonimpact printer, and he also needed a step up in volume, he added.

"The laser xerography printers, geared for 50,000 pages per month output, were too slow, while the next level in volume offered by that printer technology was a system geared for 500,000 pages per month. The higher volume printer was not a practical expense for us. We needed a system geared for our middle range in volume," McCune said.

McCune found his solution in an alternative technology — ion deposition electronic page printers, he said. The Mercurion 1 from Southern Systems, Inc. of Clearwater, Fla. offered 60 page per minute electronic output at a purchase price under $70,000, he said. The printer gave the company the 8½- by 11-in. format it wanted and a price within its budget.

There were other advantages beyond the printout quality that was McCune's primary goal — direct connection and plug compatibility with the company's IBM 370/148 system were chief among those, McCune said. "Mercurion 1 directly attaches to the multiplex channel on our IBM and looks like an [IBM 3203 Model 5] impact printer," McCune said. "In contrast, the xerographic machines required a communications link that would have restricted us to 9,600 bit/sec," he added.

The small physical size of the printer was a secondary benefit, McCune said.

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Software gives scientist crystal ball to weather events

VICKSBURG, Miss. — Back in 1906, a violent storm striking the California coast was reported on a wire service. If the account had been accurate, the storm would have been a true meteorological anomaly — one of those phenomena that scientists might expect to see once in a century. On the other hand, the wire reporter could have been swept away in an attempt to re-create the storm's violence for newspaper readers around the country.

About 80 years later, an electric power utility was building a nuclear power plant in the area once devastated by the big storm. The firm planned to construct a breakwater to protect the facility, but needed to know the historic storm's magnitude to design a marine structure strong enough to withstand similar weather conditions. So how bad was the storm?

Donald Resio, president of Offshore & Coastal Technologies, Inc. here, solved this problem by developing a software model to post-analyze the 1905 storm. Resio now conducts postanalyses as well as meteorological and oceanographic forecasts for a wide range of customers, including shipbuilders, offshore structure manufacturers, oil rig operators, marine construction companies and government agencies. With a high degree of accuracy, Resio's software predicts marine variables like wave dimensions, coastal flooding, storm surges and coastal currents for his clients.

Resio calls Offshore & Coastal Technologies a "numerical modeling company" whose computer-based measurements produce results that are as valid as data gathered by field instruments. Resio's software, housed in a Boeing Computer Services Co. data center in Bellevue, Wash., has an advantage over meteorological measurement devices: It does not sink to the bottom of the sea or get blown away like traditional field equipment, Resio pointed out.

"We have found over the years that we can predict weather about as well as other companies can measure it," Resio said.

Resio holds a doctoral degree in earth sciences from the University of Virginia, and his area of expertise is environmental fluid dynamics. His interest in the interplay between the elements eventually led him to challenge the conventional wisdom of wave modeling.

"I really thought all the answers in wave modeling had been published in the Miles-Phillips Theory. And I wasn't alone — that was the prevailing view in oceanography," he recalled.

Resio's assumption changed when he began running a numerical code he had developed for a problem involving the Great Lakes. "The Miles-Phillips Theory didn't work. And at the time, I thought the theory was correct and my numerical code was wrong," Resio confided.

During the year that followed, Resio worked on developing a wave model that applied to "anything from a mud puddle to the Pacific Ocean."

To solve the equation for particular meteorological or oceanographical events, Resio used a variety of computing tools. For every case, "the winds act as a wildcard, determining the character of the event. Wave generation is pretty much a matter of how much energy comes into the wave field from the wind," Resio maintained.

> *'All the technology we use is simply a numerical tool for getting a very specific answer at a competitive price.'*
>
> — Donald Resio, president of Offshore & Coastal Technologies, Inc.

Resio uses small models to determine wind fields. These software programs can run in 10 seconds on Offshore & Coastal Technologies' C-10 System One computer from Cromemco, Inc.

The more sophisticated Offshore & Coastal Technologies models, such as those involving wave behavior and coastal currents requiring large amounts of storage, run on a Cray Research, Inc. Cray-1S supercomputer at Boeing's data center. Resio optimized his code for the big machine, enabling the Cray to process an entire day's global predictions in 20 seconds. This computing efficiency means extremely competitive rates for Offshore & Coastal Technologies' clients, Resio added.

"Our customers want a certain product: They want to know how high the waves are going to run up on their structures or if they're going to get inundated up on the working deck of an oil rig or the chances of waves damaging their ships. All the technology we use is simply a numerical tool for getting a very specific answer at a competitive price."

What about that big blow back in 1905? "Nothing special," according to Resio. It turned out to be a very typical Pacific storm, re-created 80 years later by a businessman in Vicksburg, Miss.

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Package addresses credit union's financial modeling needs

WASHINGTON, D.C. — The Pentagon Federal Credit Union is in the business of serving the people in uniform who serve the U.S. But Pentagon Federal needed software to serve the financial modeling requirements of its management team.

An independent thrift institution headquartered here, Pentagon Federal is regulated by the National Credit Union Administration and has nearly 25 U.S. and overseas branches. The nation's second largest credit union, Pentagon Federal maintains accounts for more than 275,000 Air Force, Army and Department of Defense employees and their relatives and dependents.

Formerly, Pentagon Federal relied on outside service bureaus for its data processing needs. But, according to Comptroller Roger Kase, handling such a large volume of accounts on time-sharing systems was costing the company more than $250,000 annually. So Pentagon Federal began looking for a less expensive, in-house system. The company's research culminated in the installation of an IBM 4341 equipped with IBM's MVS operating system.

At the same time, Kase said, Pentagon Federal began setting up an information center to provide efficient systems for budgeting and account tracking for the company's managers and executives. The Pentagon Federal information center was closely modeled on the IBM information center concept. More than 100 IBM 3279 terminals were linked to the 4341 from executive offices and other central locations. The company also built up a library, staffed the center with consultants and installed a hot line to field user questions.

But, Kase said, "we needed a software tool with 'what-if' capabilities that our management team could use."

Pentagon Federal evaluated about 35 modeling languages and eventually chose Comshare, Inc.'s System W decision support system as its first major information center software installation. According to Kase, the software dovetailed nicely with Pentagon Federal's information center plans.

"We had a long list of requirements," Kase explained. "They included forecasting, inflation adjustments, technical support, multiple-user support and local service support from a stable company. We needed software that would be maintained and enhanced and that would grow with the industry." System W met those requirements.

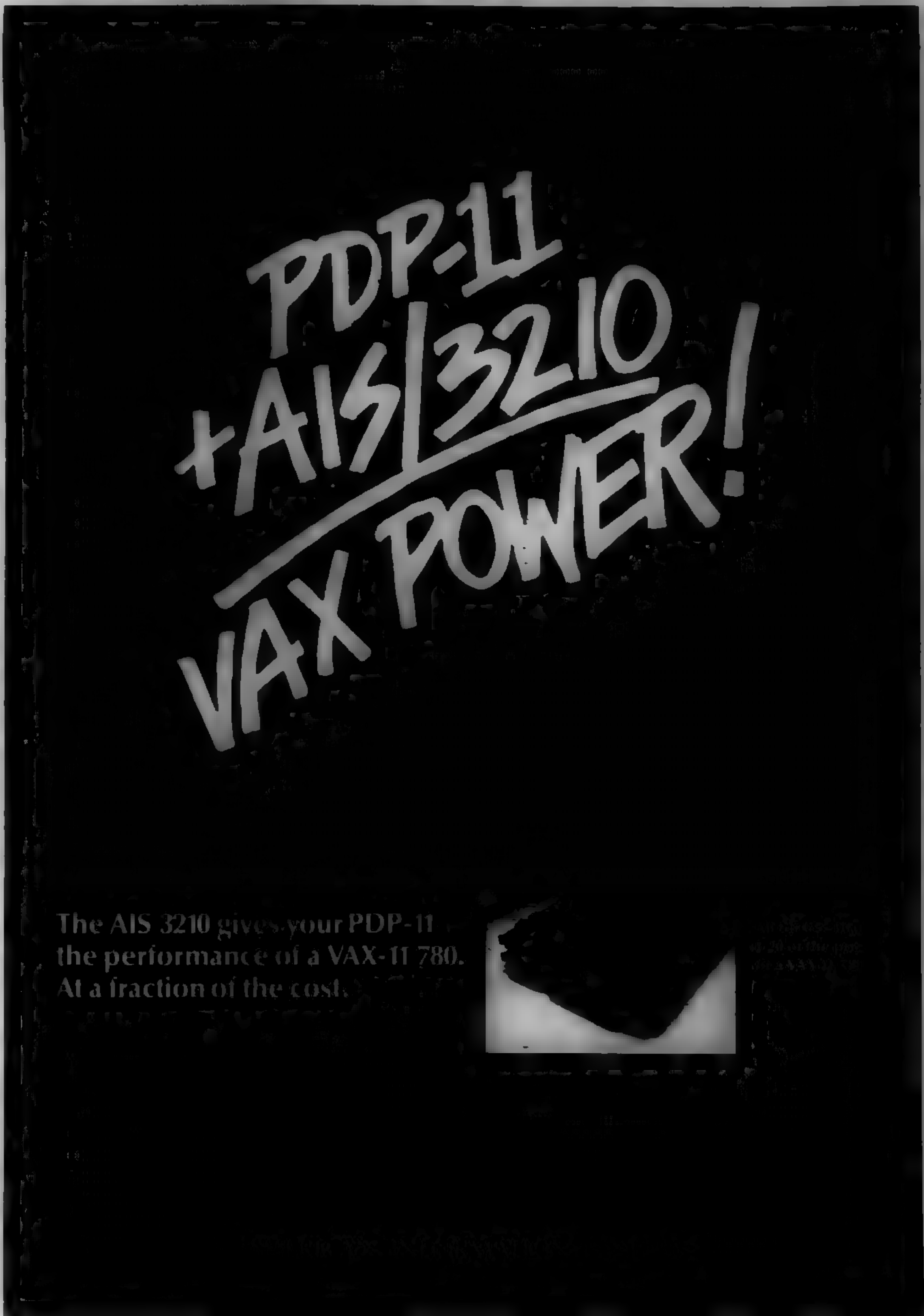
Priscilla Roach, manager of Pentagon Federal's managerial accounting department, said she and other users were impressed with System W's English syntax and comprehensive forecasting capabilities and the software's use of variable names instead of line numbers.

"With System W, I could sit down with our managers and go over calculations, and we would all understand them," she said. "In some modeling languages, the rules are so complex that using them is like learning how to program."

Pentagon Federal's initial application of System W was building an annual budget model that consisted of loan, share and expense history and developing tracking models with information on member accounts, such as loans, daily transaction data and certificate, checking account and individual retirement accounts data. Other business data included assets, liabilities, utility costs and personnel expenses.

System W's Window feature, with full screen capability, was particularly useful, Roach said. "It . . . [debugs] any kind of input data," she said. "You can get an immediate look at the bottom line or scroll through details looking for key numbers."

Pentagon Federal's future plans include using System W as a data acquisition link to existing in-house software and installation of System W color graphics for presentations to the firm's board of directors and officials.



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Electric firm brightens productivity with net revamp

JACKSON, Mich. — Consumers Power Co. began evaluating its data communications network in early 1982.

"Until two years ago, Consumers Power relied entirely upon conventional 2,400-, 4,800- and 9,600 bit/sec modems supplied by [Michigan Bell Telephone Co.] and AT&T," recounted Daniel Mandreger, telecommunications engineer in the communications systems department. "An upgrade in the network was necessary to accommodate increased traffic and prospective users. Further, transmission problems were becoming evident. We, therefore, decided to evaluate the entire system."

Consumers Power is Michigan's largest electric and gas utility. Its data communications system ties regional offices and power plants to an IBM 3033 mainframe here. Customer records account for 50% of the data transmissions, and the remainder consists of employee information, time-sharing, materials management and text management. The network is also called upon to transmit data from remote computerized meter reading equipment to Jackson.

'An upgrade in the network was necessary to accommodate increased traffic. Transmission problems were becoming evident. We decided to evaluate the entire system.'

— Daniel Mandreger, telecommunications engineer

For the evalution, Consumer Power initiated laboratory testing of modems supplied by several vendors, including Racal Milgo, Inc., Codex Corp. and IBM. In addition to modem performance, circuit diagnostic capabilities were evaluated.

Modem checks were made with an impairment generator and bit error-rate tester. Devices were first exposed to the line impairment maximums tariffed in Michigan, with more than one error in 10 million bits transmitted considered the failure point. Additionally, the equipment was subjected to excessive impairment levels and multiple impairments.

"The important differences between modems were seen in the circuit diagnostic information each manufacturer offered," Mandreger said. "The Codex CS modems and DNCS [Distributed Network Control System 300] gave specific information on a large number of [Electronics Industry Association] digital and voice frequency analog impairments at central and remote ends — from 19 to 23 status points, depending upon the particular model of modem. Also, the DNCS was the only system that would permit us to set our own alarm trip values for each impairment.

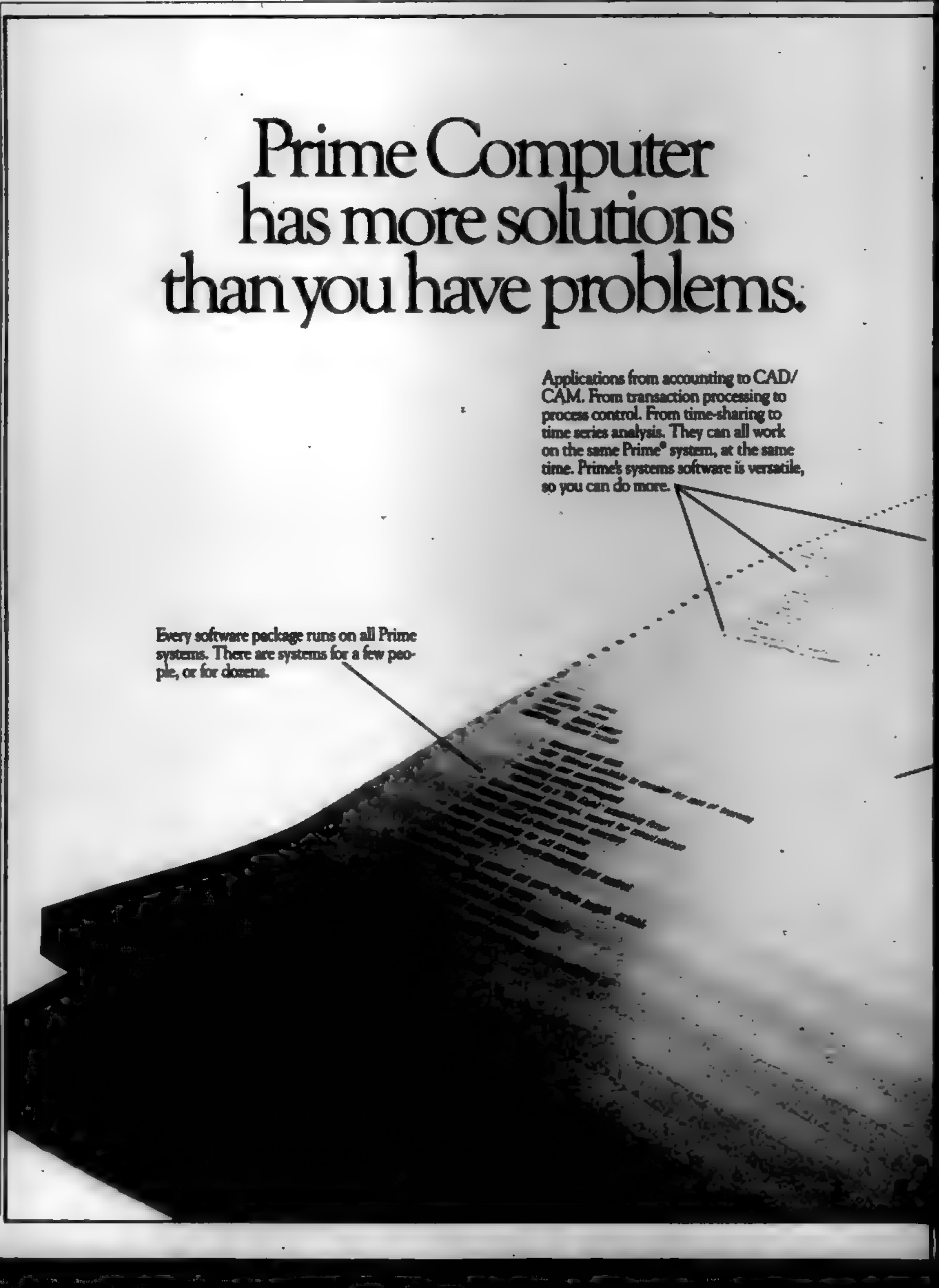
'This particular unit has a sense of humor.'

Consumer Power decided to lease the Codex equipment, which currently supports 118 CS 9600s for 59 point-to-point lines; 10 Model CS 4800s for five point-to-point lines for terminal equipment with maximum speeds of 4,800 bit/sec; 80 Model CS 48FPs for 17 multipoint lines; 22 Model MX 2400s for 11 point-to-point lines for the text management system's ink-jet printers; and 25 Model CS 9600s for seven high-speed multipoint lines.

Consumers Power has made extensive use of the DNCS 300 for testing and making benchmark lines prior to bringing them up. Mandreger said the system helped diagnose problems that probably may have otherwise been overlooked. Most line impairments involved impulse hits, low signal levels and low signal-to-noise ratios. Supplementary manual test equipment has been valuable for occasionally expanding upon DNCS leads, such as when a circuit is down or for carrier loss.

Although Mandreger said he was generally pleased with the equipment, there have been problems. "Some of the modems has been defective, and we have been continually replacing some system cards," he said.

The telecommunications manager would also like to see the system enhanced. "I would like to be able to run a diagnostic program without operator intervention," he said. "It would allow me to set a test run at night and have the results the next morning — something we can't currently do."



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Scientific workstation net expands Yale's capabilities

NEW HAVEN, Conn. — When Yale University decided to increase its computational power to handle the burgeoning number of computer science students and the university's commitment to computer research, it looked to a distributed network of scientific workstations.

The number of undergraduates enrolled in computer science courses at Yale doubled over the past three years, said John H. Goodman, director of operations and development for the computer science department. About 1,400 undergraduates are taking introductory computer courses this year — in fact, 90% of all undergraduates now take at least one introductory course in the subject.

Yale's computer science department had a collection of 24 computers from a variety of vendors to support computer science education and research, Goodman said. Some computers, such as the university's 16 Digital Equipment Corp. VAX-11s, were used for introductory courses; others, such as its five Symbolics, Inc. Lisp machines used for artificial intelligence research, were dedicated to a single purpose, he said.

As the rate of student enrollment in computer science courses grew, these facilities were not enough, he added. At this time, Yale was also expanding the experimental segment of its ongoing research programs in AI, scientific computation and systems.

The school needed a network of machines with substantial computational power that could accommodate about 130 users simultaneously, Goodman said.

The computer science department researched a number of companies and realized that present time-sharing systems could not offer the consistent performance or the transparent resource sharing that they required, Goodman said. The department next researched several companies that manufactured distributed systems, he added.

The university chose Apollo Computer, Inc.'s Domain line of 32-bit scientific and engineering workstations, which operate in a high-speed local-area network and support network-wide, demand-paged virtual memory, Goodman said. "In choosing the distributed system, we were allowing for unlimited growth in our educational and research network," Goodman added. "Since each workstation has its own dedicated CPU and main memory, adding units to the network in no way decreases power or response time," he said.

In June 1981, the first Apollo computers were up and running. Over the next two years, Goodman said, Yale installed a total of 80 DN300s, 17 DN420s and two DN600 full color graphics workstations.

The total configuration is broken down into two separate rings: one for computer science education and the other for special research projects. The network also has the ability to communicate, via an Ethernet gateway, with other computers within the department, Goodman said.

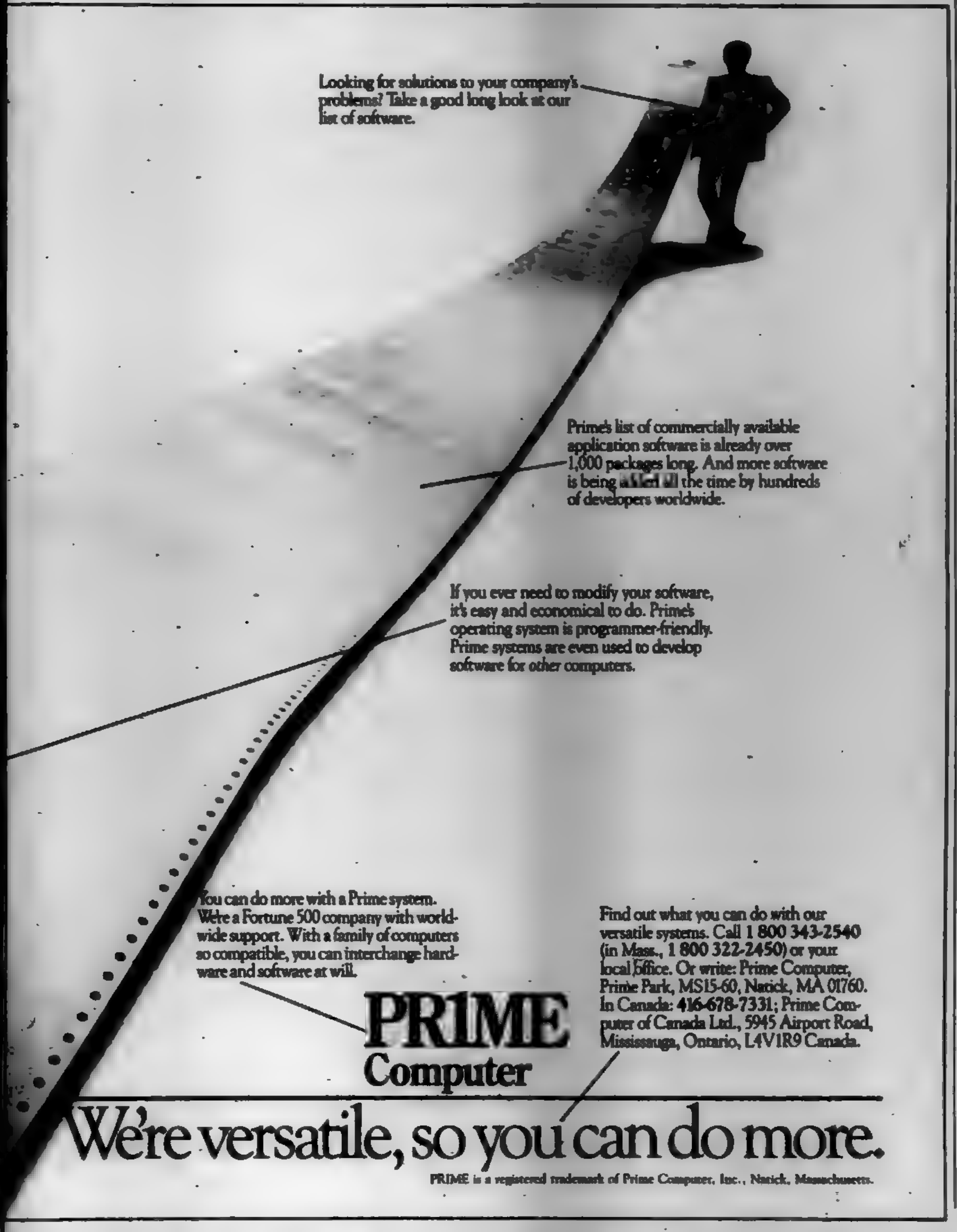
The educational systems, used primarily for advanced undergraduate and all graduate-level computer science courses, are comprised of 40 DN300s and two DN420s, which are used as file servers because the DN300s run diskless, sharing mass-storage facilities across the network, Goodman said. Each DN420 is configured with a 159M-byte Winchester disk, he added.

The research group consists of 40 DN300s and 20 DN420s with 34M-byte and 158M-byte Winchester disks, respectively. In research, however, the DN420s are not used as file servers, Goodman explained. They offer enhanced graphics capabilities and increased power for programs requiring more main memory. For this reason, each is equipped with an Apollo Performance Enhancement Board, he said. In addition, the research network has two DN600 color graphics stations, used specifically for scientific computation and electrical engineering, he said.

Each workstation offers both the Apollo Aegis operating system and AUX, Apollo's implementation of AT&T's Unix software with University of California at Berkeley extensions, Goodman said. The Apollo systems each provide a multiwindow multitasking environment, which allows up to 24 programs to run simultaneously on the same display, he explained. Given these capabilities, a student can be in the process of running a number of given programs while accessing another program or file from another workstation — all at a data transfer rate of up to 12M bit/sec, he said.

In addition to the research and basic computer science education that had been the department's original focus, the new systems provide the computational power for such applications as numerical analysis, computer architecture and attached processor research, oil reservoir simulation, geophysical acoustics, computational fluid dynamics and structural analysis, Goodman said, which are now an integrated part of the university's educational and research efforts.

In addition, the new system is used for AI research and systems research, which involves the study of languages, programming environments, operating systems and network technology, he added.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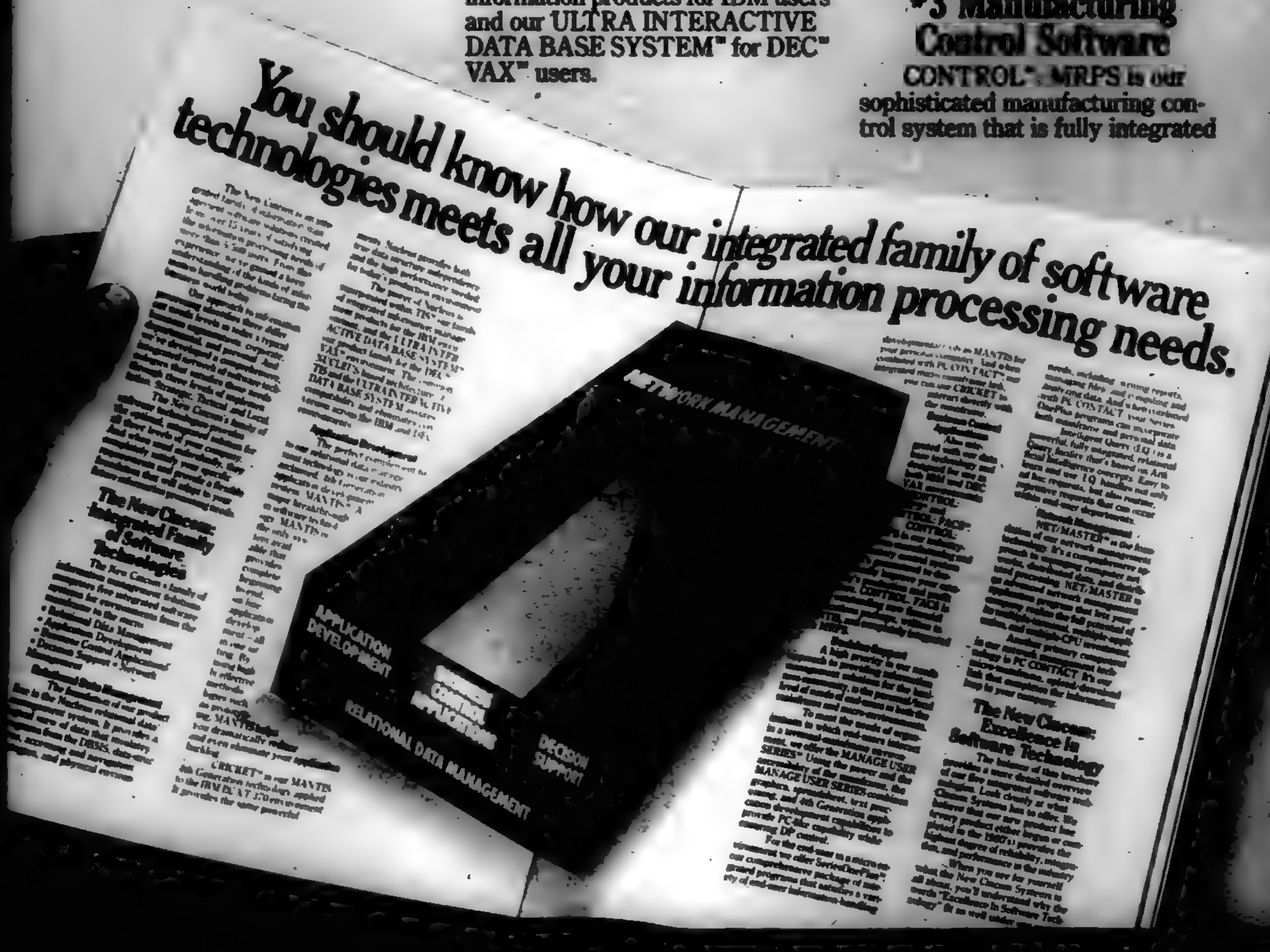

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Hospital's flexible accounting tool a healthy asset

PHILADELPHIA — The teaching hospital at Thomas Jefferson University here is happy that in 1981 it chose a general ledger software package for its flexibility, because changes in the government's Medicare reimbursement formula will now require updated software.

The Health Care Financing Administration of the U.S. Department of Health and Human Services changed its Medicare reimbursement plans as of July 1984. Thomas Jefferson University plans to merge its financial software with a cost accounting software package to form an integrated accounting system.

The changes were needed to respond to the new Medicare reimbursement plan, in which all illnesses and treatment patterns have been classified into diagnosis relation groups with a fixed price for treating each patient. Medicare reimburses hospitals for the allotted expenses, but if the hospital exceeds the fixed price, it must cover the remaining costs on its own.

"For Thomas Jefferson University, this means we must achieve reimbursements from Medicare with a minimum of disruption to our hospital's budget," said Erik Ostergaard, associate controller at the hospital.

With an annual operating budget of more than $300 million, Thomas Jefferson University functions as a business as well as a hospital and a university. In addition to maintaining a private medical college and supplying health care services, Thomas Jefferson University accounts for 450 grants from sponsors and operates three student housing facilities as well as a building for office rentals.

Prior to buying the general ledger program from Software International Corp. in 1981, the hospital was summarizing payroll, accounts payable and inventory manually. "It was very ineffective because it was not detailed enough or accurate enough to provide the reports we needed for management and accounting," Ostergaard said.

The university considered general ledger packages from 12 vendors at first, according to Patricia Iberer, project manager at Thomas Jefferson. The 12 vendors were narrowed down to six, which were invited in to make presentations. From those, Software International's package was chosen for its on-line capabilities as well as its flexibility, Iberer said. The hospital's data center runs an IBM 3083 and 3033 on the MVS operating system. Iberer said packages from IBM were not considered.

Visited user site

Ostergaard said the hospital staff's visit to a Software International user site was also a decisive factor in the move to purchase the Software International general ledger. "We were impressed that a user at that site had only been operating the software for three months and was already using it successfully. For an accounting department with almost no computer experience, that was important."

He added, "We wanted a software package that could handle our wide range of accounting functions — from project and research accounting to encumbrance and cost accounting." Iberer said, "The primary objective was to find a way to provide management with timely and accurate reports that would be useful to all levels of management." The software can generate reports on balance sheets, income statements and various management analyses.

Minor problems were experienced when the package was first installed. "Nothing's perfect," Iberer said. But Software International responded well in correcting the problems, she said.

Reports will now become more detailed to meet diagnosis relation group requirements, Ostergaard said. "Now we will have to assume the risk for differences between our cost for providing a service and the fixed price," he said.

IEEE selects next president

NEW YORK — The Institute of Electrical and Electronics Engineers, Inc. (IEEE) has elected Dr. Bruno O. Weinschel as president of the institute.

Weinschel, president and chief engineer of Weinschel Engineering Co. of Gaithersburg, Md., will serve as IEEE president-elect during 1985 and will assume the title of president in 1986.

Current IEEE President Dr. Richard J. Gowen, president of Dakota State College in Madison, S.D., will be replaced as IEEE president in the coming year by Charles A. Eldon, manager of capital equipment for Hewlett-Packard Co. in Palo Alto, Calif.

Merlin G. Smith, technical assistant to the vice-president of logic and memory at the IBM T. J. Watson Research Center in Yorktown Heights, N.Y., was elected IEEE executive vice-president for 1986.

The IEEE is located at 345 E. 47th St., New York, N.Y. 10017.

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DECEMBER 17-18, WASHINGTON, D.C. — **Assertiveness for Success.** Contact: Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-19, HARTFORD, CONN. — **CMS for Application Programmers.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-19, NEW ORLEANS — **The Institute of Electrical and Electronics Engineers First International Conference on Office Automation.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

DECEMBER 17-19, HARTFORD, CONN. — **OS/VS TSO/SPF Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-19, WASHINGTON, D.C. — **On-Line Operations Management.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-19, WASHINGTON, D.C. — **Configuration Management of Software Programs.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

DECEMBER 17-20, HARTFORD, CONN. — **Pascal Programming Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-20, CHICAGO — **Data Communications: Components, Systems and Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-21, HARTFORD, CONN. — **Structured Analysis & Design Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-21, NEW YORK — **CICS Internal Architecture.** Contact: Sysed, Inc. 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 14-18 in Chicago.

DECEMBER 17-21, ORLANDO, FLA. — **Veam Programming Workshop.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 17-21, WASHINGTON, D.C. — **Internet Systems and Protocols.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

DECEMBER 17-21, NEW YORK — **MVS Job Control Language.** Contact: Sysed, Inc. 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 7-11 in New York.

DECEMBER 19-21, ORLANDO, FLA. — **Integrated Data Dictionary Workshop.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 19-20, NEW YORK — **Unix: A Manager's Perspective.** Contact: American Management Associations, P.O. Box 319, Saranac Lake, N.Y. 12983.

DECEMBER 19-20, HARTFORD, CONN. — **DOS/VSE Job Control Language.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

WEEK OF DEC. 23

DECEMBER 27, NEW YORK — **Sysed, Inc.'s Annual Training Forum.** Contact: Sysed, 35 W. 35th St., New York, N.Y. 10001.

DECEMBER 27-28, NEW YORK — **CICS Performance Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

WEEK OF DEC. 30

JANUARY 2-4, HONOLULU — **Hawaii International Conference on System Sciences.** Contact: Nem B. Lau, Center for Executive Development, College of Business Administration, University of Hawaii, 2404 Maile Way, C-202, Honolulu, Hawaii 06822.

WEEK OF JAN. 6

JANUARY 7-8, KANSAS CITY, MO. — **Discover Unix.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 10-11 in Boston, Jan. 14-15 in Houston and Jan. 17-18 in San Francisco.

JANUARY 7-8, HARTFORD, CONN. — **Unix Systems Users Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-8, DALLAS — **Operating Systems: A Comparative Analysis.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 14-15 in Boston.

JANUARY 7-9, ARLINGTON, VA. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 9-11 in Tampa, Fla., Jan. 15-17 in Cary, N.C., and Jan. 22-24 in San Francisco.

JANUARY 7-9, NEW YORK — **PC/Focus for Beginners.** Contact:

See JANUARY page [illegible]

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RELATIVE PERFORMANCE*	125	100	64	109
PRICE	$446,350	$707,897	$437,754	$656,889
PRICE PERFORMANCE	$ 3,571	$ 7,079	$ 6,840	$ 5,999

Relative Price Performance Index
**Computerworld, August 20, 1984*

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JANUARY

from page 56

Julie Leonard, Advanced Infostructures, Inc., 475 Fifth Ave., New York, N.Y. 10017.

JANUARY 7-9, DALLAS — **VM/SP Structure, Flow & Tuning.** Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 7-10, NEW YORK — **CICS Debugging.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

JANUARY 7-10, HARTFORD, CONN. — **Designing On-Line Systems.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, HARTFORD, CONN. — **CICS/VS Command-Level Coding Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, RALEIGH, N.C. — **Unix Workshop.** Contact: Suzanne Battista, Course Manager, Plum Hall, Inc., 1 Spruce Ave., Cardiff, N.J. 08232.

JANUARY 7-11, HARTFORD, CONN. — **OS/VS Job Control Language & Utilities.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 8-9, SAN FRANCISCO — **Integrating Multivendor Voice and Data Networks.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

JANUARY 8-10, CHICAGO — **Corporate Electronic Publishing Systems: A Conference/Showcase.** Contact: Corporate Electronic Publishing Systems, Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

JANUARY 8-10, CARY, N.C. — **SAS Programming for New Computer Users.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 8-10, COLLEGE PARK, MD. — **Designing Interactive Computer Systems: A Software Psychology Workshop.** Contact: Conferences and Institutes Program, The University of Maryland University College, University Blvd. at Adelphi Road, College Park, Md. 20742.

JANUARY 8-10, LOS ANGELES — **Selecting a Local-Area Network.** Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

JANUARY 8-11, NEW YORK — **Vsam.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

JANUARY 9-11, NEW YORK — **Systems Network Architecture: Concepts, Design and Implementation.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Gary St., Santa Ana, Calif. 92705. Also being held Jan. 21-23 in Los Angeles.

JANUARY 9-11, ARLINGTON, VA. — **SAS Macro Language.** Contact: SAS Institute, Inc., Education Division, Box 8000, SAS Circle, Cary, N.C. 27511.

JANUARY 9-11, HARTFORD, CONN. — **Unix C Programming Language Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 9-11, CARY, N.C. — **SAS Applied Time Series Analysis & Forecasting Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 9-11, CHICAGO — **Relational Data Bases.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held Jan. 14-16 in Atlanta.

JANUARY 9-11, WASHINGTON, D.C. — **National Conference on Financial Management Systems for Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

JANUARY 10, SAN FRANCISCO — **T1 Carrier Strategies: The New Networking Imperative.** Contact: Marilyn Chasteen, The DMW Group, 2020 Hogback Road, Ann Arbor, Mich. 48104.

JANUARY 10-11, ARLINGTON, VA. — **SAS Report Writing.** Contact: SAS Institute, Inc., Education Division, Box 8000, SAS Circle, Cary, N.C. 27511.

JANUARY 10-12, HOUSTON — **The Essentials of Productivity Management.** Contact: The Institute of Industrial Engineers, Continuing Education Program Department, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JANUARY 12-13, NEW YORK — **CICS Command-Level Intensive.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 19-20 in New York.

WEEK OF JAN. 13

JANUARY 13-16, NEW YORK — **Annual Convention and National Retailers Business & Equipment Exposition.** Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

JANUARY 13-16, HONOLULU — **Seventh Annual Conference of the Pacific Telecommunications Council.** Contact: Pacific Telecommunications Council '85, Suite 308, 1110 University Ave., Honolulu, Hawaii 96826.

JANUARY 14-15, SAN FRANCISCO — **Taking Charge: New Directions for Data Entry Management.** Contact: Marilyn Bodek, Data Entry Management Association, P.O. Box 16711, Stamford, Conn. 06905.

JANUARY 14-15, HARTFORD, CONN. — **Personal Computers — Hands-on Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 14-16, ST. LOUIS — **DOS/VSE Internals, Debugging & Problem Determination.** Contact: Betty Bruce, Goal Systems Interna-

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tional, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 14-17, ANAHEIM, CALIF. — **Cadcon West '85 Conference & Exposition.** Contact: Morgan-Grampian Expositions Group, Two Park Ave., New York, N.Y. 10016.

JANUARY 14-18, SAN FRANCISCO — **CICS Command-Level Programming.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

JANUARY 14-18, WASHINGTON, D.C. — **Software Engineering and Quality Assurance: A Statistical Approach.** Contact: Dick White, George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

JANUARY 14-18, SAN DIEGO — **Computer Capacity Planning for Sperry 1100 Systems.** Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

JANUARY 15, ARLINGTON HEIGHTS, ILL. — **The Association for Information and Image Management Seminar.** Contact: The Association for Information and Image Management, 821 N. Stratford Road, Arlington Heights, Ill. 60004.

JANUARY 15-16, LAKE BUENA VISTA, FLA. — **Foundation for Growth: Productivity and Quality in Application Development.** Contact: Nolan, Norton & Co., One Forbes Road, Lexington, Mass. 02173.

JANUARY 15-16, CARY, N.C. — **SAS Color Graphics.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 15-16, HARTFORD, CONN. — **OS/VS Operating Systems Concepts.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 15-18, HARTFORD, CONN. — **Computer Systems Fundamentals.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 16, BELLEVUE, WASH. — **Unix for Managers.** Contact: Kathy Howard, Specialized Systems Consultants, P.O. Box 7, Northgate Station, Seattle, Wash. 98125.

JANUARY 16-18, CARY, N.C. — **SAS Processing Course.** Contact: SAS Insitute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 16-18, HARTFORD, CONN. — **Data Base Systems Analysis and Design.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 16-18, HOUSTON — **PC World Exposition.** Contact: Maura Fitzgerald, Sterling Public Relations Group, 222 Third St., Cambridge, Mass. 02142.

JANUARY 16-18, HARTFORD, CONN. — **Electronic Spreadsheets: Lotus 1-2-3, Multiplan and Supercalc.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 16-18, NEW YORK — **Designing Focus Systems.** Contact: Julie Leonard, Advanced Infostructures, Inc., 475 Fifth Ave., New York, N.Y. 10017.

JANUARY 17-18, WASHINGTON, D.C. — **Information Centers.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

JANUARY 17-18, BOSTON — **Dbase: Concepts, Applications and Introduction to Programming.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Gary St., Santa Ana, Calif. 92705.

JANUARY 17-18, HARTFORD, CONN. — **ANS Cobol OS Dump Analysis.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

WEEK OF JAN. 20

JANUARY 21, BOSTON — **How to Document a Computer System.** Contact: Technical Communications Associates, Suite 210, 1250 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JANUARY 21-22, ORLANDO, FLA. — **Vsam OS & DOS Performance & Tuning.** Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 21-23, ATLANTA — **EDP Auditing & Controls.** Contact: Laurie Christie, Training Services, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 21-23, ATLANTA — **Auditing Advanced Computer Systems.** Contact Laurie Christie, Training Services, MIS Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 21-23, FORT LAUDERDALE, FLA. — **Office Information Systems Conference.** Contact: Lynn Bentley, Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

JANUARY 21-23, ATLANTA — **Auditors Role in Systems Development.** Contact: Laurie Christie, Training Services, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

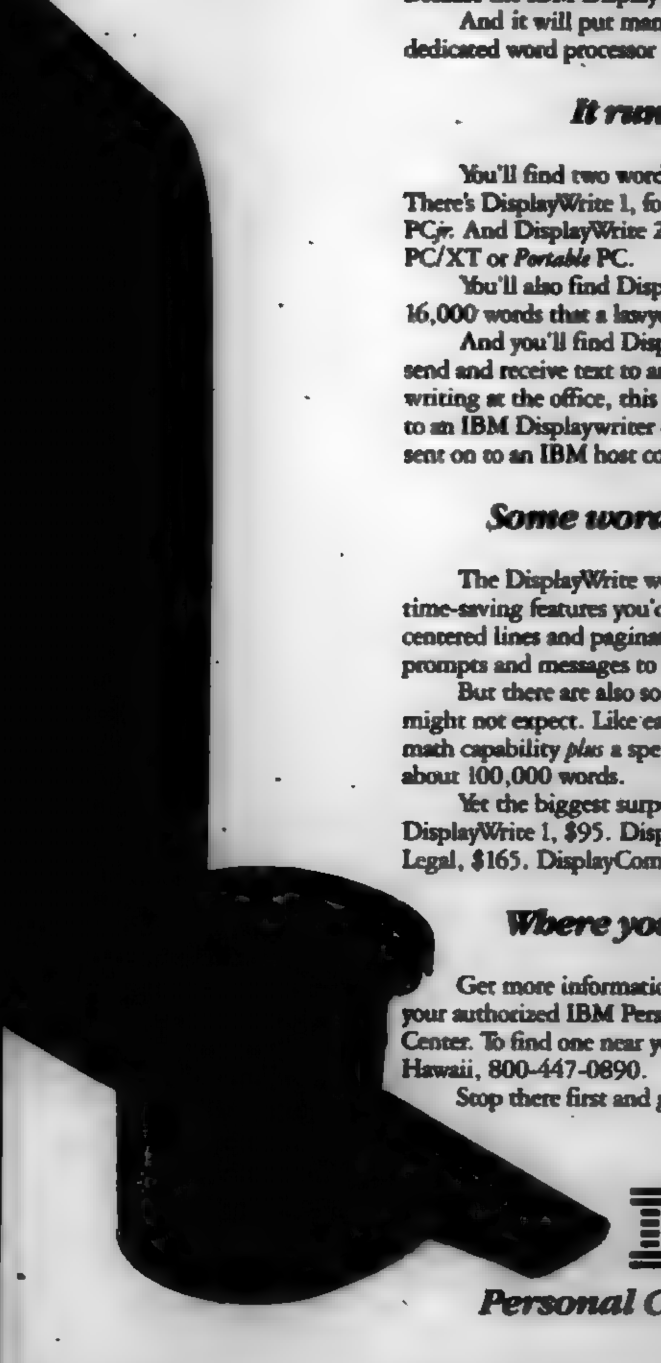
JANUARY 21-24, LOS ANGELES — **CICS Application Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

JANUARY 21-25, DALLAS — **Uniforum: The International Conference of Unix Users.** Contact: Uniforum, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

JANUARY 21-25, HARTFORD, CONN. — **ANS Cobol Programming Workshop** 1. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 21-25, RALEIGH, N.C. — **C Programming Workshop.** Contact: Suzanne Battista, Plum Hall, Inc., One Spruce Ave., Cardiff, N.J. [illegible]

JANUARY 21-25, DENVER — **Computer Basics for Human Service Managers and Practitioners.** Contact: West Virginia University Research and Training Center, Suite E, One Dunbar Plaza, Dunbar, W.V. 25064.



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EDITORIAL

Say good-bye to Hollywood

As the Orwellian year of 1984 speeds to its conclusion, it is interesting to reflect upon the barrage of general media coverage to which we were all subjected 12 months ago.

Countless social critics set about to remind us that Big Brother is alive and well. To many of them, the computer was the manifold expression of Big Brother — all leering, much too all knowing.

Actually, the seeds of distrust of our poor, dumb computing machines have been sown in the gardens of the masses for years. Ask any number of people for the greatest symbol of evil in Stanley Kubrick's 1968 classic *2001*, and most will answer HAL, the nefarious system that conspired to kill the astronauts.

But that was 16 years ago, and even the general public now knows a computer only does what it's told, right? So then, what accounts for the box office success of last year's movie 'classic' *War Games*, in which a mainframe called Wopr (as in whopper) — even more dangerous than HAL — was triggered by a phone call into a rampage that nearly precipitated a thermonuclear war. Now that's entertainment. But the admonitions of the social critics generally focused on more serious topics and abuses, namely the great threats to our cherished constitutional rights of privacy posed by the mass computerization of personal records that begin at the moment of birth of every native-born American. In this sense, too, the public has been fed a lot of conflicting information from the general media.

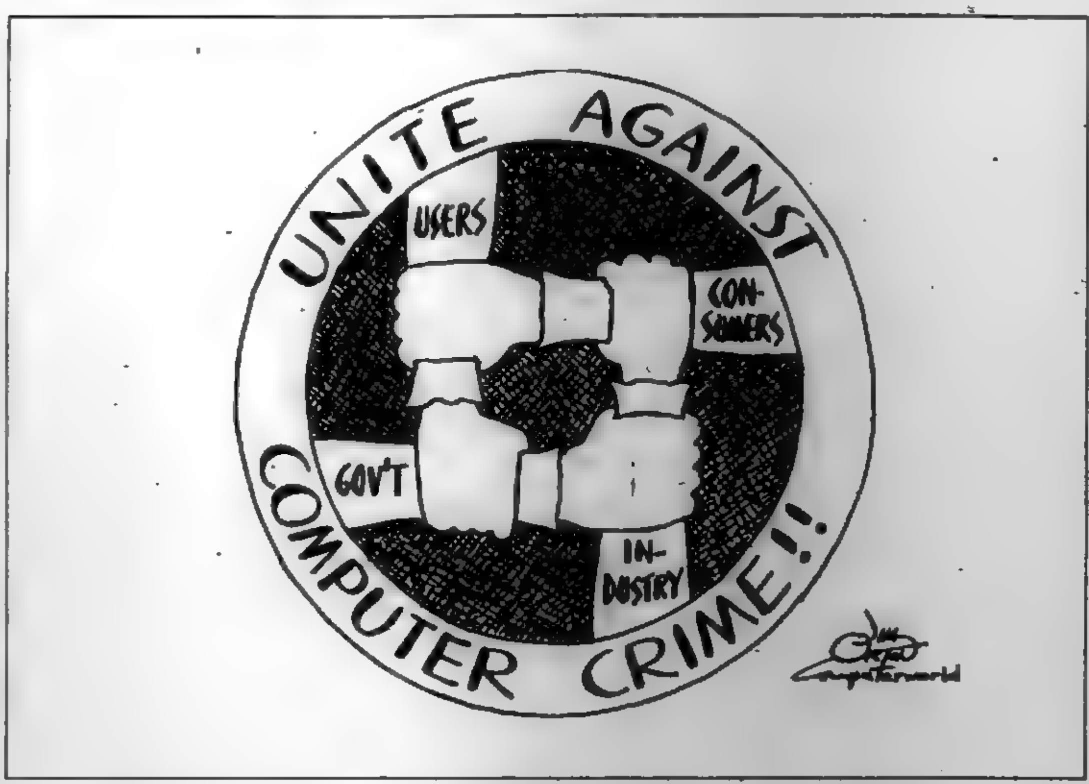
For example, most taxpayers want the government to spend their tax dollars prudently, and that includes dispensing transfer or welfare payments only to those entitled by law to get them. In the past 10 years, mass computerization and computerized cross-matching of various personnel employment records by the U.S. Department of Health and Human Services has enabled the government to cut welfare fraud by as much as 75% by some estimates and has likely greatly curtailed the temptation to defraud.

The same can be said for the computerization of criminal investigations. Early last month, a simple computer cross check of Connecticut drivers' license files by Massachusetts State Police enabled Federal Bureau of Investigation agents to locate and arrest a group of long-wanted, suspected terrorists in Ohio [CW, Nov. 26]. Indeed, the modern day embodiment of Big Brother is ubiquitous, just as Orwell said. But that doesn't necessarily spell trouble, except to those who look for it.

The point here is that, while the price of our civil liberties is eternal vigilance, the track record of mass computerization of personal records has, to this point, been pretty good.

It can be argued that there were a lot more abuses of civil rights by government agencies in the 1960s — abuses not aided by mass computerization — when various government bureaus sought information every which way but loose on suspected subversives, including civil rights and antiwar activists. Those governmental abuses gave birth to the Freedom of Information Act, whereby Americans are entitled to be told most information the government has on them, computerized or not.

Computerworld, and certainly the media at large, will continue to scrutinize carefully the evolution of mass computerization within the government, with a watchful eye toward whether they are building adequate security against abuse into their systems. In the meantime, we'd all do well to take a lesson from recent history, Hollywood notwithstanding.



LETTER

Kudos for Cobol-80

How wonderful to finally see comments of those who have had actual experience with the new Cobol-80 language as reported in "DEC users get head start implementing Cobol-80" [CW, Nov. 19]. After years of persistent criticism and fears of Cobol-80's negative impact overshadowing its positive impact, we can begin to understand the frustrations of many in the international Cobol community (particularly outside the U.S.) over the delayed new Cobol language.

It is clear that the data processing community has been denied this productivity-improving Cobol-80 language for too long. It is time to expeditiously finish all procedural matters required to release the official new American National Standard Cobol language and to pay attention to the new advances in the Cobol language that are waiting in the wings. These advances of which I speak are not futuristic Cobol features that are solving hypothetical problems of tomorrow; they are features that have been under consideration for some years and solve problems we have today.

Few things in this world are perfect. Cobol-80 is no exception (nor is any programming language that I know of). Even with its imperfections, however, Cobol-80 represents a vast improvement over previous versions of Cobol.

Jerome Garfunkel
Litchfield, Conn.

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VIEWPOINT

Striking DP hardware/budget balance a delicate task

THE DATA CENTER
John P. Murray

How much information processing hardware is the right amount for a given installation? There is no one correct answer, of course. But, there is a method we can use to develop a rational discussion about the issue with senior management.

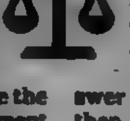
Sooner or later, the issue of too much or too little information processing hardware will arise. Too much hardware represents excessive expense; too little may raise questions about a perceived failure to use information processing technology agressively.

The best approach is to alert senior management to the expense associated with information processing hardware before the subject becomes a critical issue. The appropriate expense for an organization is an issue relative to the expectations of senior management regarding the goal of the information processing function.

Criteria must be developed to determine the correct balance between information processing hardware capacity and expense. One method is to determine what level of overall information processing service senior management considers appropriate. When that has been determined, a plan should be developed that will deliver that level of service.

The approach sounds very straightforward, and it is, which may be the reason why it is not used more often. It may also be the case that although senior management members agree, they do not fully comprehend the implications of the proposed plan.

How then, might the process work?



The first step is to consider the various components that will determine the level of service the information processing department offers to the client community. Some of those components might include adherence to the data center schedule for production of reports, agreement to process all incoming orders within a given amount of time, maintaining a certain level of processing network availability and providing a selected maximum CRT response time across the network.

An additional consideration might be guaranteeing a certain level of systems and programming test terms within a given period of time. Ultimately, this will determine the amount of progress made toward enhancing existing systems or developing new ones.

Perceived needs of organization

The list of potential components can encompass a number of items, depending upon the perceived needs of a particular organization. The mix will be different in every organization, based upon senior management's view of the mission of the information processing department.

The issue of the right amount of hardware to install can be reduced to a question that asks, "What do you want to do; what do you want to pay?" Conversely, the question might be rephrased as, "How much pain are you willing to endure?"

If the information processing department can obtain an answer to the above question, it should then become possible to provide the right amount of hardware.

Yet, even though it seems straightforward, the issue is not quite that simple. To come to some reasonable position, the potential for growth of demand must be taken into consideration.

Pain-sharing exercise

This can be viewed as a pain-sharing exercise between information processing and the rest of the organization. The trick is to judge the growth in the processing demand accurately so that neither the pain of the expense nor the reduced levels of service as the hardware reaches its saturation point are excessive.

This is, of course, a very difficult proposition, particularly if the time span is several years. It is not easy to foresee the items to accommodate; any radical change in the needs of the organization will have a negative impact on the hardware configuration.

An unanticipated increase in the work load will decrease the service level from information processing, indicating that too little hardware is in place. Conversely, a decrease in the anticipated work load may lead to an improvement in the service level response time, but the expense associated with the service level, in terms of too much hardware, may then become an issue.

The concern here is not only with appropriate planning but also with coming to an agreement about the correlation between information processing hardware, the overall information processing service level and the acceptance of the associated expense.

The results will never be perfect, but improvements can be made that may help forestall the difficulty that arises from too much or too little information processing hardware.

The eventual course may be somewhat smoother if information processing staff and senior management can understand and agree on the issues prior to expending funds on hardware or raising clients' expectations relative to their service level.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Electronic data systems: Public service or federal crime?

HUMAN CONNECTION
Jack Stone

If you want to get your Monday morning juices flowing in a hurry, run through this scenario: A few minutes after your arrival for another tranquil week at the computer center, there is some heavy-handed knocking at the machine room door. You casually mosey over to open it, thinking that the visitor is one of the more irascible users who is missing some output.

What you find instead is a cadre of heavily armed, highly intimidating police whose spokesman flashes a legal looking document past you and loudly proclaims, 'We have a complaint against this business that alleges that it is using computing and communications equipment in the commission of a felony. This is a search warrant that entitles us to enter your premises and confiscate any and all equipment which may be involved in this illegal act. We demand that you shut down power immediately, and show us where the loading ramp is so that we can back up our trucks and haul off your system.'

Impossible, you say? I'm not so sure, particularly in light of what happened to one Tom Tcimpidis of Los Angeles. If you haven't heard about the case, let me brief you on it.

This man is one of hundreds of electronic bulletin board operators who run an informal network for the communication of electronic mail over personal computer systems, something loosely akin to what ham operators do in the amateur radio arena.

Earlier this year, Tcimpidis' home was invaded by Los Angeles police armed with a felony search warrant who preemptively removed some equipment (later returned) after a complaint was issued against him. The complaint alleged that he was involved in the distribution of illegally obtained private information — namely telephone credit card numbers and network access codes — through his system. He later stated that he was unaware that such information was present.

> *The basic issue in the case, one that raises interesting questions for all computer centers that support public data systems is this: To what extent is the system operator responsible for the monitoring and control of the data that flows through the system?*

The basic issue in the case, one that raises interesting questions for all computer centers that support public data systems is this: To what extent is the system operator responsible for the monitoring and control of the data that flows through the system?

One side of the issue is the fact that the system operator is performing a community service (operators typically charge the public little or nothing to sign up, as long as the telephone charges are prepaid). The service is similar to that of a bulletin board at a college social center, and the operator has no control over what the users post. On the other side, one can view the system operator as an information publisher and disseminator, operating under legal constraints, and responsible for ensuring the legality, as well as the accuracy, of data.

I can't help wondering — and perhaps you should as well — to what extent computer centers are vulnerable to such complaints and about the prospect of having a mainframe shipped out the back door while the system manager watches helplessly.

Now I grant that there was a special factor in the Tcimpidis case that encouraged the police to act; the complaint was made by a billion dollar organization (Pacific Telephone company) and the defendant-to-be was a private consultant with few resources to fight back. But there has been a considerable amount of publicity attached to the case that has extended well beyond the computer community and may easily encourage legal action in any issue pertaining to the validity, sanctity and/or legality of records in public data system files.

After all, these days there are powerful activist organizations in the consumer, industrial and government sectors who are willing to take legal action against anyone or any company if they believe their cause is just.

And one case of an ill-begotten charge code number or a substantive error in a credit rating or the release of private information without authorization may be just the spark that sets one of them off crying "Felony!" or "Libel!" or "Invasion of privacy!", with the resulting possibility of equipment confiscation. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Academia must study benefits, costs of high-tech gifts

READER'S PLATFORM
Fritz H. Grupe

The pull of technology has brought many colleges and universities into the computer age. Institutions of higher education are keenly aware that their status as a "computing power" affects, among other things, their ability to attract and retain students and faculty, their capability for managing their resources and their standing in the public mind as an up-to-date place to study.

Grupe is the coordinator for Campus Computing Services at the University of Nevada Reno.

It is not surprising, then, that colleges are aggressive in their pursuit of corporate gifts of computing equipment.

Many high-technology corporations have responded with gifts of equipment and money to support research and teaching. Indeed, many corporate contribution programs have been initiated by the corporations to foster growth in specific developmental areas. Without these gifts, higher education would be much poorer.

Corporations clearly benefit from donations such as these. At times, saleable products are realized that boost sales. Donations in support of research are recognized with federal and state tax credits that are sometimes in excess of the dollar value involved.

Association with a local university beneficially affects the corporation's image. Students who learn on particular brands of computers can establish a brand loyalty that stays with them when they become purchasers of computer equipment in the commercial world. Maintenance contracts will also benefit the donor.

University personnel, tantalized by the very visible support provided by computer companies, look for donated support whenever they can. They must meet the growing demands of students within the constraints of their university's budget.

Despite the symbiotic relationships at play, some issues need to be considered by university and industrial personnel alike.

■ Equity. A major question for the public schools is whether more affluent districts, able to afford large numbers of microcomputers, are providing a better education for their students than is possible for less wealthy districts.

Faculty in less prestigious institutions watch with envy as some universities and colleges that are already exceptionally well supported receive added equipment and gifts.

Breaking the cycle

And these faculty members know they are in a cycle in which poor equipment and facilities make attracting and developing faculty difficult. In turn, students with an interest in computing look elsewhere for an education. How does the cycle get broken?

■ Maintenance and support. Many institutions that find themselves caught in the pressures of a less than booming economy accept whatever computer equipment they can from any source they can obtain it from in the expectation that the equipment will strengthen their educational program. Often it does.

However, administrators and faculty not familiar with such equipment too often overlook the costs implicit in such gifts. They underestimate the maintenance costs that are incurred. They forget to ask about staffing requirements, about facilities that need modification, about power requirements and about additional furnishings needed to make a system fully functional. They may not have the knowledge that enables them to decide whether the equipment really advances them toward their goals.

■ Obsolescence. "Never look a gift horse in the mouth," it is said. But it would be a foolish recipient who accepts and attempts to put into use every computer offered him.

When the school's own money is involved, intricate bidding procedures are usually in place to force the school to determine which bid brings the best product. This is not necessarily so when gifts are involved.

■ Product delivery. Applied research projects have had a continuing, yet uneasy, presence on campus. The "contribution" of equipment with the hook that a deliverable, marketable product is forthcoming bears review. To what extent does the development of marketable products reinforce or detract from the educational goals of the institution? What happens to colleges for which teaching, not research, is of primary importance? Are they locked out again?

The issues noted above are not cited as reasons to forgo the real capacity for industry to aid in research and education on college campuses. However, gift giving and gift receiving are things that require thought and a clear sense of values. An effort needs to be made to assist all colleges and universities to acquire satisfactory instructional computing facilities. ‡

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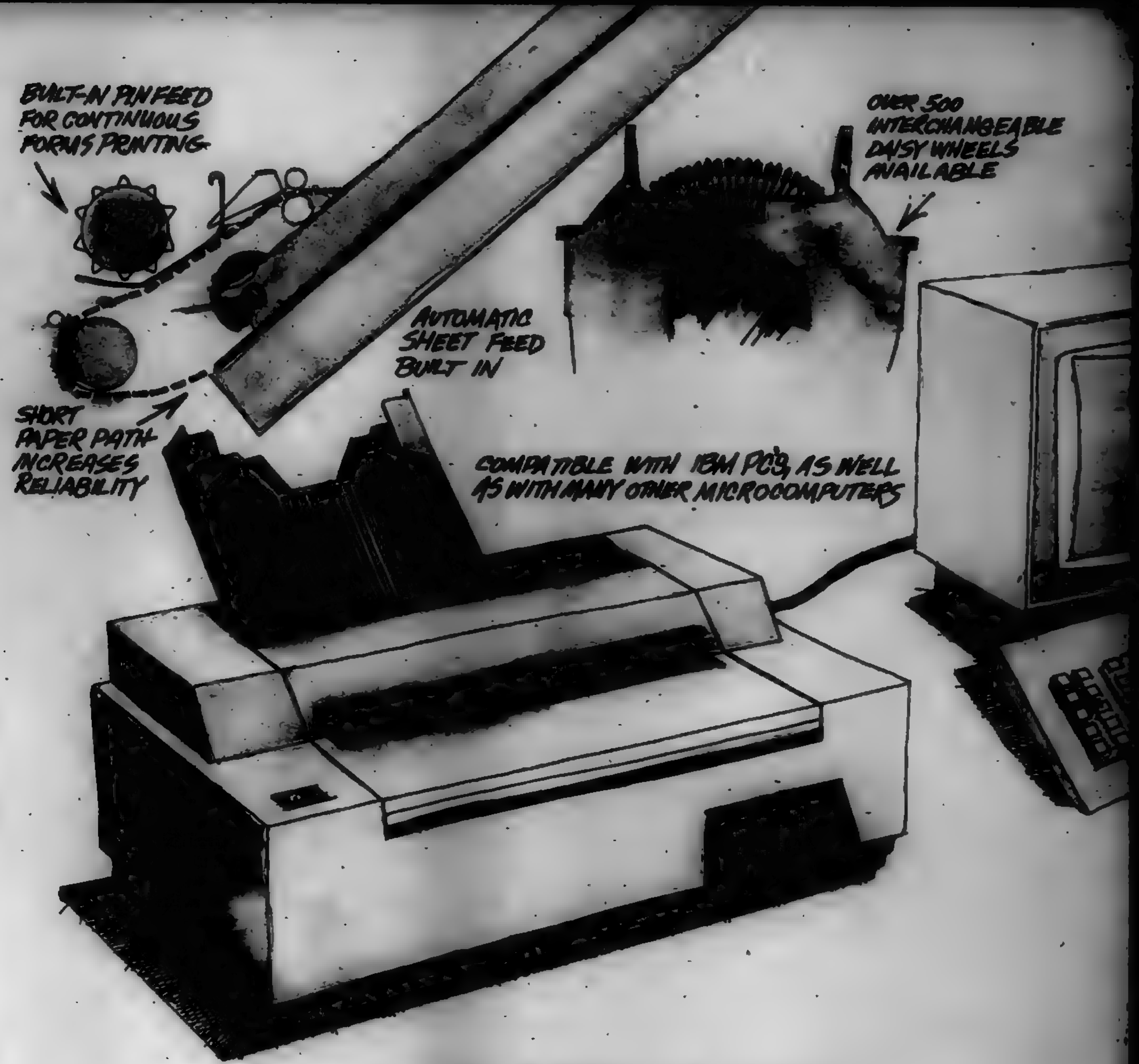
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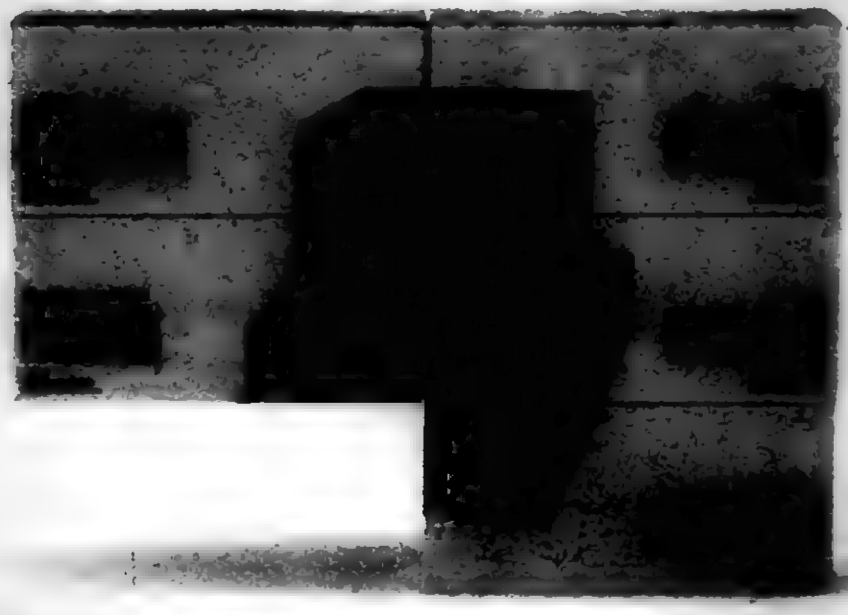

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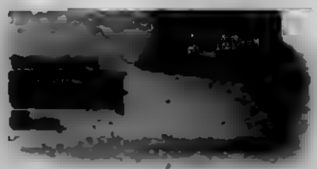

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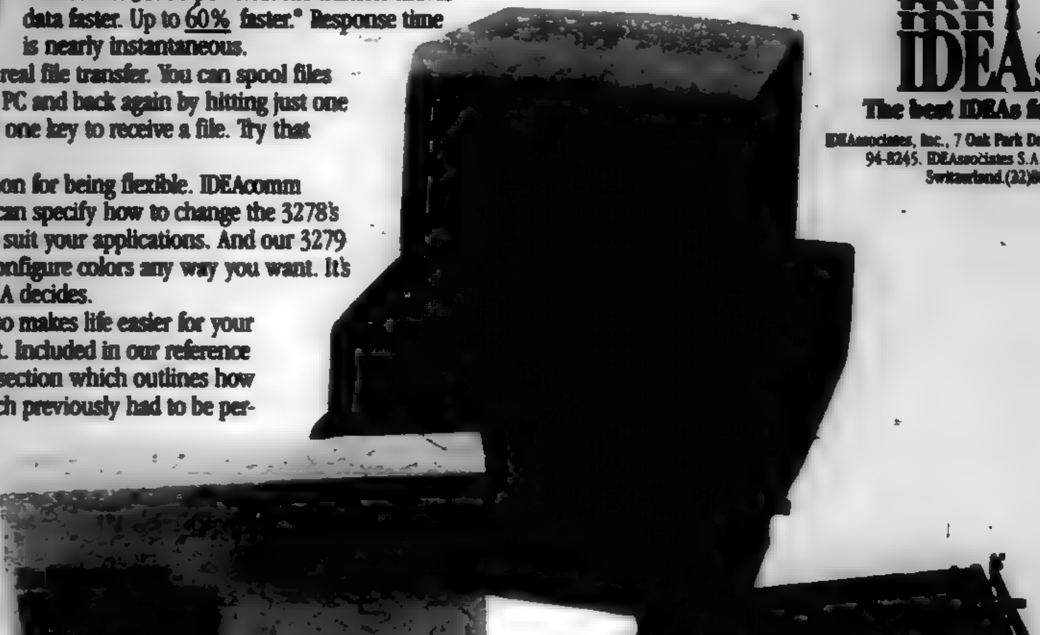

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SOFTWARE & SERVICES

Joint venture benefits user

Working with vendor yields better packages

By Paul Gillin
CW Staff

SAN DIEGO — There is an alternative, though little used, to the "make or buy" decision on applications software. One can develop the package in concert with the vendor, exchanging functional expertise with the vendor's technical knowledge.

Milnes (l) and Sherck

CW photo by P. Gillin

That option has worked well for CTS Corp., a diversified manufacturing firm based in Elkhart, Ind. CTS is now installing seven copies of a materials requirements planning (MRP) software package on IBM System/38 computers, each serving a different division of the corporation.

According to Mike Sherck, a programmer/analyst, and Kent Milnes, MIS manager, the experience was not without difficulties, but it did result in an MRP system that fit CTS's needs more closely than one purchased off the shelf. Sherck and Milnes were interviewed at the recent Fall User Conference sponsored by Professional Computer Resources (PCR) of Oak Brook, Ill.

The scarcity of native-code MRP systems for the System/38 prompted CTS to approach PCR, which develops native System/38 software. PCR was thinking about getting into manufacturing, and the combination of the two companies' skills seemed to be a good fit, Milnes said.

The companies were especially careful in drawing up the sales contract, Sherck said. "It was developed in large part in parallel with the design," he said. "We went through requirements definition, functional design and detailed design and signed the contract after the functional design."

The contract provides for CTS to re-

See PCR page 86

Subschema key in proper use of DBMS

Basic rules maintain independence of data

First of a two-part article

By Mike Ruggera
Special to CW

The worst thing that can happen to a data base management system (DBMS) is to use it as a file access method instead of as a data base. That this happens at all is primarily due to the data base specialist, who is concerned with arranging the data elements in a fashion that reflects the physical world but with reasonable processing efficiency.

He must concentrate on the physical representation of the data, on navigation through the data base segments and on keeping track of the currency of the data at each level in the data base.

On the other hand, the production programmer is concerned with accessing the data elements he needs in an order appropriate for his program. The vehicle to bridge the connection between the data base's physical structure and the programmer's data element needs is the subschema.

The following three basic rules can help provide data independence between data bases and the programs that use them:

- Avoid data base navigation; instead, let the subschema perform any navigation required, and let the programmer work with a flat file representation of the data.
- In record searches, express all search arguments and their keys. Let the DBMS, through the subschema, decide if there are indexes and segment keys that can be used to make the search more efficient.
- Use a DBMS to implement major systems consisting of subsystems; each subsystem has its own subschemas that refer-

See DATA page 80

Ruggera is a DP management consultant based in Fords, N.J.

■ CGA Software Products Group, Inc.'s Top Secret security software is now available in the Cullinet Software, Inc. IDMS environment/66

■ An intelligent link between micro spreadsheets and DEC VAX computers has been introduced by Ross Systems, Inc./66

■ Artificial Intelligence Corp. has announced two new implementations of its Intellect query language/67

■ A change control system for software development projects is now available to Digital Equipment Corp. VAX users/67

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IBM offers ISPF for SSX/VSE, enhances VM system version

WHITE PLAINS, N.Y. — IBM has extended the functionality and widened the operating range of its Interactive Systems Productivity Facility (ISPF) with the announcement of an enhanced version of ISPF for the VM operating system and the introduction of an ISPF version for its SSX/VSE operating system.

According to a spokesman, both IBM's base ISPF system and the ISPF/Program Development Facility (PDF) are now available for use with SSX/VSE. In addition, Version 2, Release 1 of ISPF for VM/SP environments was released with what IBM labeled as significant function and usability enhancements in the dialogue management facilities.

The announcements, in conjunction with the release of ISPF for MVS earlier this year, mean that an application developed under ISPF can now be run under any of the three main IBM operating systems in use today — MVS, VM or VSE.

The availability of ISPF for SSX/VSE is said to provide complete cross-system capability for the dialogue manager function of ISPF, which provides control and services to support the processing of interactive applications (dialogues) in different

See ISPF page 86

MVS/VS1 Users

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CGA extends Top Secret package to Cullinet systems

HOLMDEL, N.J. — CGA Software Products Group, Inc. has announced that its Top Secret security software for IBM mainframes has been extended to provide protection for Cullinet Software, Inc. IDMS/DC and IDMS/CICS environments.

According to a spokesman, no modifications to IDMS will be required to install support for the security software. Top Secret IDMS will reportedly operate on any release of IDMS 10.0 and above. All users must identify themselves to the Top Secret security system through a user sign-on.

The IDMS version offers all of the security software's password features, including password masking, minimum password length, suppression of vowels, random generation of passwords, no password option, automatic password expiration and automatic suspension threshold.

The spokesman said IDMS terminal security will include distributed administration, auditor, time-of-day protection, day-of-week restrictions, facilities and source limitations. Users may be specifically excluded from certain IDMS transactions.

All Top Secret on-line administration commands are available in IDMS/DC or CICS region to provide on-line security control and maintenance capabilities on either a centralized or decentralized basis.

The extended version of Top Secret for IDMS is scheduled for release in the second quarter of next year. It will be available on a lease basis with a starting price of $10,900.

CGA Software Products Group is located at 960 Holmdel Road, Holmdel, N.J. 07733.

Ross offers micro link to VAX-11

PALO ALTO, Calif. — Ross Systems, Inc. has introduced an intelligent bridge between microcomputer spreadsheets and Digital Equipment Corp. VAX-11 superminicomputers.

According to a spokesman, Maps/Microlink allows micro-based spreadsheets, such as Lotus Development Corp.'s 1-2-3, to share data with Ross Systems' accounting and decision support applications residing on a VAX-11 supermini.

The bridge is designed to integrate with Maps/Model and Maps/General Ledger (GL), the company's general ledger and financial software.

By using a single command, financial managers reportedly can transfer data from the micro to the applications on the VAX-11. Maps/Microlink allows 1-2-3 spreadsheets to be collected and consolidated in conjunction with Maps/Model, the company's VAX-11-based financial modeling software. In addition, the bridge software provides a direct 1-2-3 data transfer to and from Maps/GL.

Communications modules within the product run independently on the IBM Personal Computer and the VAX-11 to provide error-free, two-way communications between the computers. Maps/Microlink is priced at $10,000.

Ross Systems can be reached at Suite 210, 1860 Embarcadero Road, Palo Alto, Calif. 94303.

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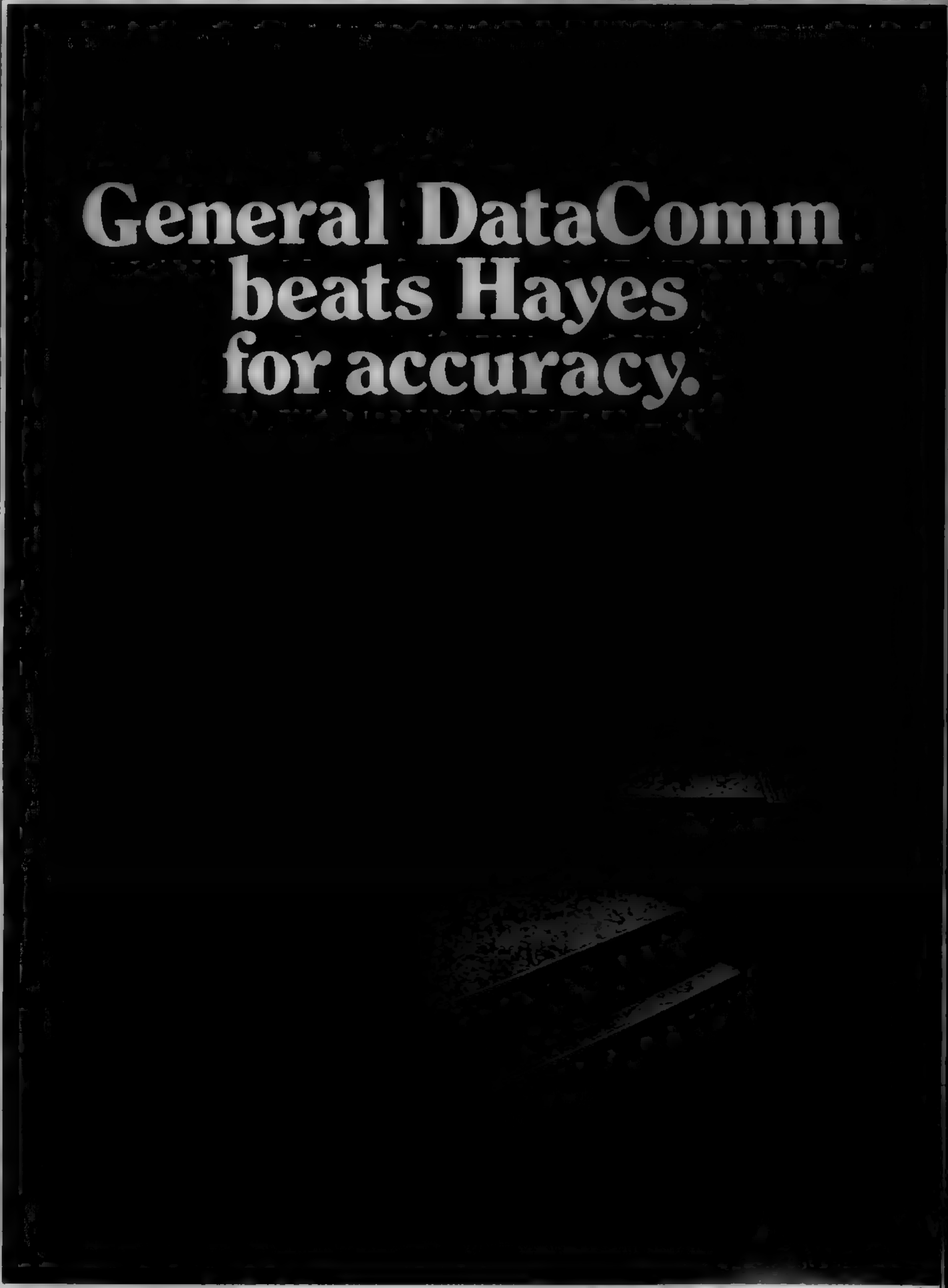

Aide-De-Camp available for DEC's VMS

CONCORD, Mass. — Software Maintenance and Development Systems, Inc. (SMDS) has announced that its Aide-De-Camp (ADC) change control and information management system is available for Digital Equipment Corp.'s VMS operating system.

According to a spokesman, the product, which was formerly available only for the AT&T Unix operating system, helps manage software development projects by maintaining software sources and changes to the software in a data base. ADC can manage software written in any language, the spokesman said.

Changes are treated as logical units that can be added to or subtracted from a named base version. New versions can serve as base versions for future developments, the vendor said.

ADC can maintain any number of versions or changes to a project, and a single ADC data base contains all versions of the software being developed along with significant information about the software.

Information includes named entities, code, changes, versions and external documentation and can be accessed on-line or through reports, according to the vendor.

Single-site licenses for ADC start at $5,000. More information is available from SMDS, P.O. Box 555, Concord, Mass. 01742.

Intellect versions introduced

WALTHAM, Mass. — Artificial Intelligence Corp. has introduced two new versions of Intellect, its natural language query system for IBM mainframes.

Intellect/SX reportedly allows nontechnical users to create data dictionaries for building a data base. It is said to offer the same natural language capabilities as Artificial Intelligence's Intellect product and to use AI capabilities to retrieve data from IBM mainframe data bases.

Intellect Focus reportedly consists of Intellect, for data retrieval using conversational English, and Information Builders, Inc.'s Focus, a fourth-generation language and data base management system that includes presentation graphics, report formatting, statistical analysis and financial modeling capabilities.

Intellect/SX and Intellect Focus are each priced at $30,000 and run on the IBM 30 series, 4300 series and 370 series mainframes.

Artificial Intelligence is located at 100 Fifth Ave., Waltham, Mass. 02254.

SYSTEMS SOFTWARE

APPLIED INFORMATION DEVELOPMENT, INC.

JCLWTR Release 3.0

Applied Information Development, Inc. has introduced Release 3.0 of its JCLWTR software package, which is said to include enhancements that improve its on-line search capabilities and eliminate the product's dependence on catalog operation.

JCLWTR manages the storage and retrieval of system output listings from production jobs so that there is no need to print them, according to the vendor. The software is said to also scan the output to identify errors and abnormal endings so the operation staff does not have to review each job.

Release 3.0 of JCLWTR is

See SOFTWARE page 68

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SOFTWARE from page 67

said to enhance the IBM TSO/SPF interface, including data selection in the search for system outputs, new Help and tutorial screens, logic-to-bypass screens when needed and enhanced error analysis routines. It also provides the capability to bypass catalog operations, making it compatible with installations that use IBM's integrated catalog facility, the vendor said.

JCLWTR, priced at $12,000, operates on IBM MVS operating systems. Release 3.0 is available to current JCLWTR license holders under the vendor's extended warranty agreement.

Applied Information Development, 823 Commerce Drive, Oak Brook, Ill. 60521.

CGA SOFTWARE PRODUCTS GROUP, INC.

Version 7.5, Single Image Software

CGA Software Products Group, Inc. has announced Version 7.5 of its Single Image Software (SIS) for IBM OS installations.

According to a spokesman, the SIS software features three multiple systems products that enable multi-CPU users to run their operations without the problems of reserve lockouts, lack of data integrity, accidental tape erasures or multiple console management. The software is designed to simplify operations and increase productivity by adding a series of SIS options that automate various tasks.

Enhancements to SIS include an Automatic Requeue feature. When two jobs require the same data set, SIS prevents simultaneous access and loss of data integrity. The option automatically requeues the waiting job until the conflict is resolved and then resubmits the job without operator intervention. For tape management, Version 7.5 features an Automatic Reply option. If all tape and mountable disk devices are in use, the option will either cancel the waiting job automatically or keep it waiting, depending on site standards and the nature of the job.

Also added is the Shorthand Commands feature, which simplifies the operator command entry to reduce the chance of error, the vendor said. Version 7.5 of the SIS software is priced between $9,000 and $15,000.

CGA Software Products Group, 960 Holmdel Road, Holmdel, N.J. 07733.

IBM

Personal Banking Machine Availability Management-Batch Reporting system

IBM has announced the Personal Banking Machine Availability Management-Batch Reporting (PBMAM-BR) software system, designed to help banks and other financial institutions monitor the performance of IBM 4730 networks and identify potential problems with a specific 4730 for corrective action.

According to a spokesman, the system gathers data about each 4730 terminal and creates two types of reports: network and transaction. Network reports list all the 4730s in a network along with data to help financial institutions compare the performance of each terminal with the others in the network. Workstation reports provide detailed information about the performance of a specific terminal, the vendor said.

The PBMAM-BR system runs in batch mode under IBM's VSE or OS/VS and creates reports by processing 4730 events and command responses collected by the 4730 Personal Banking Machine Network Monitor. PBMAM-BR is available for a one-time charge of $14,000 and a monthly charge of $930.

IBM, Information Systems Group, National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

ADVANCED TECHNOLOGY INTERNATIONAL, INC.

Maple; Super PDL

Advanced Technology International, Inc., a subsidiary of Advanced Technology Ltd. of Israel, has announced that it will begin marketing two software products in the U.S. for IBM and Digital Equipment Corp. systems.

Maple is a protocol that is said to link IBM mainframes with IBM Personal Computers or compatible systems. Maple is said to be open-ended on both the mainframe and personal computer sides. The end user is shielded from viewing IBM CICS screens, the vendor said.

Prices are $15,000 for IBM OS or DOS versions for each mainframe and range between $650 and $950 for the Personal Computer.

Super PDL is an interactive design program for DEC's VAX minicomputers under the VMS operating system that is said to feature a structured design language, design analysis facility and full documentation capability.

Super PDL is priced at $15,000 per DEC VAX.

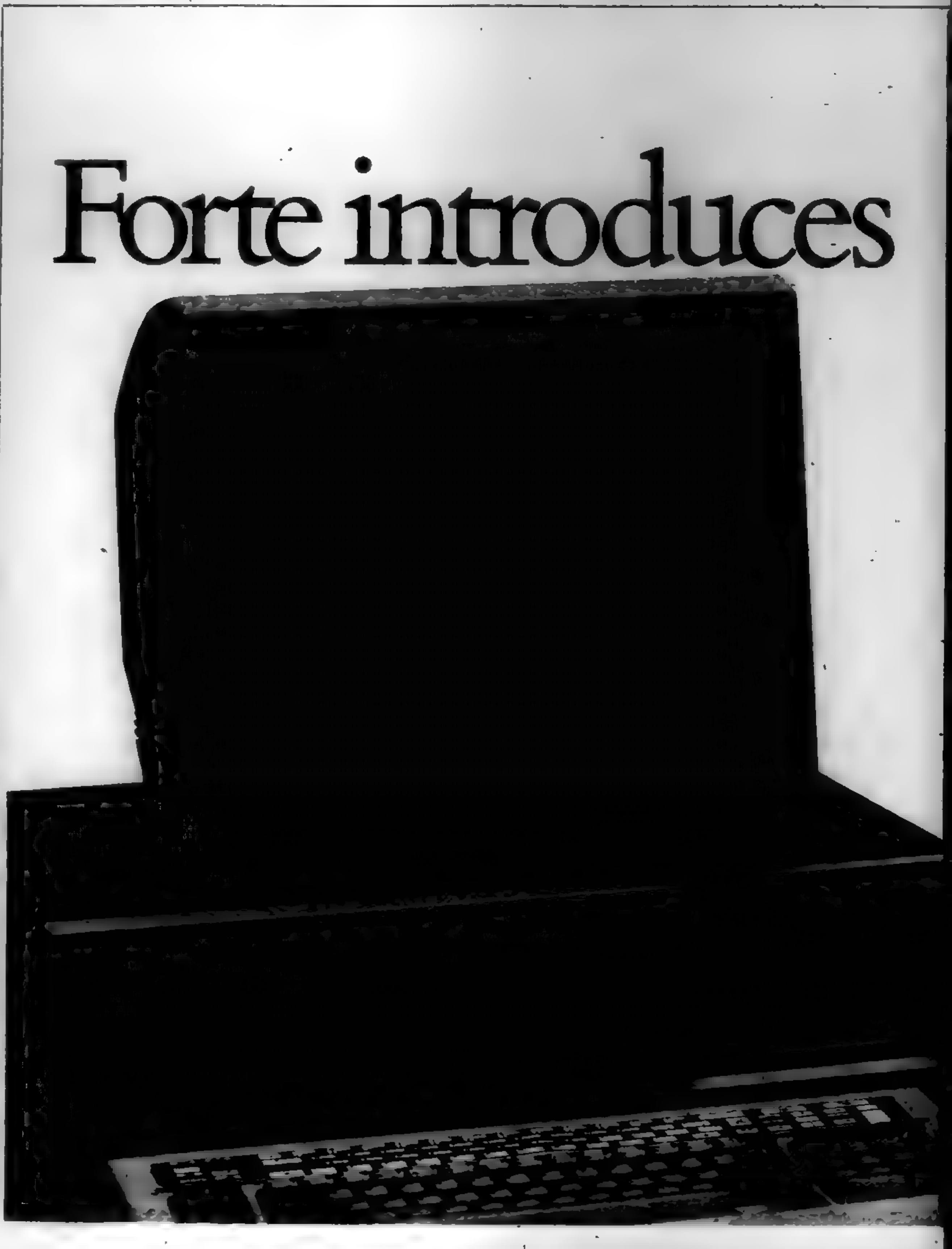
Advanced Technology International, 135 W. 41st St., New York, N.Y. 10036.

THE SYSTEMS CENTER

Network Datamover MVS Release 3.0

The Systems Center has announced Release 3.0 of its Network Datamover MVS, a network application designed to distribute applications, corporate data and documents. The distribution is carried out between an IBM mainframe under MVS and a microcomputer, between two mainframes and between a mainframe and a minicomputer.

The release features checkpoint restart for data transmission and mainframe support for LU2-type connections, including cluster controllers, IBM 3270 data stream and coaxi-



SOFTWARE & SERVICES

al connections.

The datastream support on Network Datamover is said to allow mainframes to accommodate coaxial cluster controller connections.

Network Datamover MVS Release 3.0 will be available Jan. 1 and costs $30,000 for the first CPU at a site and $20,000 per additional CPU.

Systems Center, 2988 Campus Drive, San Mateo, Calif. 94403.

INTERACTIVE SOFTWARE SYSTEMS, INC.
ADT-Reportwriter

Interactive Software Systems, Inc. has introduced an interactive report generator for use on Digital Equipment Corp. VAX-11 superminicomputers.

According to the company, ADT-Reportwriter uses a Menu/Help approach at every level and uses its own data dictionary.

It reportedly provides users with single or multiple input data files, data record selection, new field calculation, multilevel breaks, subtotals and report totals.

Licenses for the ADT-Reportwriter range from $1,250 to $5,000, depending on system configuration, according to the vendor.

Interactive Software Systems, P.O. Box 27466, Denver, Colo. 80227.

FORTH, INC.
Polyforth/32

Forth, Inc. announced its Polyforth/32 operating system, designed for use with Motorola, Inc. 68000 CPUs and Mizar, Inc.'s Mizar 9000 computer.

The multitasking, multiuser operating system has no limit on users' partition size or number of users, the vendor said. Up to 2G bytes of memory and 2G bytes of disk may be directly accessed.

The Polyforth/32 system features more than 100K bytes of available user program space in the 128K-byte configuration, according to the vendor.

The operating system, Forth compiler, 68K-byte assembler, editor and programming aids are all resident in 16K bytes without overlays, the vendor said.

The Forth nucleus is delivered in programmable read-only memory, with source, electives and utilities on disk.

The price for a single license is [illegible].

Forth, 2309 Pacific Coast Highway, Hermosa Beach, Calif. 90254.

SIGNAL TECHNOLOGY, INC.
Pacs Plus

Signal Technology, Inc. has introduced a process accounting and charge-back system for Digital Equipment Corp. VAX-11 machines using the VMS operating system.

According to the company, Pacs Plus tracks hardware and software use and includes a data management interface that can be used to access a mini data base of system resources information. The system reportedly allows a user to edit, retrieve and examine system resources data via on-screen forms and simple keypad commands. It is said to include a general report writer that allows multilevel reporting on all system resources. There are up to 30 system variables, including node, account, project, user session and image, the company said.

Base price of the system is $3,900.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

INFORMATION SYSTEMS CONSULTANTS, INC.
Soloman Release 3.1; MRS

Information Systems Consultants, Inc. has announced Release 3.1 of its Source and Object Library On-Line Manager (Soloman) for use on large-scale Honeywell, Inc. computer systems that use both Honeywell's Gcos III and/or Gcos 8 operating systems.

The release provides functions such as automatic regeneration of transaction processing routine (TPR) libraries when an individual TPR is changed; recompilation of programs to include new versions of copy libraries; interfaces to other systems, especially those used with Honeywell Manufacturing System software; and on-line Help and manual facilities.

The company also released an update for the Soloman Management Reporting System (MRS). MRS provides reporting functions for DP auditors, managers and operations staff on the status of each production file resident in the library. The user can create reports with different contents depending upon selection criteria specified.

The price of Soloman Release 3.1 is $10,000, and the price of MRS is [illegible].

Information Systems Consultants, 7816 N. 19th Ave., Phoenix, Ariz. [illegible]

PRODUCTIVITY AIDS

SCHONFELD & ASSOCIATES, INC.
Ingot

Schonfeld & Associates, Inc. has announced Version 3.0 of its Ingot fourth-generation language and decision support system. Ingot runs on Data General Corp.'s MV series computers under DG's AOS/VS; Digital Equipment Corp.'s VAX-11 machines under DEC's VMS; any Apollo Computer, Inc. computer that runs under Apollo's Aegis or AT&T's Unix operating systems; any Prime Computer, Inc. machine under Prime's Primos; Hewlett-Packard Co.'s HP 9000 series under AT&T's Unix; and Tandem Computer, Inc.'s Nonstop machines running under Tandem's B00 operating system.

The package uses English commands for calendar management. All

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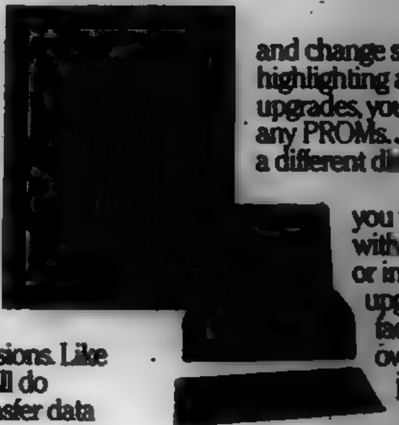
the smarter ~~desk~~ disk



You've read about the IBM® 3270 PC. Now there's a technology that gives your existing PCs and compatibles IBM 3270 PC emulation. And more.

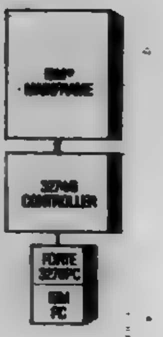
You can run all this concurrently: an IBM DOS session, mainframe sessions with four different hosts, and two note-pad sessions. Like IBM's machine, your PCs will do windows. You can even transfer data between windows. Save your work on diskettes. Then upload to the mainframe.

Unlike IBM's system, the Forte 3270PC™ emulator is entirely soft-loaded from diskette. With high-powered, menu-driven software. You can reconfigure the keyboard and change screen colors or highlighting at will. For upgrades, you don't replace any PROMs. Just plunk in a different diskette.

With Forte, you won't get stuck with an obsolete or impossible-to-upgrade product. In fact, if you already own Forte PJ,™ just call your local distributor for a fast upgrade to the Forte 3270PC on disk.

We're faster than IBM, too. With local screen capture. Transfer of whole files instead of single screens.

So before investing in a "smart desk," see how Forte can transform the PCs you already have into something even smarter.



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SOFTWARE & SERVICES

AIDS

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mathematical, statistical and financial functions of Ingot can be used in conjunction with project management.

The price of Ingot licenses range from $8,000 to $60,000, depending upon CPU size.

Schonfeld & Associates, 2550 Crawford Ave., Evanston, Ill. 60201.

SIGNAL TECHNOLOGY, INC.

Smartstar Interface to RDB

Signal Technology, Inc. has announced that its Smartstar application development and data management software has been enhanced to perform as a user interface to Digital Equipment Corp.'s RDB relational data base management system.

According to a spokesman, Smartstar offers nontechnical users a videoactive, no-programming interface for application development and data management. Command functions are assigned to a DEC VT series keypad and tied to specific video capabilities; and a user can key in design and processing commands with the keypad and see a direct real-time response on the CRT screen.

The spokesman said the videoactive attribute is said to apply across all three of Smartstar's user components — applications design and development, data updating and retrieval and general reporting. The software reportedly also supports complex applications development for more technical users and programmers. It also supports the DEC VAX/VMS RMS relational query processing facility. Smartstar is an integrated interface for both RDB and RMS.

The extended version of Smartstar for RDB will be available in January at a price between $9,800 and $19,800.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

APPLICATION PACKAGES

BURROUGHS CORP.

Burroughs Distribution Partner

Burroughs Corp. has announced the Burroughs Distribution Partner (BDP), a software system for manufacturers, distributors and wholesalers.

According to the company, BDP is developed with the Logic and Information Network Compiler fourth-generation language. The product runs on Burroughs B1000, B5000, B6000 and B7000 series systems as well as the A series of mainframes. BDP modules use on-line documentation and Help screens, the company said.

The BDP Base Module includes order entry, inventory control, accounts receivable, inquiry and management reporting. Price for the Base Module on the B1000 series is $22,500. Prices can range up to $50,000 for the B7000 series.

Burroughs, Burroughs Place, Detroit, Mich. 48232.

GELCO PAYMENT SYSTEMS, INC.

Travel Expense Control System

Gelco Payment Systems, Inc. has announced software that monitors and accounts for travel costs. The Travel Expense Control System (Tecs) runs on IBM IMS or CICS systems and Wang Laboratories, Inc. VS systems. A batch version is available for hardware with Ansi Cobol, and an IBM Personal Computer-compatible version is also available.

Tecs verifies the accuracy of employee expense reports and bills, analyzes expense transactions from all money or billing sources, compares expenditures with the company's budget and reports on a weekly, monthly, quarterly and/or year-to-date basis.

The vendor said the price of the software is $225/mo to lease the Personal Computer version or $9,000 to buy it; $35,000 for the CICS version; $55,000 for the IMS version; $25,000 for the Wang VS either batch or on-line versions; and $25,000 for other batch systems.

Gelco Payment Systems, P.O. Box 16069, Minneapolis, Minn. 55416.

ABSOLUT SOFTWARE

Software for 3B2 and 3B5

Absolut Software has announced that it has ported its order entry/inventory/accounting software to run under AT&T's 3B2 and 3B5 computers.

According to a spokesman, the C language package is designed for use by distributors, wholesalers, chain retailers, direct response marketers and distributing manufacturers.

The single-user version of the order entry/inventory/accounting software licenses for $2,995, and a version supporting up to four users licenses for $4,995.

Absolut Software, 2001 Beacon St., Boston, Mass. 02146.

DATA I/O CORP.

Abel 1.1

Data I/O Corp. has announced a computer-assisted estimating software tool that reportedly develops logic designs for programmable logic devices.

According to the company, Abel 1.1 supports more than 95 logic devices, including Monolithic Memories, Inc.'s Megapal and logic devices from Cypress Semiconductor and VLSI Technology, Inc.

The product is available for the IBM Personal Computer with the PC-DOS operating system and the Digital Equipment Corp. VAX-11 computer with VMS or AT&T's Unix operating system.

See PACKS page 74

Imagine.™ Expand the way you think about information retrieval. It's the only query and reporting system built for CICS with: Entirely menu-driven architecture • Integrated on-line and batch query and report writing • Comprehensive system-managed control of CPU resources and data security. • Integration of production files into an on-line informational data base. For more information, call (617) 547-8050.

MULTIPLICATIONS ✳

UCCEL has selected Imagine for use with its application software products. Multiplications has offices in the following locations: Cambridge, MA. Atlanta, GA. New York, NY. Oakland, CA. Rochester, NY. Toronto, CN.

© Multiplications Software, Inc. 1984 Imagine is a trademark of Multiplications Software, Inc.

DIGITAL BRINGS VAX TO LARGE SCALE COMPUTING.

INTRODUCING THE VAX 8600 SYSTEM.

Your applications can do exactly what you want them to on Digital's new VAX™ 8600 computer system. They can expand.

User population can increase. Scientific problems can become more complex. Transaction volume can intensify. And data storage requirements can grow exponentially.

The VAX 8600 system gives you unprecedented capacity for applications growth. It's the first of a new generation of large scale VAX processors, with memory expansion to 32 million bytes and online storage up to 160 billion bytes. Yet the VAX 8600 system maintains complete architectural compatibility with every other VAX processor – including the new desktop-size MicroVAX I™ system. Every system in the family gives you the same VMS™ operating system software, with the same set of proven development tools, communications options and data management facilities. Quite simply, there's not another computer family in the world that can match the growth path you get with Digital's VAX systems.

YOU GET UP TO 4.2 TIMES THE PERFORMANCE.

We've engineered the VAX 8600 system to deliver more than four times the processing speed and performance that the industry-standard VAX-11/780 system is known for. We've achieved this performance increase through the use of ECL gate array technology and several advanced engineering techniques.

Specifically, the VAX 8600 system incorporates four-stage pipelined processing that increases throughput by allowing the system to execute one instruction while it simultaneously decodes a second, generates an address for a third and fetches a fourth. There's also a floating point accelerator that speeds floating point operations.

Even with all its power, the VAX 8600 system conserves floor space. The CPU fits into the same size cabinet as the VAX-11/780 CPU. Power consumption and air conditioning requirements are similar, too.

VAX 8600 SYSTEM HIGHLIGHTS

MAXIMUM MAIN MEMORY SIZE 32 Million Bytes
MAXIMUM STORAGE CAPACITY 160 Billion Bytes
MAXIMUM COMMUNICATIONS LINES 512 plus Local and Wide Area Networks
PROGRAM ADDRESS CAPACITY 4 Billion Bytes
BUS SUPPORT Availability includes 6 UNIBUS,™ 2 SBI, 4 DR780, 3 CI and 4 MASSBUS™
PHYSICAL DIMENSIONS 60½" x 73½" x 30"
POWER CONSUMPTION 6.5 KW (10 KVA)
AIR CONDITIONING REQUIREMENTS 22,200 BTU/hr
ACOUSTIC LEVEL 60 dBA

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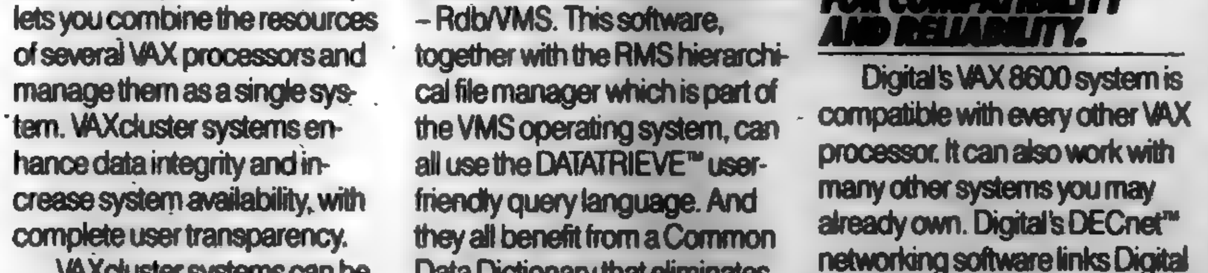
SNA is a trademark of International Business Machines Corporation.

VAXCLUSTERS LET YOU SHARE THE WEALTH OF VAX RESOURCES.

The large-scale storage and multi-user support you get with Digital's VAX 8600 system can be increased many times over with VAXcluster™ systems. This multiprocessing capability, which is unique in the industry, lets you combine the resources of several VAX processors and manage them as a single system. VAXcluster systems enhance data integrity and increase system availability, with complete user transparency.


The expanding VAX family

VAXcluster systems can be configured with up to 16 processors and storage servers in a variety of combinations. You can boost computing power in an existing VAXcluster configuration by adding a VAX 8600 system. Or you can build a new VAXcluster using a VAX 8600 system as a compute server.

The wealth of resources available to all VAX systems includes VAX Information Architecture, which offers a CODASYL-compliant database – VAX DBMS; and a relational database – Rdb/VMS. This software, together with the RMS hierarchical file manager which is part of the VMS operating system, can all use the DATATRIEVE™ user-friendly query language. And they all benefit from a Common Data Dictionary that eliminates data redundancy and permits record-, field- and user-specific security controls. What's more, you can automate your office with Digital's ALL-IN-1™ software.

All VAX systems give you a complete set of program debuggers, editors, and screen management utilities to work with. You have a choice of 15 programming languages. And you can combine different languages in a single application through the common calling standard.

ENGINEERED FOR COMPATIBILITY AND RELIABILITY.

Digital's VAX 8600 system is compatible with every other VAX processor. It can also work with many other systems you may already own. Digital's DECnet™ networking software links Digital systems, users, files and applications over a variety of communication devices, such as Ethernet, leased lines, standard telephone lines, and public wide area networks. We offer protocols for communication with non-Digital environments, such as the SNA™ gateway.

The VAX 8600 system is engineered for the reliability your large-scale applications require. Self-diagnostic intelligence simplifies maintenance.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The VAX 8600 system, like all Digital hardware and software products, is engineered to conform to an overall computing strategy. This means our systems are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy direct from desktop to data center.

For a brochure on the VAX 8600 system, contact your local Digital sales office. Or call 1-800-DIGITAL, ext. 280.

THE BEST ENGINEERED COMPUTERS IN THE WORLD.

digital™

PACKS

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Abel 1.1 includes an equations-reduction algorithm and is said to minimize reduction time by using separate algorithms optimized for each type of device. During processing, Abel reportedly reduces design equations pin-by-pin and identifies each equation on the CRT by the output pin it represents.

Abel 1.1 for the IBM Personal Computer sells for $895; versions on the DEC VAX-11 sell for $2,495.

Data I/O, 10525 Willows Road N.E., Redmond, Wash. 98073.

META SOFTWARE, INC.

DRG Optimizer

Meta Software, Inc. has announced a software package said to help hospitals meet the record-keeping and reporting requirements of the U.S. government's Medicare Diagnostic Related Groupings (DRG) reimbursement program.

The DRG Optimizer is an expansion of the vendor's DRG Grouper, DRG Reanalyzer and Ad Hoc Report Generator software. The DRG programs are part of the vendor's Charms hospital software packages for managing medical records and utilization review.

The DRG Optimizer is said to assist in the computation of DRG by validating the assignment on the basis of the clinical data in the patient's record. It computes the DRG rating for each discharge diagnosis recorded as if it were the principal diagnosis, the vendor said.

DRG Optimizer runs on IBM 370, 4300 and 30 series mainframes in IBM's OS, DOS and PCS operating environments. DRG Optimizer costs $8,000 when purchased with the vendor's Charms records package.

Meta Software, 1860 Broadway, New York, N.Y. 10023.

LANIER BUSINESS PRODUCTS, INC.

Textway

Lanier Business Products, Inc. has announced Textway, a product that formats files created on a Lanier No-Problem or Typemaster word processor for use on Lanier's Business Processor.

The product converts embedded commands, format settings and data so that the user does not have to clean up or retype any information, Lanier said. The product reportedly works at a speed of 400 word/min.

Textway is menu-driven and consists of a hard-disk interface board and a utility program.

It costs $695, the vendor said.

Lanier Business Products, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

CIE SYSTEMS, INC.

Payroll/680

A payroll accounting software package said to provide multicompany and multistate accounting capabilities, as well as reports and listings that produce an audit trail, has been introduced by CIE Systems, Inc.

Payroll/680 is available for the CIE 680 family of multiuser business computer systems. According to the company, the package includes a year-end closing program, federal, state and local tax table maintenance, union file maintenance and reports and tax deposit history. Workers' compensation calculations, check histories, adjustment programs, sloan transaction flexible data entry and user-defined categories are also included, the company said.

The product is priced at [illegible].

Cie Systems, 2515 McCabe Way, Irvine, Calif. 92713.

DIGITAL EQUIPMENT CORP.

VAX Decrad V2.0

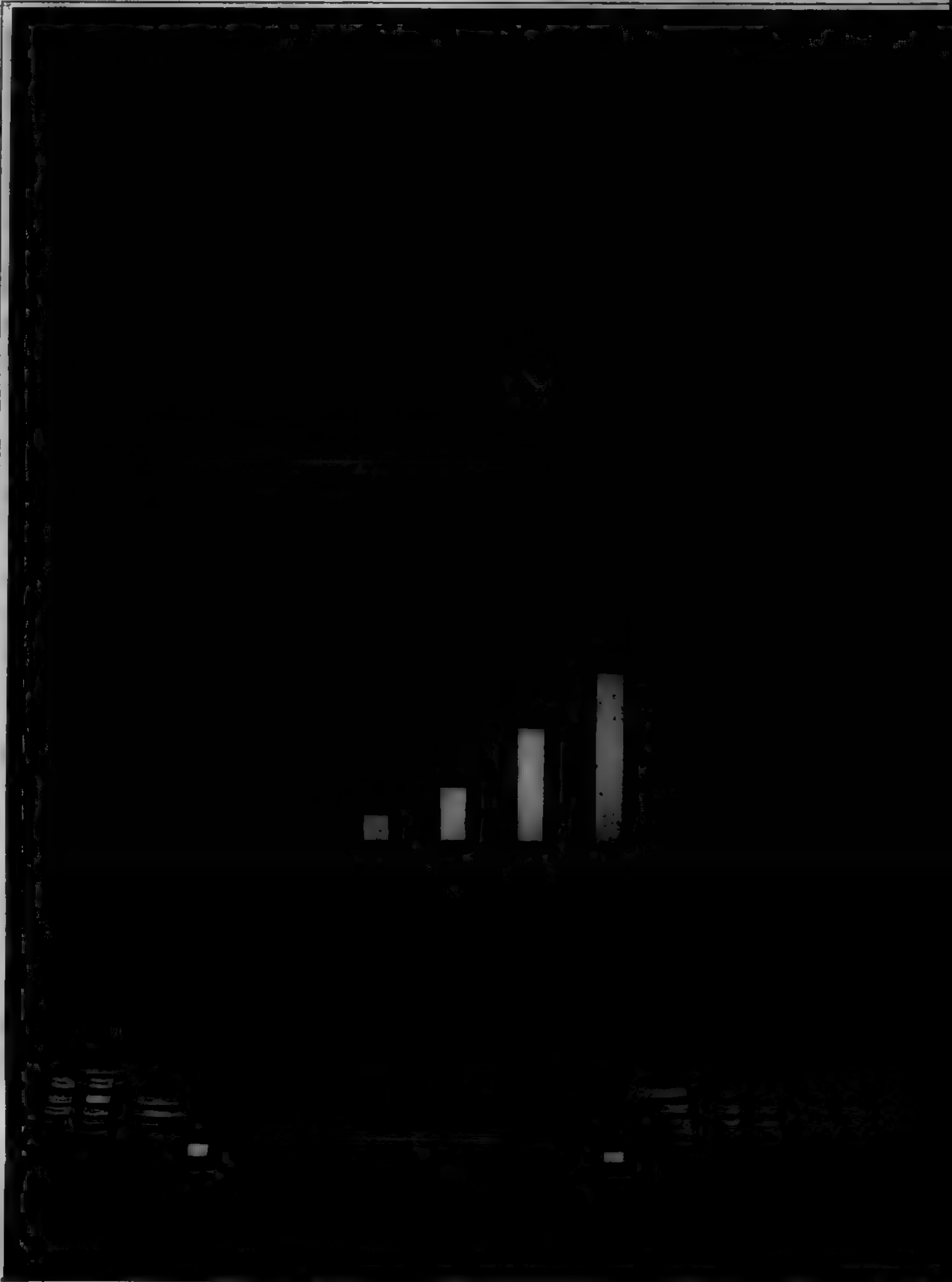
Digital Equipment Corp.'s Medical Systems Group has announced enhancements for its VAX Decrad application package for use in hospital radiology departments.

VAX Decrad V2.0, which runs on DEC VAX-11/750, VAX-11/780 and VAX-11/785 processors, reportedly was developed with the assistance of the Radiology Information System Consortium, a nationwide group of medical centers. It may stand alone or network with other information systems.

Features are said to include increased functionality and throughput in transcription, scheduling, patient tracking, film library management and management report production.

Scheduled for delivery in March, it costs $36,500.

DEC, Maynard, Mass. 01754.



SOFTWARE & SERVICES

DATA BASE MANAGEMENT SYSTEMS

SPERRY CORP.
Voice Response Support Package

Sperry Corp. has announced the Voice Response Support Package, which is said to provide telephone access to Sperry mainframe data bases.

According to a company spokesman, the Voice Response Support Package is an enhancement to Sperry's Voice Information Processing System (Vips). It integrates Vips with a Sperry Series 1100 host computer and allows users to interrogate a Series 1100 data base, guided by voice prompts, through any Touch-Tone telephone. The system also allows for concurrent execution of multiple applications.

Under the Series 1100 host, a user-defined vocabulary of words, phrases or prompts can be created to guide the telephone user in retrieving or entering data to the host-based applications. The controlling applications programs are based on Sperry's Mapper system. The Voice Response Support Package supports such applications as on-line order entry, data collection, information retrieval, status reporting and information inquiry and updating, according to a vendor spokesman.

The spokesman said the package acts as an intelligent controller for the telephones and the telephone network, making the Touch-Tone telephone a controlled-access data terminal linked to the host computer. The voice vocabulary needed to guide the user is created and stored using the telephone, and a command language instructs the user to make inquiries or enter information from the telephone.

Pricing for Vips with the Voice Response Support Package ranges from $134,000 to $217,000, depending on configuration, Sperry said.

Sperry, Computer Systems, P.O. Box 500, Blue Bell, Pa. 19424.

BUSINESS CONTROLS CORP.
Report Builders-1

Builders Controls Corp. (BBC) has announced a report writer that produces either Basic or Cobol compiler code.

Report Builders-1 (RB-1), for Digital Equipment Corp. VAX-11 systems, works will all standard RMS files. It reportedly uses the common data dictionary for data definitions.

The vendor said using the RB-1 menu system and the on-line Help facility, the user can create a report specification file for each report. Report name, author, users, control breaks, subtotal fields, sort fields, page and line breaks can all reportedly be included in the report.

The RB-1 is priced at $4,500 for the first system and $3,000 for each additional system.

Business Controls, 3-7 W. First St., Clifton, N.J. 07011.

SOFTSYSTEMS, INC.
Journal Processing Utility

Softsystems, Inc. has introduced its Journal Processing Utility (JPU), a tool for recovering lost data for IBM Vsam files and IBM DL/1 data bases operating within an IBM CICS environment under either IBM's DOS/VSE, OS/VS1 or MVS operating systems on IBM mainframe computers.

JPU provides forward recovery capabilities by allowing the user to select all or specific Vsam file and/or DL/1 data bases to be processed against the CICS journal. JPU also has backout, print, copy and user exit capabilities.

A permanent license for DOS sites is $3,900 and $4,500 for OS sites. The price includes one year of maintenance.

Softsystems, 311 Mallick Tower, One Summit Ave., Fort Worth, Texas 76102.

See PACKS page 78

YOUR TWO FAVORITE COMPUTERS NOW HAVE ONE THING IN COMMON. YOUR FAVORITE GRAPHICS TERMINAL.

Introducing the new CX4100 Series of Tektronix high performance, yet affordable color graphics terminals.
Now you can have the Tektronix PLOT 10 graphics command set you've always wanted while you use the host of your choice, IBM or DEC. Just by typing a single "switch-host" command.

Tek's CX4106, CX4107 and CX4109 are all directly plug compatible with both host environments. One coax to a standard IBM 3270 controller is all you need or one RS-232 connection to your DEC system.

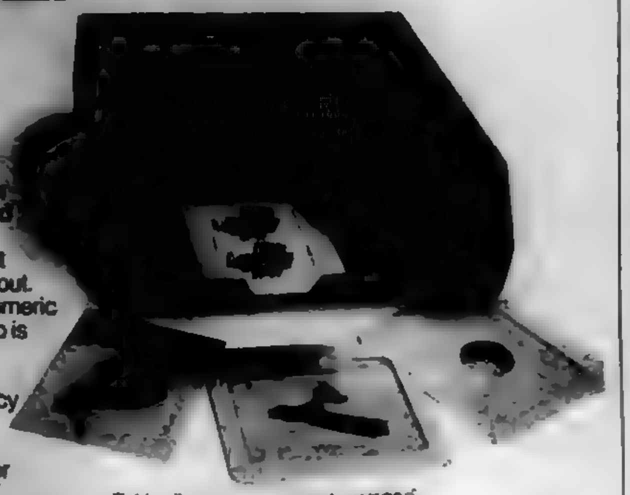
To make your use of existing or new graphics data fast and friendly, the CX Series comes with an IBM-style keyboard. Plus Tek enhancements: individual key programmability, user-selectable ten-key pad, and joydisk for quick cursor movement and graphics input.

Screen output will be just as familiar as keyboard layout. 32-line 3278/3279 alphanumeric emulation is built in. And so is full support for the 4957 Graphics Tablet, plus full hard copy and transparency output to a full range of Tektronix Color Graphics Copiers and the 4510 Color Graphics Rasterizer.

IBM flexibility is matched by DEC flexibility. In RS-232 mode, the terminals can run all VT100 applications through the extended ANSI X3.64 command set. In addition to the host interface port that transmits data at rates up to 38.4k baud, CX terminals are provided with two additional RS-232 ports and a Centronics-style parallel port for connecting a wide range of peripherals.

But best of all you'll have great graphics and full software compatibility. The CX Series will accept many existing programs written for 4010, 4100, and 4110 Series terminals. And they're fully compatible with PLOT 10 IGL, GKS, and TCS programs as well as with popular third-party software such as SAS/GRAPH,® ISSCO's DISSPLA® and TELL-A-GRAF® and Precision Visuals' DI-3000®.

Familiar 3270 IBM-style alphanumeric output is fully emulated on all CX4100 terminals. Enhanced IBM-style keyboard is part of the package.



Tek's all new precision ink jet 4692 color copier produces very high quality full color transparencies or hard copy.

That's software investment protection—matched by technology protection. CX terminals feature a 60 Hz non-interlaced display with 4096 x 4096 addressability displayed in a 640 x 480 matrix.

16 colors, eight line styles, 11 marker types, rapid area fill, scalable/rotatable text, complete segment support, true zoom and pan, and separate dialog area. It's all there with the full PLOT 10 command set.

So don't wait. Set the best of three worlds on one desk: TEK, DEC, and IBM. Contact your local representative today for information on the CX4100 Series. Call 1-800-547-1512. In Oregon 1-800-452-1877.

Tektronix
COMMITTED TO EXCELLENCE

SOFTWARE & SERVICES

PACKS

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SIR, INC.
SIR/DBMS

SIR, Inc. has announced that its SIR/DBMS relational data base management system is now available for Hewlett-Packard Co.'s HP9000 Series 500 machines running under HP's HP-UX operating system.

The package was specifically designed for analytical uses in business, industry, science and research, according to the vendor.

Included in the package is SQL+, the company's expansion version of IBM's SQL.

Also included in the package are the Forms feature for interactive screen-oriented data entry and query by forms; Host, an interface for access to one or more SIR/DBMS data bases; Help, for on-line documentation and user assistance; and Graph, for production of business and scientific graphics.

The price of the SIR/DBMS package for HP 9000 Series 500 machines is $6,000 for a single-user initial annual license fee.

SIR, Suite 400, 820 Davis St., Evanston, Ill. 60201.

DIGITAL INFORMATION SYSTEMS CORP.
Version 4, DBL for Unix

Digital Information Systems Corp. has announced that its Data Business Language (DBL) now runs under the AT&T Unix operating system.

According to the company, Version 4 of DBL has the ability to chain to non-DBL programs and to interface to subroutings written in other languages.

Multikey IBM Isam files, full screen programming functions, a fixed-point decimal data type and a symbolic debugger are all said to speed development time.

Pricing starts at $449 for personal computers and ranges up to $3,549 for superminicomputers, according to the vendor.

Digital Information Systems, Suite 340, 3336 Bradshaw Road, Sacramento, Calif. 95827.

AMDAHL CORP.
Ingres under Unix on Amdahl mainframes

Amdahl Corp. has announced that it has entered into a joint marketing agreement with Relational Technology, Inc. to offer that company's Ingres relational data base management system under UTS, Amdahl's version of the AT&T Unix operating system.

Relational Technology has an early installation program for the UTS-based Ingres system under way and is said to view its customer base, which includes more than 700 installations, as prospective users of the new software.

According to the agreement, Relational Technology will license the program directly.

A supported license for the product is priced at $90,000.

Amdahl, 1250 E. Arques Ave., Sunnyvale, Calif.

LANGUAGES

COMPLETE SOFTWARE, INC.
Cdebug

A menu-driven C language source-level debugger that operates independently of its host has been introduced by Complete Software, Inc.

Cdebug is an interactive tool that symbolically debugs source code routines written in C, according to the vendor.

The program uses its own preprocessor to incorporate symbol tables into source code and a runtime library to compile and link programs.

The software operates on Digital Equipment Corp.'s VMS operating systems, Bell Laboratories' Unix 4.1, 4.2,

III and V versions and IBM's PC-DOS for the IBM Personal Computer, according to the vendor.

The company said the product examines and modifies all C elements by name and types.

Depending on the number of users, Cdebug ranges in price from $300 for personal computers to $3,000 for a VAX-11/780.

Complete Software, 60 Aberdeen Ave., Cambridge, Mass. [illegible]

IBM
VS Fortran Interactive Debug Release 2

IBM has announced Release 2 of its interactive debugger for VS Fortran running on IBM mainframes. Enhancements include:

■ Debugging of VS Fortran programs compiled by VS Fortran Release 2 or later in IBM's MVS/XA environment. When linked to the Release 4 VS Fortran library, debugging of 31-bit addressing mode is supported.

■ Debugging of programs compiled with the VS Fortran Release 4 compiler except those compiled with the reentrant option.

■ Added task-type Help panels to aid in debugging 31-bit addressing mode programs under MVS/XA.

Initial licensing is $1,800 with a $300 monthly charge.

IBM, National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

PERKIN-ELMER CORP.
Sibol

Perkin-Elmer Corp. has announced that the Software Ireland, Ltd. Sibol language system is now available for its Everyware family of computer systems, ranging from the desktop PE 7350 supermicrocomputer to the Series 3200 family of superminicomputers. The package runs with PE's Xelos and Unisoft Corp.'s Uniplus+ operating systems.

Sibol is an implementation of Digital Equipment Corp.'s Dibol business-oriented language.

The Sibol compiler allows Dibol programs to be written on PE's hardware systems, as well as allowing existing applications written in Dibol to be recompiled and run on the PE systems.

The Sibol system consists of a compiler, a linker, a runtime interpreter and a library of external utility subroutines.

Sibol licenses start at [illegible] for the PE 7350 and $1,250 for the entry-level PE Model [illegible]. Full documentation is included.

Perkin-Elmer, Data Systems Group, Two Crescent Place, Oceanport, N.J. 07757.

ADVANCED COMPUTER TECHNIQUES CORP.
Fortran 77 compiler

Advanced Computer Techniques Corp. has announced a version of its Fortran 77 compiler that targets the MIL-STD-1750A chip set.

Programs are written on Digital Equipment Corp.'s VAX-11 series computers under Digital Equipment Corp.'s VMS operating system to run on MIL-STD-1750A chip-set-embedded computers. This version of the compiler will generate the MIL-STD-1750A assembler code output.

The package is consistent with the Ansi X3.9-1978 for full Fortran 77, according to the vendor.

The military standard extensions to the Fortran 77 language, MIL-STD-1753, are also featured in the product.

Machine-independent optimization techniques for code generation are said to include invariant code movement, strength reductions, constant folding and common subexpression elimination.

The price of the source code is $170,000.

Advanced Computer Techniques, 16 E. 32nd St., New York, N.Y. 10016.

COMPUTER THOUGHT CORP.
Ada Interpreter/Debugger

Computer Thought Corp. has announced an Ada language interpreter and interactive, source-level debugger. The software is available for Symbolics Corp.'s Symbolics 3600 series workstation in Symbolics' Zetalisp environment.

The interpreter supports all major Ada language features and is fully integrated with the interactive debugger, which allows programmers to diagnose errors at the source-code level. Both interpreter and debugger use windowing techniques and support the use of a mouse to select commands.

The license fee for the Ada

See TALK page 78

Cityscape in alternative resources: solar, wind and geothermal technologies are applied to maximize energy efficiency. Solar panels form windprops which rotate parallel to desert surface; temperatures of air and water supplies are maintained by flows through buried conduits.

If You Can Imagine It...

CYBER Can Run It.

It's true. The uses of the CYBER 180 computers are limited only by the breadth of the human imagination.

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To this question, Control Data has developed an astonishing new answer.

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The new 64-bit word Supermini 810 does everything you'd expect of a supermini system. But that is only the beginning.

In terms of all the usual criteria — performance, application portability, compatible growth potential, ease of installation and the increasingly sensitive matter of security — the Supermini 810 represents some very impressive technology.

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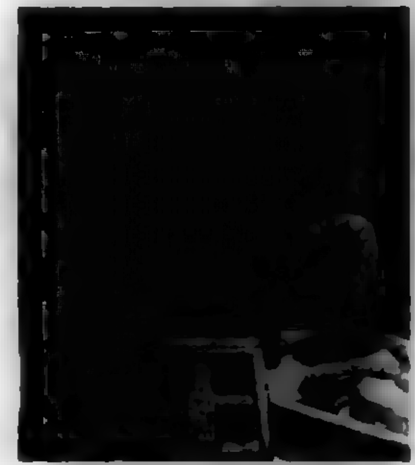
The Incredible $250,000 system.
Actually, a Supermini 810 could



run less than $250,000.

And, we're not talking some bare-bones unit either. We're talking about a state-of-the-art supermini system, complete with operating software and peripherals, up and running. The more you learn about the system the better that price looks.

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You can look at the Supermini 810 as the ultimate supermini computer system. It's exciting enough in those terms. But it is *only* the entry point to a compatible family of systems that boasts a 1-to-60 performance range. That is the largest compatible growth path in the industry.

So when you look beyond today and see the potential to accommodate growth, you can really appreciate the significance of this new system.

With the CYBER 180 performance range you can, if you wish, enter fully into supercomputing. You can expand your computing power as your future needs warrant. And you can do it in an orderly fashion, and at manageable costs, without massive operational disruptions.

You can start with a call or letter.
We hope what you've learned so far will stimulate you to explore the possibilities presented by the Supermini 810. You can do that by calling 1-800-253-4004 ext. 146. (In Minnesota, 1-612-921-4400 ext. 146). Or by writing Computer Systems Marketing, Control Data Corporation, P.O. Box 0 HQW09G, Minneapolis, MN 55440.

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SOFTWARE & SERVICES

TALK

from page 77

Interpreter/Debugger is priced at $15,000 for the first workstation and $10,000 for up to four workstations. Subsequent workstations cost $7,500.

Computer Thought, Suite 125, 1721 W. Plano Pkwy., Plano, Texas 75075.

UNISOFT SYSTEM CORP.

Pascal-2 for Uniplus+

Unisoft System Corp. has announced the Pascal-2 compiler, developed by Oregon Software, Inc. for Unisoft's Uniplus+ Unix-based operating system.

According to a spokesman, the Pascal-2 compiler performs eight types of code optimization. Pascal-2 programs can call subroutines written in C or Assembler, allowing the user to take advantage of existing Uniplus+ software.

Pascal-2's language extensions provide input and output handling and can gain access to low-level operations.

Program development tools include a high-level interactive debugger, an execution profiler and other utilities to aid in coding and development. The compiler is said to support all capabilities of standard Pascal and conforms to level one of the international Pascal standard.

Pascal-2 for Uniplus+ systems is licensed for $1,000.

Unisoft, 739 Auston Way, Berkeley, Calif. 94710.

POTOMAC SYSTEMS RESOURCES, INC.

RM Cobol for Masscomp systems

Potomac Systems Resources, Inc. has announced the availability of Ryan-McFarland Corp.'s RM/Cobol for Masscomp's line of real-time, multiuser microcomputers.

The language is available from Potomac Systems Resources at a cost of $3,750 per user.

Potomac Systems Resources, P.O. Box 3510, Reston, Va. 22091.

REMOTE COMPUTING SERVICES

GENERAL ELECTRIC INFORMATION SERVICES CO.

Softran

General Electric Information Services Co. (Geisco) has introduced Softran, an electronic software management and distribution system, to its time-sharing network.

Softran reportedly can be used to coordinate and control the distribution of personal computer software in an organization. It reportedly can also be used to distribute proprietary software including programs, files, messages and spreadsheet templates.

Distribution under Softran reportedly can either be limited to the U.S. only or worldwide. It is said to consist of a module for system administrators on the Geisco Mark III Service and an end-user module for each micro.

Softran is priced at $100 for the end-user package, plus a charge for each download, typically $6 to $24.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

ADP NETWORK SERVICES, INC.

Savings and Loan data base update

ADP Network Services, Inc. has released an updated version of its Savings and Loan data base, containing balance sheet and income statement information on more than 4,000 U.S. savings

Oh, the joys of being a DP professional.

Every job has its share of problems. But DP professionals seem to be blessed with more than their fair share.

We can help you do away with some of the grief and hassle. Things such as JCL errors, production foul-ups, and network breakdowns.

Our JCLCHECK™ program spells "relief" from JCL problems. It catches all JCL errors, gives you complete, on-line error validation and concise diagnostics. Plus full documentation on a job stream, or entire production system, suitable for insertion in the run book.

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Our NetCheck™ program takes the pain out of taking control of your CICS network. It allows you to organize your network in manageable groups with easy-to-remember names. It enables you to bring up the network in just minutes. And troubleshoot problems in seconds. So things get done faster and easier, with you in control of your network, instead of vice versa.

For all the details on JCLCHECK, ProDict, and NetCheck send the coupon, or call us at (408) 554-8121. We'll deliver fast, long-lasting relief.

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PHONE__________
OPERATING SYSTEM__________ NUMBER OF CICS TERMINALS__________

Triangle Software Company
4340 Stevens Creek Blvd., Suite 108
San Jose, CA 95129

SOFTWARE & SERVICES

and loan associations. The service is primarily accessed through ADP's Screen software but can be accessed through ADP's Datapath or through Fortran subroutines.

The update reflects recent, major modifications to the format and frequency in which savings and loan associations are required to report their financial positions to the Federal Home Loan Bank Board, the vendor said. Quarterly information is now provided.

The price of the system is transaction-based and depends on resources used and length of time on the system.

ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

BANK EARNINGS INTERNATIONAL, INC. INNERLINE, INC.

Peer Group

Bank Earnings International, Inc. (BEI) and Innerline, Inc. have announced the Peer Group, an on-line, IBM Personal Computer-based service that allows banks anonymously to compare their performance to that of competing institutions.

Using BEI's Executive Manager Personal Computer Software, a spokesman said, the Peer Group allows banks, bank holding companies and savings and loan companies to upload financial and operational data to Innerline's on-line financial information network. Innerline will compile client data and create a variety of comparative financial reports that will then be downloaded to customer personal computers.

The Peer Group is said to provide nationwide analysis capabilities based on asset size, branching, location and in-house data processing vs. non-DP institutions. Financial and operational data will be available on-line within 48 hours of receipt.

A one-year subscription to the Peer Group service is currently priced at $3,600, with discounts available for multiple subscriptions, a spokesman said.

Innerline, 95 W. Algonquin Road, Arlington Heights, Ill. 60005.

COMPUTER SCIENCES CORP.

Medi-Cal claims service

Computer Sciences Corp. (CSC) has announced that medical billing firms and health care providers in California can now enter and validate Medi-Cal claims data on magnetic tape into the automated claims processing system that CSC operates for the California Department of Health Services.

CSC can process claims submitted on magnetic computer tape on the same day they are received and send more than 90% of them on to the State Controller's Office for payment on the following Monday, CSC said.

Computer Sciences, 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

ON-LINE DATA BASES

VM SYSTEMS GROUP, INC.

Electronic bulletin board

VM Systems Group, Inc. has introduced an electronic bulletin board for users of systems operating under IBM's VM operating system.

V/Net can be accessed by users with a 300 bit/sec Ascii terminal, a telephone and a V/Net user identification number supplied by the vendor. The bulletin board will enable users to exchange information about VM installations and products.

V/Net is free, except for the cost of the phone call, to all VM sites, those planning to install VM and to other persons or institutions upon request, the vendor said.

VM Systems Group, Suite 515, 2300 S. Ninth St., Arlington, Va. 22204.

PREDICASTS, INC.

Promt data base for ADP Network Services

Predicasts, Inc. has announced that its Promt data base is now available through ADP Network Services.

Promt contains abstracts of more than 400,000 business-related articles published since 1960 from more than 1,600 publications.

Information from Promt can now be used in conjunction with numeric, financial and economic data available through ADP, Predicasts said.

Promt incorporates ADP's Screen, a text searching software package through which users search, retrieve and display information from ADP's data bases. By entering key word qualifiers, users can identify the companies, industries, markets or technologies they want to study.

The service is accessible through ADP's Datapath, a data access software package used with the IBM Personal Computer and Lotus Development Corp.'s 1-2-3. With Datapath, users can download information from Promt to Personal Computers.

ADP charges $15 for a 300 bit/sec connection or $30 for a 1,200 bit/sec connection. In addition, customers are charged $225 for each abstract accessed.

Predicasts, 11001 Cedar Ave., Cleveland, Ohio 44106.

INNERLINE, INC.

Saving Institution Performance Index

Innerline, Inc. has introduced Saving Institution Performance Index, an on-line service that gives savings and loan institutions the opportunity to compare and evaluate their own and their peers' financial performances.

The service compares information on all insured institutions nationwide based on balance sheets, income statement data and 71 performance ratios derived from call reports filed with the Federal Home Loan Bank System, according to the vendor.

Executives can use the index to determine market share or examine possible merger and acquisition candidates, the vendor said. The index reportedly provides four report formats, including the Individual Institution Report and the Comparative Report.

Connect-time costs range from $30 for 20 minutes each month to $300 for 515 minutes a month. The surcharge ranges in price from 54 cents to 60 cents per minute.

Innerline, 95 W. Algonquin Road, Arlington Heights, Ill. 60005.

SST, INC.

Handshake Colt

SST, Inc. has unveiled a software package that reportedly provides a direct link between AT&T Unix-based minicomputers and microcomputers and the full range of Western Union Corp. services including Telex, Telegram, Cablegram, Computer Letter and Mailgram.

Called the Handshake Computer Linked Telex (Colt), the software is now available on the Fortune Systems Corp. 32:16 desktop computer. According to the vendor, the product allows the user to send and receive a variety of electronic communications over a terminal. The user can perform routine tasks while messaging takes place concurrently and transparently, the vendor added, without interrupting applications. Handshake's capabilities are said to include automatic answer and send, text editing, message log with auditing and the ability to send a message at a preprogrammed, specified time.

The price of Handshake is $850 for a single CPU.

SST, 9434 N. 107th St., Milwaukee, Wis. [illegible]

VM SYSTEMS GROUP, INC.

V/Net

VM Systems Group, Inc. has introduced V/Net, an information exchange service for users of IBM's VM operating system. To log on to V/Net, users must have a 300 bit/sec Ascii terminal, a telephone and a V/Net user identification.

V/Net users can ask questions about VM, receive other users' advice, look through files, add information or create a file for which input is desired.

This electronic bulletin board service is free, but the user must contact VM Systems Group to request a user identification.

VM Systems Group, Suite 515, 2300 S. 9th St., Arlington, Va. 22204.

METHODOLOGIES

M. BRYCE & ASSOCIATES, INC.

Release 7 Pride-Automated System Design Methodology

M. Bryce & Associates, Inc. has announced enhancements to its Pride-Automated System Design Methodology program that are said to improve its speed, performance and ease of use and to upgrade the product's documentation.

Release 7 is said to include an interactive facility that replaces four previous modules: search data base, interactive component display, interactive data entry and interactive display. The purpose of the subsystem is to provide a complete interactive environment in order to display, enter, search and reference systems component information that resides in the product's Information Resource Manager, the vendor said.

Release 7 also includes enhancements to the product's Automated In-

Continued on page 84

When your different computers "don't talk to each other"—

MAY & SPEH has the answer.

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DATA

from page 65

ence only those data elements with which it is concerned. As subsystems are added, the schema and the subschemas are changed; there should be no need to modify or rewrite the programs of prior completed subsystems.

It is a shame that most organizations do not take full advantage of this device to achieve and maintain data independence. Instead, the subschema is usually structured to be a mirror image of the schema. As a result, the programmer is forced to perform detailed data base navigation and thereby lock the programs to the physical structure of the data base.

One of the common misuses of a DBMS is to perform data base navigation in the program coding. In practice, data base navigation should be avoided at all costs.

Data base navigation is a technique for retrieving records from the data base. For a multisegment record structure, it involves reading each segment at a given level in sequence and then explicitly using the pointers to the lower segment to retrieve the lower segment records. At each level, checking the data base status is necessary to ascertain whether the end-of-chain for a given segment level has occurred.

Masking the best alternative

The best alternative is to use the DBMS' capabilities to mask the physical structure of the data base from the programmer. Most, if not all, of the currently popular DBMS include this capability, which is generically a component of subschema definition.

Through the subschema, the DBMS keeps track of whether end-of-chain has occurred on each level and retrieves the next data base segment for a lower level. Almost all DBMS are smart enough not to re-retrieve a segment that is already available.

The advantages of this programming technique are numerous. First, the program is considerably more readable. Second, the data base record appears as a flat record, allowing the processing techniques used with flat records to be employed.

The greatest advantage of this technique is that the program is now oblivious to the physical data base structure. Fields can be added or deleted. Segments can be added, deleted, broken into more segments or combined. After making the appropriate changes to the subschema, the programs will almost never have to be modified for segment arrangement changes. Any program that uses a field that was deleted, or which must use a field that is being added, will have to be modified.

The major objection to this technique is that performing the detailed data base navigation in the program is more efficient. This premise is incorrect and leads to false economics. The subschema definition is a program that performs all the segment retrieves and status checks that the programmer would perform. A subschema generator would be optimized to the DBMS and the machine on which it runs. As a result, in most cases, letting the DBMS retrieve the segments is more efficient than the code produced by a high-level language.

More important is the fact that the programmer must code and debug the detailed logic in each program. Furthermore, if unnecessary program changes are required because of data base structure changes, the value of the programmer's time will far exceed the value of the machine time expended on any data base inefficiencies.

Another area where we fail to take advantage of the power of the DBMS occurs when one accesses specific records using selection criteria. This occurs for two reasons. First, in much the same way as sequential access, there is a strong desire to instruct the DBMS on how to find the desired record. Second, there is an attitude that all or nearly all of the fields that will be used as selection criteria must be either segment keys or secondary indexes.

In both cases, it is better to treat the data as flat records and to access the records by specifying the fields to be selected and the desired values. Then let the DBMS analyze the resources that are available, such as segment keys and secondary indexes, and choose the most efficient means of accessing the desired record.

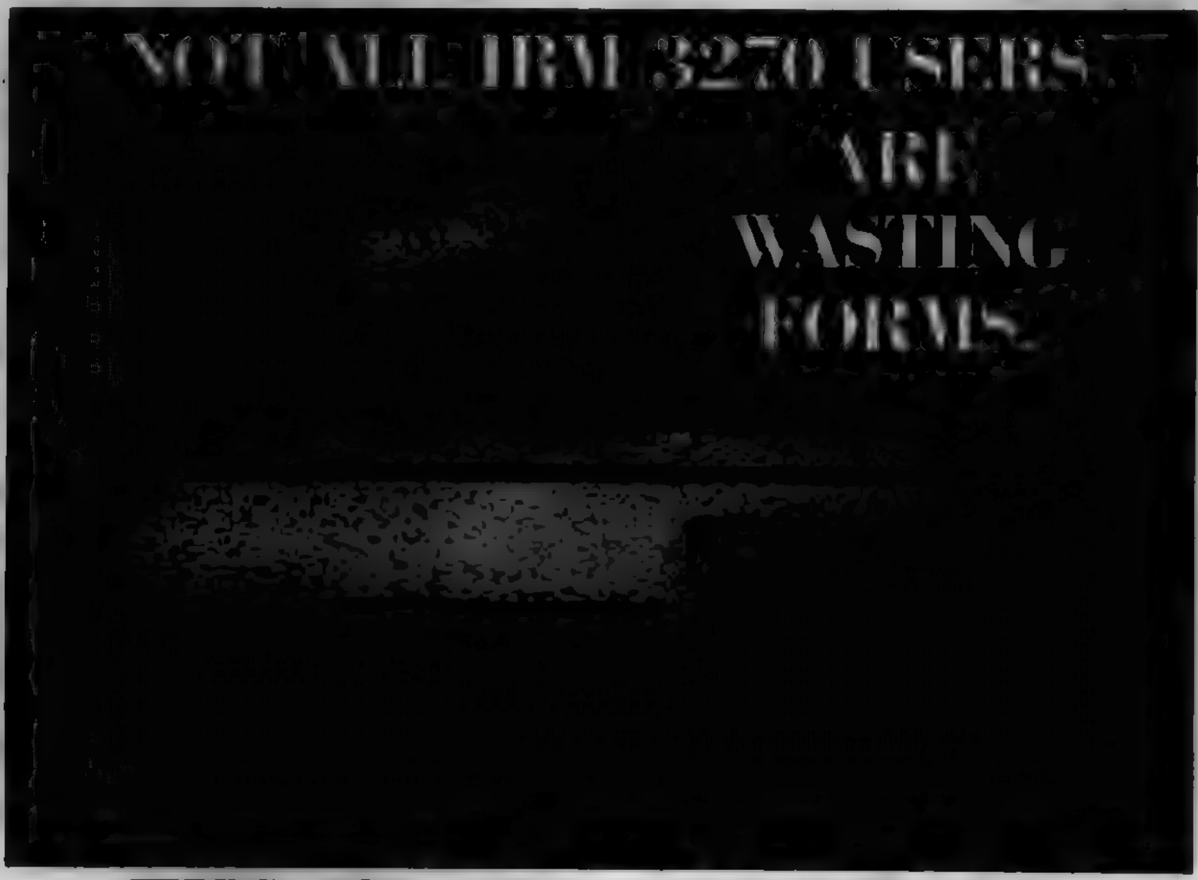
Multistep process typical

A typical manner in which specific records on a data base are accessed is to employ a multistep process. The first step is to direct the DBMS to use a specific secondary index to retrieve one of the segments of the desired record. The second step involves issuing unique retrieval requests that specify any of the selection criteria that happen to be segment keys. If the selection criteria includes any nonkey fields, a sequential search loop is constructed to locate the specific record.

All fields that are involved in the selection criteria should be specified in a retrieval request, regardless of whether an index or key exists for them. It should be left to the DBMS to determine what facilities are available and to use those facilities in an optimal manner. This also leaves the greatest opportunity to take advantage of key and index facilities if they should become available.

It is possible to place the system, using this coding technique, into production with the intention of optimizing the access facilities at some later time. This would be done by monitoring the data usage and selection patterns. When it seems appropriate, one can devise a new schema, modify the subschemas if necessary and then reorganize the data base itself.

In his next article, Ruggera will discuss a method to build a major system using subsystems.



THE ISI 487 CONSERVES.

Not long ago, all IBM 3270 users were treated alike. Anyone that needed immediate access to a printed form was forced to waste a form for each form removed. Simple tasks turned into costly and frustrating procedures on the IBM 3287 printer.

Then the ISI 487 arrived. With tractors tucked neatly away and a tear-off scale positioned conveniently up front, the ISI 487 allows users to tear-off forms right after printing without any waste. Designed to fulfill any application, the ISI 487 handles continuous forms or single sheets and delivers dot matrix, near-letter quality, and incredibly sharp large character label printing.

The ISI 487 has satisfied a variety of IBM 3270 users. Isn't it time you joined them? This plug-compatible replacement for the IBM 3287 carries a price tag as low as $3,350 and belongs anywhere forms are dispensed immediately after printing. *Hospitals, insurance companies, manufacturers, and ticket outlets* — put an end to unnecessary waste!

For more information about the ISI 487 and our other IBM compatible (fully integrated, *no box!*) printers, like the ISI 736 letter quality printer with twin sheet feeder, call, write, or TWX us today!

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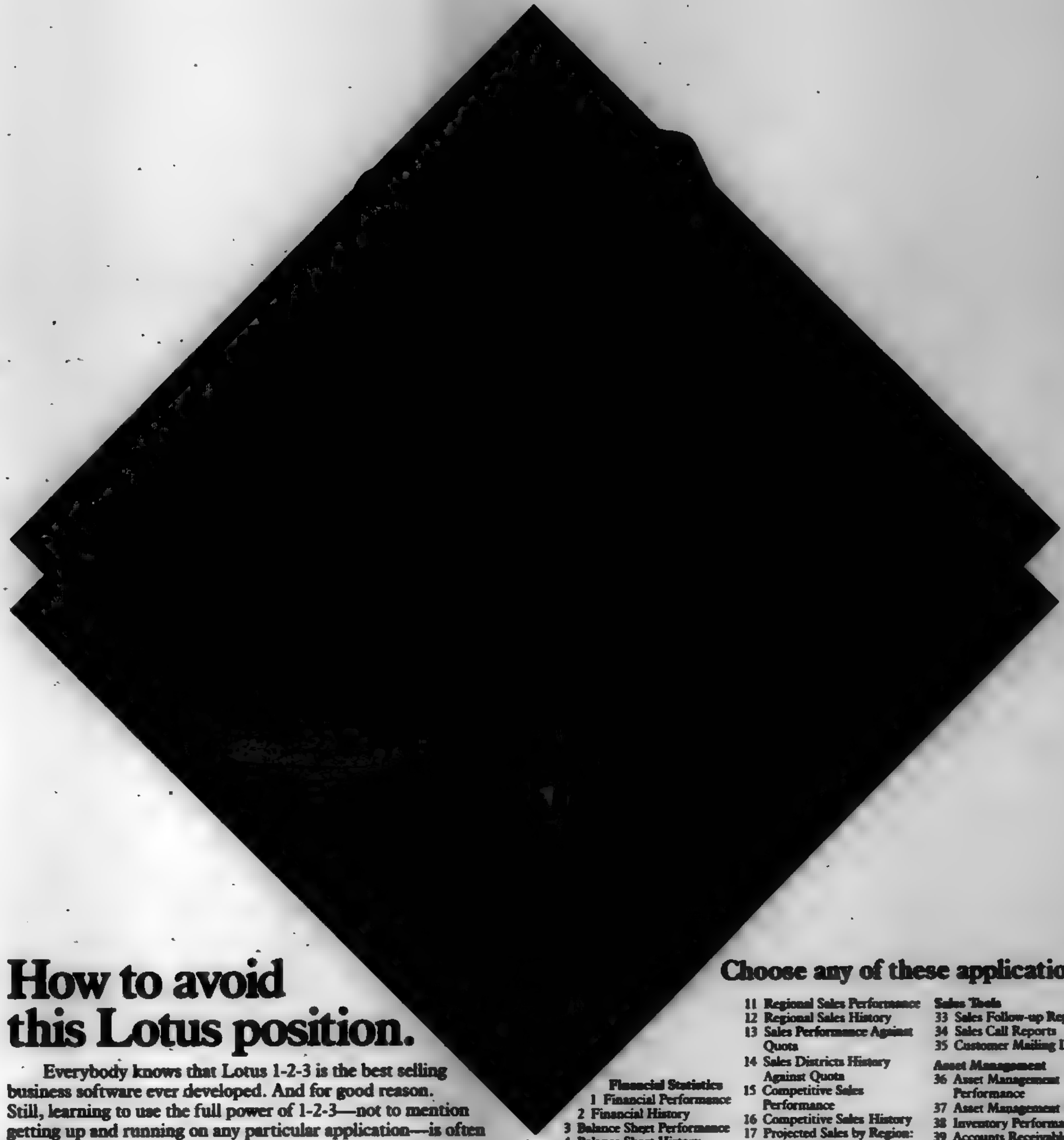

How to avoid this Lotus position.

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Sales and Marketing
9 Sales and Market Performance
10 Sales and Market History
11 Regional Sales Performance
12 Regional Sales History
13 Sales Performance Against Quota
14 Sales Districts History Against Quota
15 Competitive Sales Performance
16 Competitive Sales History
17 Projected Sales by Region: Qtrly. & 5 Year
18 Price List
19 Competitive Sales Projections
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24 History of SG&A Expenses
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52 Graph Maker
53 Personal Mailing List
54 Phone Messages
55 Personal Income Tax (Form 1040)
56 Asset Records for Insurance

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The key word in that long, drawn-out headline is system.

A system built for PCs.

At Hewlett-Packard, it's a quality system of personal computers, plotters, a truckload of software, and Local Area Network (LAN) capability.

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Yet the system is so flexible each part can stand alone. Or even team with an IBM PC.

So you can build just the system your staff needs.

It all starts with two of our Hewlett-Packard personal computers.

We call one the HP Touchscreen and the other (because it can do even more) the HP Touchscreen MAX.

The first comes with two double-sided disc drives that give you 256K bytes of main memory, expandable to 640K bytes.

The HP Touchscreen MAX has even more capacity, with the added power of a 14.8M byte Winchester disc drive.

And both have DSN/Link, to let you set up a direct line of communication between them and your HP 3000 Department Computer.

As the names imply, you can actually change things on either screen just by touching the screen.

That makes the Touchscreen PCs easier to use. And a lot easier to learn.

The system also includes two printers many people think are simply the best around.

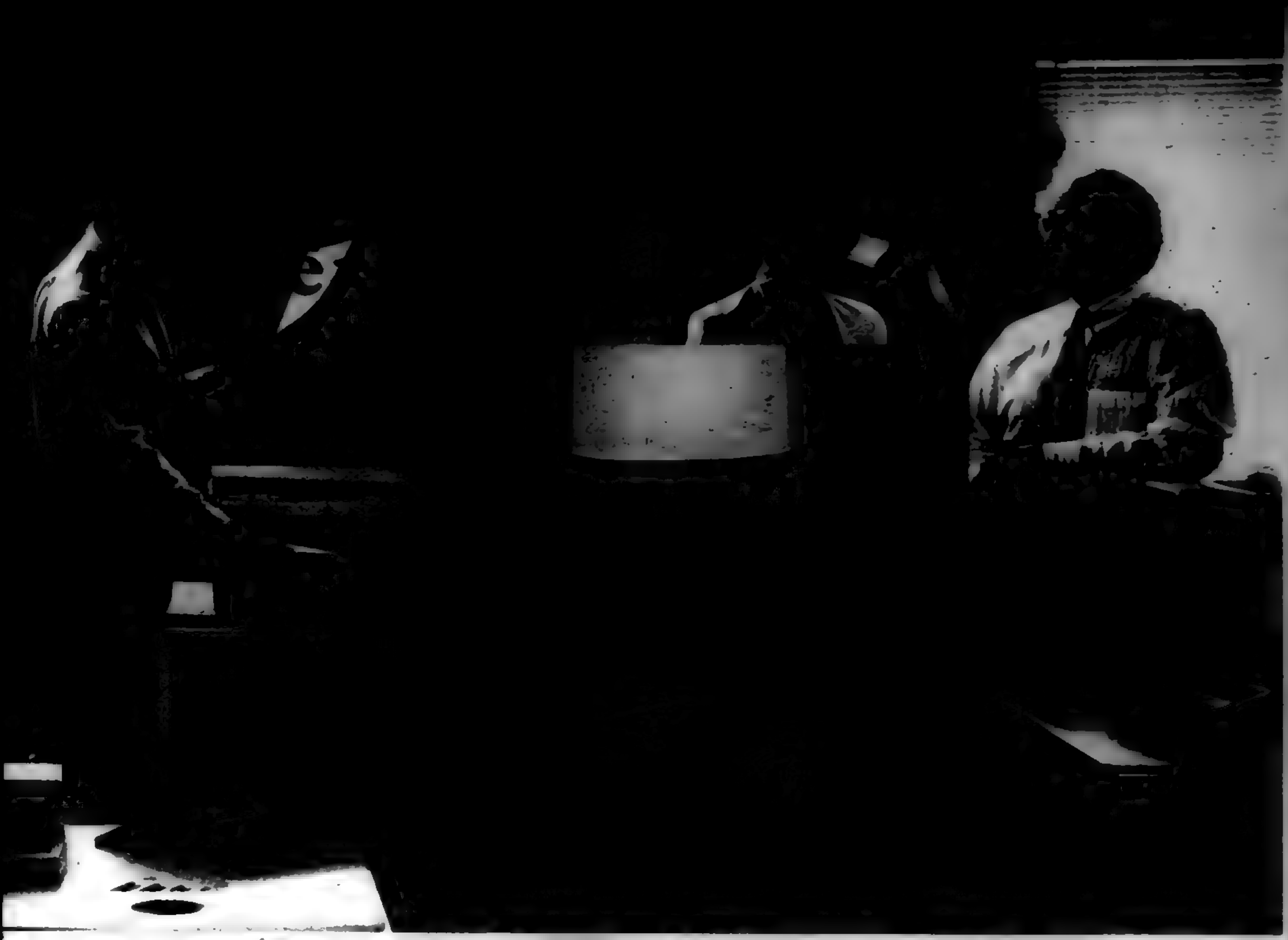
Our Hewlett-Packard LaserJet and ThinkJet printers are both breathtakingly fast and refreshingly quiet.

The ThinkJet printer runs at a rapid 150 characters per second.

Yet because the ThinkJet paints each character with a small jet of ink (instead of smashing the paper with keys), it's as quiet as a sigh.

At 300 characters per second, our LaserJet printer is even faster.

Ten times faster than the best daisy-wheel printers. Yet the image is as sharp as you'll get from a printing press. Amazing.



and when you get to your hotel, change everything.

Two different plotters are also part of the HP personal computer system.

Both create full-color graphics. One with two pens, the other with six for even more detail.

If you like, the system can be knitted together through a LAN.

It lets a number of HP personal computers link up, talk to each other, share printers, and exchange information.

By the way, there can be a lot of information to exchange. That's because there are more than 500 business software titles available. For word processing, accounting, spread sheets and graphics. You'll find the big names there, too.

1-2-3™ from Lotus.™* WordStar.™** MicroPlan.™*** And the whole catalogue of software from HP.

Finally, when you travel, you can take the system with you.

Hewlett-Packard's portable personal computer turns your hotel room (or your den at home, or your customer's desk) into another part of your personal computer system.

The Portable has plenty of capacity; 272K bytes of RAM and 384K bytes of ROM. And with its built-in modem, it can link you with your office printers and plotters. Not bad for a computer that weighs just nine pounds and can fit into a briefcase.

The system is all linked up, all on the same programs, all designed to work together, and all ready to go.

And all from Hewlett-Packard.

Just dial 800-FOR-HPPC, toll free, to find the name of a Hewlett-Packard dealer or sales representative near you.

HEWLETT PACKARD

*1-2-3™ and Lotus™ are U.S. Trademarks of Lotus Development Corporation. **Available for the HP Portable beginning January, 1985. WordStar™ is a U.S. Registered Trademark of MicroPro International Corporation. ***MicroPlan™ is a U.S. Trademark of Chang Laboratories, Inc.

Continued from page 79

structional Materials that contain narratives and instructions for executing all tasks associated with systems design, data base design and project management.

The product runs on a variety of minis and mainframes from IBM, Digital Equipment Corp., Honeywell, Inc., Sperry Corp. and NEC Corp. The price is $80,000.

M. Bryce & Associates, 1248 Springfield Pike, Cincinnati, Ohio 45215.

SPECTRUM INTERNATIONAL

Spectrum/Prototyping

Spectrum International has announced Spectrum/Prototyping, a manual system development package that allows users to design a prototype of an application before building a complete system.

The written development methodology enables a manager to estimate the scope of a project before beginning the actual work, according to the vendor. Spectrum/Prototyping allows a user to create models by providing tasks, estimating guidelines and constructing examples that can be used in a working model, Spectrum International said.

The methodology is said to provide step-by-step project guidance, establish project criteria, develop preliminary design and conduct periodic evaluations.

Spectrum/Prototyping costs $10,000.

Spectrum International, Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

TRAINING

CREATIVE APPROACHES, INC.

Training for IBM IMS, CICS, TSO and CMS

Creative Approaches, Inc. has introduced IBM mainframe-based software for teaching end users the fundamentals of data entry for any IBM IMS, CICS, TSO or CMS application. The course runs on any IBM mainframe under IBM's Interactive Instructional Presentation System.

The course is customized to any one of the client's application screens, the vendor said. It provides exercise screens so the student can master concepts such as cursor placement, tabbing, function keys, error messages and problem resolution.

The course is priced at $1,200 plus an hourly charge for customization. The typical cost is $4,000.

Creative Approaches, 8 Prince St., Rochester, N.Y. 14607.

MENTOR RESOURCES, INC.

Taskmaster

Mentor Resources, Inc. has announced an on-line interactive training system for users of Wang Laboratories, Inc. VS operating systems.

Taskmaster reportedly allows users to design their own training programs. The program is said to allow students to interact with VS features through simulation activities.

Course titles are "Command Processor," "Operator's Console," "Backup," "WP Administration in a VS Environment," "Disk Space Management," "VS Problem Resolution," "Configuration Management" and "Communication Concepts."

Courses are available for $500 and are sold on a per-CPU basis.

Mentor Resources, One Tara Blvd., Nashua, N.H. 03062.

OXFORD SOFTWARE CORP.

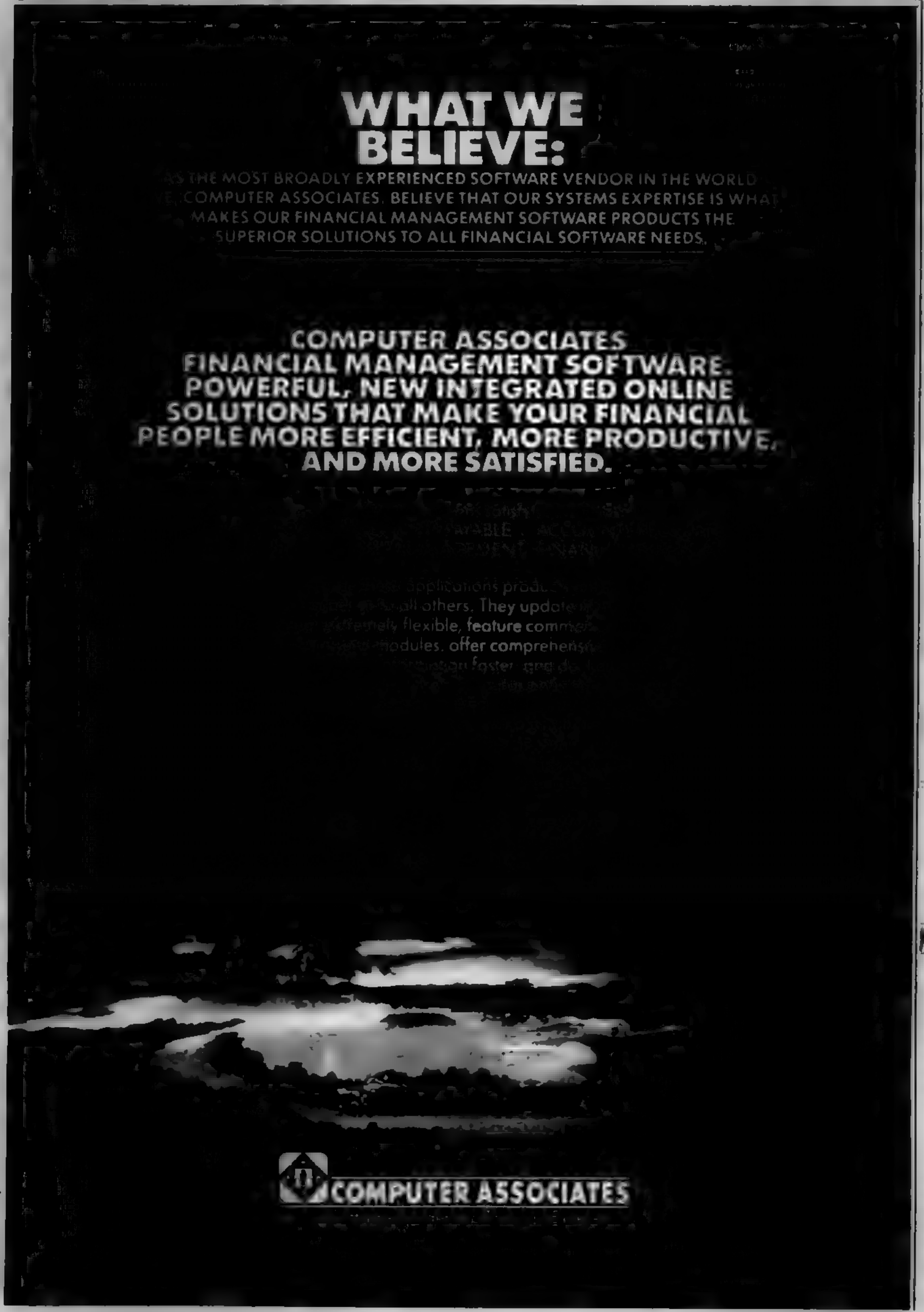
Video Training Tape for Maxicalc II

Oxford Software Corp. has announced a full color, video training tape to tutor users on the most recent release of Oxford's Maxicalc II IBM CICS-based spreadsheet package. The tape is available in ½-in. VHS, ½-in. Beta or ¾-in. video formats and is accompanied by a Maxicalc II reference card.

The tape is one hour long and teaches users how to sign on to Maxicalc II; build a simple workbook with three worksheets; modify, format and print work sheets; generate and display full color graphics; and sign off from the package.

The price of the Video Training Tape is $200 for the first tape and $150 for each additional tape. It is available to those organizations having a license agreement for the product.

Oxford Software, 174 Boulevard, Hasbrouck Heights, N.J. 07604.



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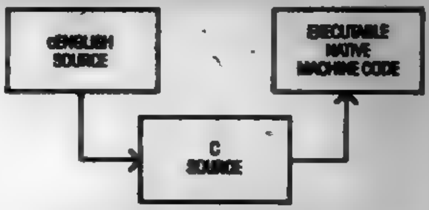
cENGLISH.™
The C Generation Language.

What is cENGLISH? cENGLISH is a comprehensive fourth generation procedural language based on dBASE II® syntax. It is portable to a wide range of micros and minis. The language features user-transparent interfaces to a wide range of popular C compilers, operating systems, and data base managers.

How is portability achieved? cENGLISH through its compiler interface translates cENGLISH into documented C source and uses a host C compiler to produce native machine code.



C source can be embedded in cENGLISH source.

Differences in the operating system and data base manager are handled by the runtime libraries.

The result is that cENGLISH source can be compiled without modification on any micro or mini configuration supporting cENGLISH.

What about performance? cENGLISH executes FAST, just like any compiled C program.

How easy is cENGLISH to use? While cENGLISH is a powerful high level language that can accommodate complex software development, it remains simple and straightforward to use.

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Foreign Language Versions:
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Attention MS/DOS users. Demo version and special introductory offer available for IBM PC,™ XT,™ AT,™ and other MS/DOS systems. Requirements: 256K, hard disk or two floppy disk drives, and MS/DOS 2.1 or higher.

Attention dBASE II and dBASE III users. dBASE II to cENGLISH Converter now available; dBASE III Converter available later this quarter. Converted code is portable to micros or minis and executes as fast as original cENGLISH source.

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SAMPLE cENGLISH PROGRAM

```
IDENTIFICATIONS
  MODULE:   Mininame
  AUTHOR:   bcs
  DATE:     8/29/84
  REMARKS:  Sample cENGLISH program that adds first
            names to a file
END IDENTIFICATIONS


GLOBALS
  FIXED LENGTH 1 ans
  FIXED LENGTH 15 Fname
END GLOBALS


MAIN PROGRAM

  BEGIN
    CLEAR SCREEN
    SET ECHO OFF

    USE "NAMES"
    VIEW BY "ID_FNAME" ASCENDING

    AT 23,1 SAY "Add a record? Y or N"
    AT 23,25 ENTER ans USING "!"

    WHILE ans EQ "Y"
      CLEAR GETS
      AT 6,1 SAY "Enter first name"
      AT 6,20 GET Fname
      READ SCREEN

      INSERT
        Fname = Fname
      END INSERT

      AT 12,10 SAY "Welcome to cENGLISH," & Fname
      WAIT
      AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
      STORE "                " TO Fname
      STORE "  " TO ans
      AT 23,1 SAY "Add another record? Y or N"
      AT 23,30 ENTER ans USING "!"
      CLEAR ROW 1 THRU 23

    END WHILE

    AT 12,10 SAY "That's all for now!"
    UNUSE "NAMES"
    SET ECHO ON

END PROGRAM
```

cLINE™, Inc.

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City ____________ State ______ Zip ______
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C4Q84

PCR

from page 65

[illegible] unlimited use and maintenance of the MRP software for 25 years after paying one flat fee up-front. The benefits were offset by a substantial risk, Milnes said.

"[PCR] took a risk because we could have designed a completely unusable system that they couldn't sell," he explained. "On the other hand, we were taking time and a lot of knowledgeable people to work with them."

Most input at design end

CTS assigned three people during the spring and summer, two people in the fall and one person in the winter to work virtually full-time with PCR. Most of the CTS input came at the design end, and then the compromise began.

> *'One problem was that we designed a lot more [features] than human programmers could code, and the project turned out to take far longer to finish than we thought at first. . . . [But] if we had written it ourselves, it would have taken a lot longer.'*
>
> — Mike Sherck, programmer/analyst, CTS Corp.

"One problem was that we designed a lot more [features] than human programmers could code, and the project turned out to take far longer to finish than we thought at first," Sherck said. "If I could do it again, I would have tried to generate numbers during design for how long the coding would take."

But he added, "If we had written it ourselves, it would have taken a lot longer."

Both men noted that a joint development arrangement is not for the fainthearted. "It's very important that you understand the risks up front," Sherck said, "and you have to be willing to be frustrated. The vendor will want to do things to make the package more generic. You have to be willing to compromise."

Milne also stressed the need for a carefully structured contract that spells out what the product will do and what it will cost. Unforeseen problems are likely to occur, he said.

'Step-wise approach'

Milnes said a contract should specify a "step-wise approach. You should have a contract for each part of the design," he said. "You should decide up front what you're going to get and what you're going to pay for it." But he cautioned, "You also can't let lawyers huddle in a courtroom for days. There has to be give and take between you and the vendor."

In contrast with the manufacturing systems CTS used, to use the PCR MRP package "is like a bullet train compared to a horse and buggy," Sherck said. "I don't think there's any small group that could have designed and built this. It's just too big."

Added Milnes, "I'd rather go the route of buying off the shelf whenever possible. But we just couldn't do it. The software wasn't there."

ISPF

from page 65

host environments. A dialogue managed by ISPF consists of selection panels, or menus, from which the user selects a particular processing option, functions that perform the requested processing and data entry panels on which the user supplies the additional information needed for the application.

Application development aid

The spokesman said ISPF/PDF for SSX/VSE aids in the development of various types of applications, including dialogues. It may be used with both conventional and structured programming techniques, and it provides simplified procedures for development of dialogue applications.

ISPF/PDF provides functions such as multilevel programming library support, full screen context editing, models that help a user develop dialogue panels, messages, function routines, file skeletons and tables, scrolling of source and data listings, utilities, interfaces to standard language processors, dialogue test facilities and on-line tutorials.

The enhanced version of ISPF for VM features CMS sequential file support, added library definition services and CMS/DOS simulation support. In addition, added dialogue manager functions include an IBM APL interface that supports IBM's APL2 system in VM, an IBM Graphic Data Display Manager interface allowing graphic objects to be displayed within an ISPF panel, table enhancements and added device support for 3290 terminals.

So-called usability enhancements include added profile pool support, a dynamic screen area that may be accessed and controlled completely by the application, display, variable and file tailoring enhancements and panel update program descriptions.

Version 2, Release 1 of ISPF for VM has a $500 initial charge and a monthly charge of $165; for SSX/VSE, the initial charge is $749, and the monthly charge is $75. ISPF/PDF for SSX/VSE has an initial charge of $800 and a $125 monthly charge.

IBM's National Accounts Division is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

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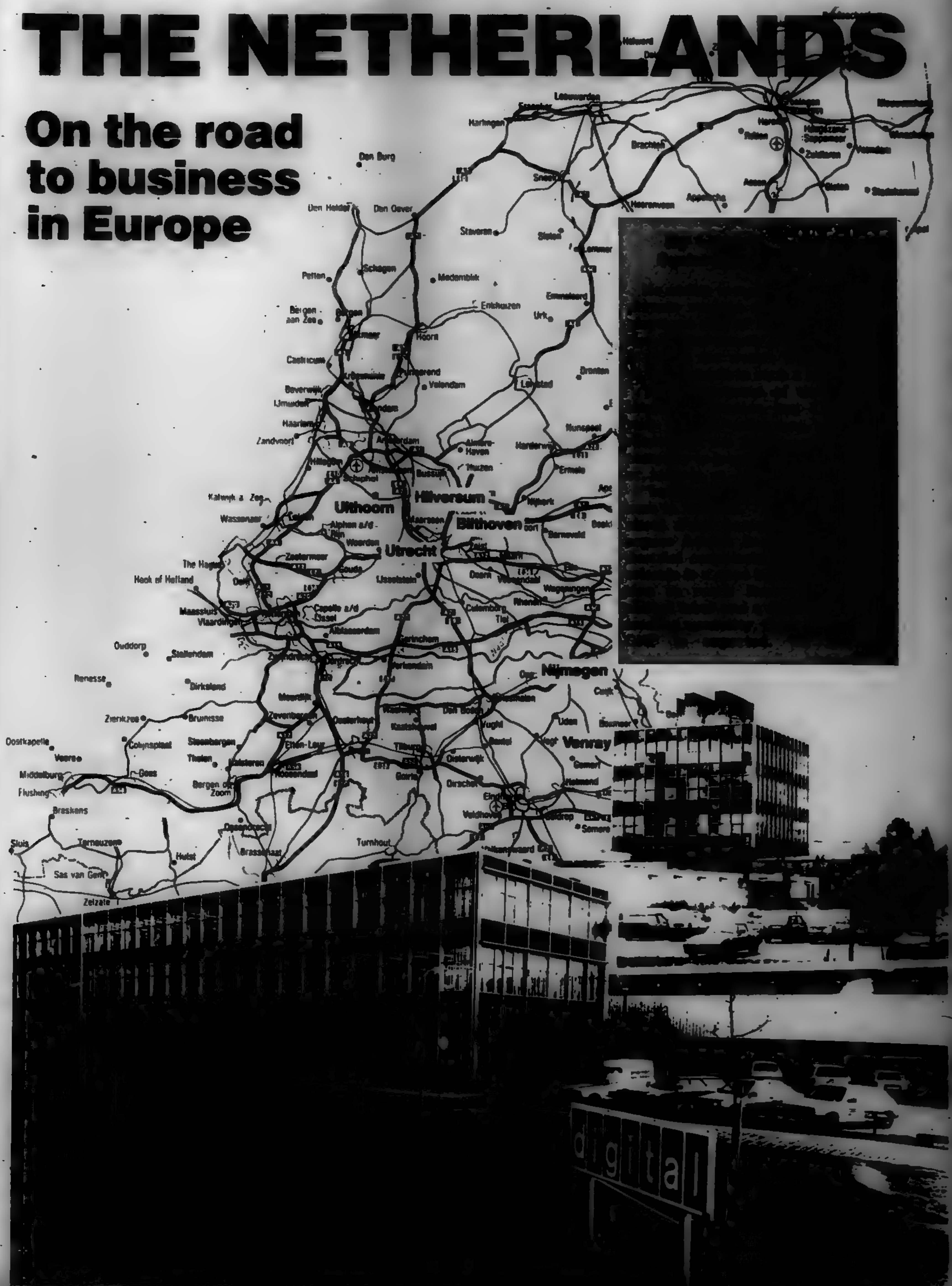
IN DEPTH

THE NETHERLANDS

On the road to business in Europe



[illegible]

extremely outward-looking country. Always select an outward-looking country."

"We are looking for foreign investment," says Martin de Leeuw, deputy commissioner for foreign investments, "but not for the sake of employment. We're looking for the long-term benefit. Foreign companies setting up here pay taxes, but they are small, because we have liberal tax policies."

These financial incentives do not rival the tax holidays Ireland proffers. The Netherlands is not jumping into a bidding war for high-technology business. This country of just 14 million is flipping over the coin, saying, "Look at the other side":

- We may not offer much of a home computer market to sell to, but we can give you Europe as only a "Dutch trader" knows how.
- Our citizens won't risk their savings to fund new ventures, but our government started the MIP Equity Fund in 1982 with $400 million capital to meet your needs.
- The country is small and crowded, but we have built a transportation structure geared to getting goods into and out of the country as fast as you need.

"Europe in general and maybe the Dutch in particular are very negative," de Leeuw notes. "We say the cup is half-empty. I think it goes back to the 16th century, when we changed from Catholic to Reformist with Mr. Calvin. We always say, 'It's not good enough.'"

In September, ITT Corp. decided the Netherlands was good enough as a central distribution site for Europe and eventually to the Middle East and Africa.

"That was a major decision," de Leeuw says, "because ITT made a thorough study. We must really be number one. ITT will set up distribution centers in the U.S., Japan and the Netherlands. They studied Europe for 2½ years and found out that on a cost basis, the Netherlands was by far the best country."

The Dutch government has identified the critical stages companies such as ITT go through in developing a mature, European operation: 1) establishing an initial European presence; 2) spreading into several countries; and 3) developing an integrated European organization.

According to de Leeuw, the government assists at each point, by gathering market information for a company in stage one, for instance, then helping to create a sales organization and consulting on locations and Customs procedures. The government might also propose a joint venture as the quickest means of entry into Europe. The Netherlands Industrial Commission will select prospects and aid in negotiations.

In the second stage, the government helps evaluate whether it is feasible to create a European assembly plant, centralized distribution or research and development facility.

At the final stage, the foreign company will be supported in considering regional headquarters and administrative coordination centers.

Government grants for research, called Basic Research Subsidies, can amount to $250,000. One requirement: Any products resulting from the research must be manufactured at least partially in the Netherlands. The government takes no equity position in the companies receiving these subsidies.

Such grants are comparatively easy to land. "The first one you get just if you fill in the application," de Leeuw says. A sound track record in scientific as well as the commercial development of products ensures the subsidy.

Also in the field of R&D is the High Technology Grant, given when a product is new to the Netherlands, has a high added value and advanced technological characteristics.

The Technology Development Loan goes to companies on favorable credit terms. Companies pay back loans only if the product makes a profit.

Two other basic grants are noteworthy: "One is a 12.5% tax break given on investments in buildings and equipment — everyone gets that," says Roosen. "You get the tax break only when you have a profit, of course.

"The second is a cash grant, given by the government as a percentage of investments in buildings and equipment." The Dutch government coaxes companies to the outlands of the north and

How to be in 16 places

south with grants running as high as 35% of fixed assets up to a maximum of $6 million. The cash grant applies to initial as well as add-on investments.

The MIP Equity Fund operates much as venture capital funds do in the U.S. It was started by the government as a means to fill in where private capital was sorely lacking. MIP combines pension funds with private and state money. The minimum investment is $1 million. Twenty smaller venture capital funds seek investments under $1 million.

The Dutch have long looked beyond their narrow borders for partners in trade. Citizens from cabbie to chief executive officer learn to speak English, German and French in school. Rotterdam is the world's largest port and Schiphol one of the most efficient airports. The Dutch move people and goods in and out so fast it sometimes seems there is no border at all.

This effort to be an international trading country runs up against strong protectionism within the European Economic Community (EEC).

"Computer companies are more willing to set up in bigger countries where there is a bigger home market and a tie to a bigger government," de Leeuw says. "For instance, MAI, an American company, was planning an extension in Enschede [the Netherlands], but they wouldn't do it because to sell to France, they had to set up there. France will say, 'If you don't set up here, you can't sell here.'

"It can be a major problem having no home market. France is suggesting, especially to Japanese clients, that if they locate outside France, they won't be allowed to sell inside France."

The Netherlands is a founding member of the EEC, which recently devised Esprit. This European Strategic Program for Research in Information Technologies is a plan for the 1980s that hopes to encourage common spirit among The Ten where now there is open competition if not commercial combat. One project funded in Esprit's pilot stage was the development of a very large-scale integration description language by Philips Information Systems, Inc. and West Germany's Siemens.

Philips, located in Eindhoven (or Philipstown, as it is known), is No. 26 on *Fortune's* list of the largest industrial companies worldwide. With sales of $16,176,941,000, net income of $226,631,000 and 343,000 employees, the electronics giant possesses the stable center around which the Dutch can create a computer industry.

In October, Philips launched one of the world's largest private telephone networks, an 18,000-extension system to handle voice and data for employees in Eindhoven.

Philips recently joined Siemens, a $15,724,273,000 company, to develop and manufacture advanced microchips with 1M bit and 4M bit memories capable of storing 16 and 64 times more data respectively than 64K bit chips.

Currently, European-owned companies supply no more than 10% of the world semiconductor market. The hope in The Hague and Bonn is that this kind of commitment between Europe's supercompanies will pump up the continent's lagging computer industry. Production of these chips would not take place until 1989. In 1986, Philips and Siemens will make the critical decision to carry on with their production plans or not.

Closer to its home base, Philips formed a venture partnership with the Nederlandsche Middenstand-bank in 1983 to provide start-ups in Holland with scientific and entrepreneurial support. Philips was not buying itself new ideas; in fact, the giant would have to bid along with any other interested parties for the products that might come from this program. Philips is taking on the role of leader in vitalizing the climate for electronics and computers in its home country.

The Netherlands is considered seventh on the most-favored list of sites for U.S.-owned electronics companies to locate subsidiaries. Still ahead are Britain, Ireland, West Germany, Mexico, Japan and France. Canada and Italy have been surpassed.

The following reports picture Holland's computer industry through the business of several companies, both domestic and foreign, operating there.

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One-stop supplier

ADVANCED SEMICONDUCTOR MATERIALS INTERNATIONAL (ASMI), Bilthoven

ASMI, the "not-so-little-anymore" maker of chip manufacturing equipment, thrives because traditional semiconductor companies do not have the design experience or expertise to build their own machines. Customers include Intel Corp. and Motorola, Inc., as well as computer vendors such as IBM and Digital Equipment Corp.

Philips, the Dutch electronics giant with annual revenues exceeding $16 billion, joined ASMI last April in a 50-50 venture to build and market the stepping aligner used to print integrated circuits onto silicon wafers. Philips, which operates Europe's largest chip factory, developed the stepper for internal use.

"We found Philips sitting on a tremendous wealth of technology," says Arthur del Prado, ASMI president and chief executive officer. "We said, 'Why don't you let us bring it to market?' It took them many years to digest that idea."

The venture, ASM Lithography Systems Ltd., gives ASMI access to Philips facilities and, just as important, Philips engineers. "We lifted 50," del Prado says, no small boost to ASMI, a company with annual sales estimated at $115 million for 1984.

Del Prado notes that it is characteristic of European companies to develop technological advances in-house but not market them. "Philips was ahead of everyone in videodisk technology but gave the market away because it didn't move. Philips is changing its posture now, through joint ventures, for instance."

Designing automated factory

The stepper fills out ASMI's product line, creating, in effect, a one-stop supplier. "We can now start designing the automated factory better than most of our competitors because of our product mix for the entire process," del Prado asserts. Together, ASMI and Philips are aiming for 30% of the lithography market by 1988.

Del Prado projects worldwide semiconductor sales of $32 billion in 1985, up from $24 billion this year. Wafer diameter dimensions will change drastically. "It is four inches now; eight inches is around the corner, and we have even seen 10 inches. We're looking at lifespans of only six, seven or eight years. That means tremendous changes in equipment."

ASMI's stronghold now is in chemical vapor deposition (CVD) equipment and also plasma-enhanced CVD. There was no use designing for the small Dutch home market or even the wider European market, which lacks, del Prado says, "the dynamics or cohesive structure to justify the investment.

"We had to become a global company. Here it's not like in Silicon Valley, where there are markets everywhere around you."

Capital from U.S.

To become global, ASMI needed capital. "We had been growing through internal financing until 1980," del Prado says. "We realized that unless we found a good source of financing, we could not keep up. We looked to European equity funding, but Europe is asleep, or was asleep, in this area. The Dutch capitalistic system is broke. It is trying to recover. If it doesn't, the chances for technological development are not good. We cannot keep looking to government."

ASMI shed its "funny little Dutch company" image and drummed up capital in the U.S. The company's stock is 20% publicly owned — 80% of that by Americans.

It is curious, perhaps, that Americans are more interested than the Dutch in investing in a Dutch company. That del Prado accepts. But the Dutch government's actions toward home companies quite visibly anger him.

"The government is not yet industry-oriented," he says. "The response mechanism is so slow we would have to have a special department to deal with them. I don't think the Dutch government has a vision yet related to industry. They should not be trying to bring American companies [to the Netherlands] at the expense of neglecting companies here.

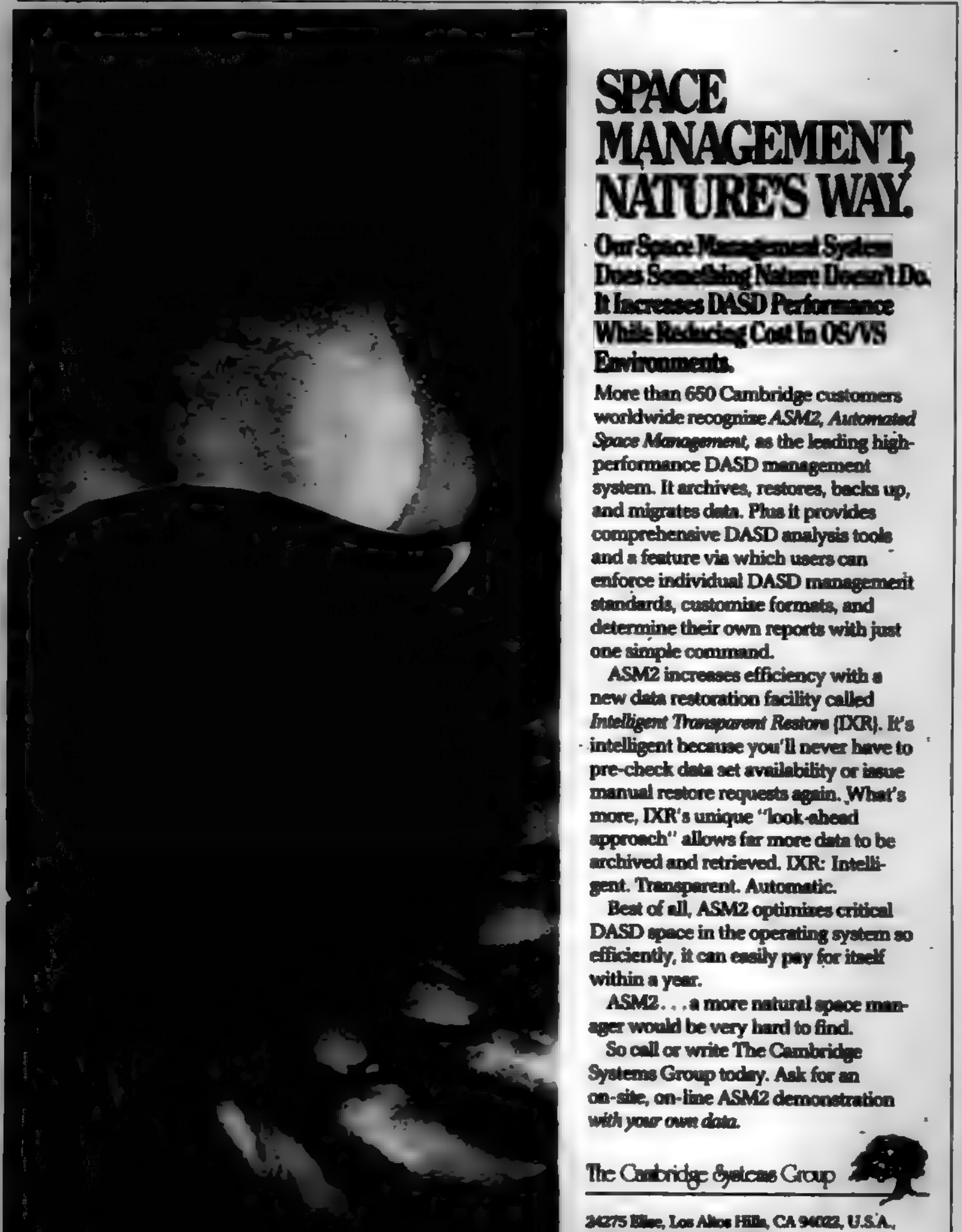
"The government is responsible for some of the negatives — such as taxation. It is responsible, in a way, for its own headaches. If the climate doesn't change, if it got to where we couldn't raise money, then we would have to go. I'm being very critical about our climate, but it's by pure experience."

Advantages at home

Del Prado does go on to mention the considerable pluses to being a homegrown Dutch company or even a foreign doing business there. "In America, management changes every year," he says. "The pressures are tremendous for short-term growth. Dutch companies are more stable. The unions do not bother us. For any well-run company, they shouldn't be a fear factor. We have more union pressure in Phoenix than here. And the education base is very sound. The engineers can stand up to any technological changes."

Del Prado admits that if ASMI had started in Silicon Valley, he would probably not have brought the company to Holland to do business.

But he cautions others not to follow his logic necessarily in choosing where to set up foreign facilities: "Many companies make the decision to go where their markets are. It may be the fastest way, but it may not be the best."



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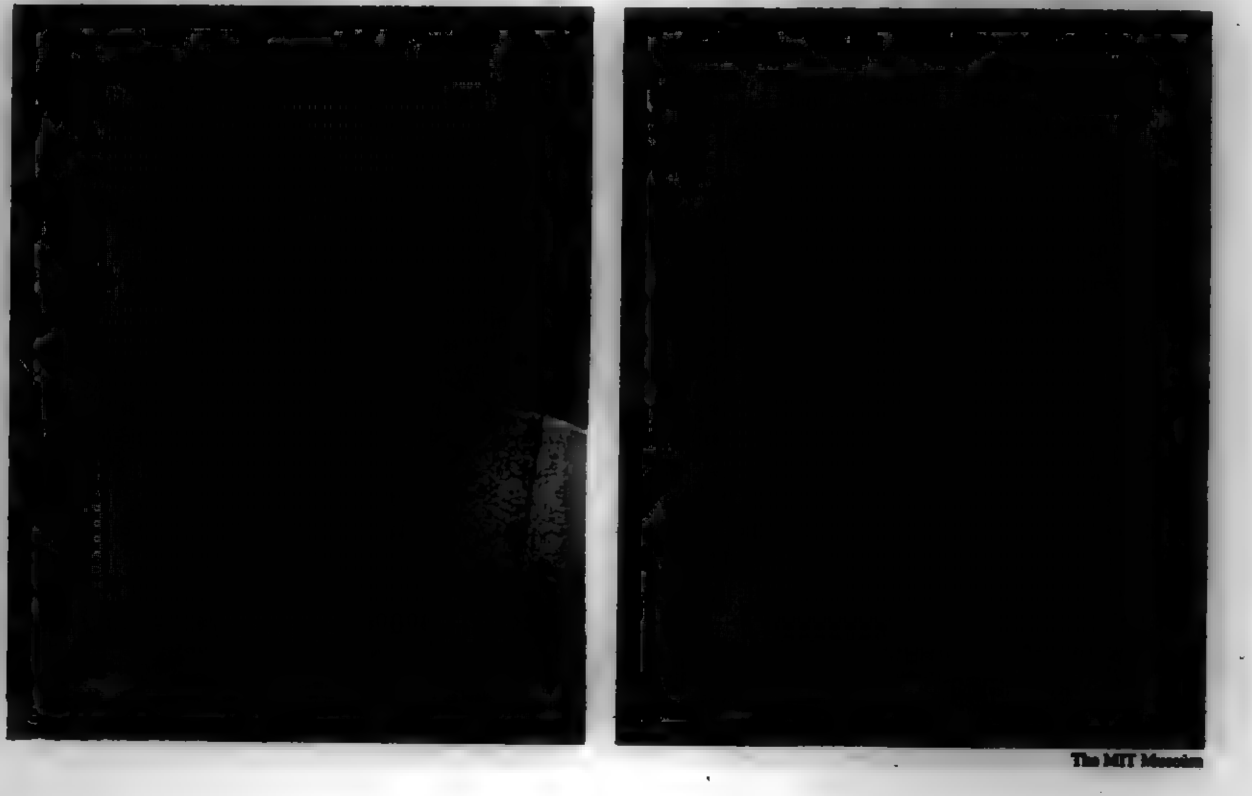

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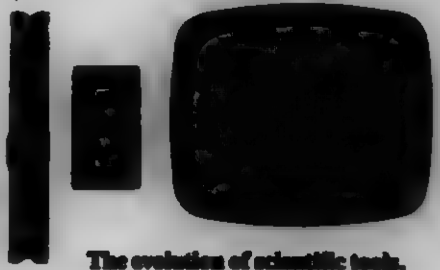

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Supply center to Europe

ITT CORP.
THE NETHERLANDS

ITT, the telecommunications, industrial technology, natural resource and diversified service company with annual sales exceeding $20 billion, has operated in the Netherlands for 74 years. On Sept. 10, this conglomerate with headquarters in New York City chose this country as the centerpoint for worldwide distribution of certain products.

"This now establishes Holland as our major redistribution center in Europe," says Levon Soorikian, the director of physical distribution and logistics for ITT. "We will be able to do here what we do in the States now — react within 24 hours to delivery anyplace in the country."

ITT expects to reduce inventory and transportation costs for goods shipped to and from Europe. In the computer area, those goods include personal computers, printers, semiconductors, connectors and telephone equipment. The port of Rotterdam and Schiphol Airport will be the entry points for the shipments, which will bear an expected transit value of $590 million.

According to Soorikian, the Netherlands was chosen because of rapid Customs processing, a strong transportation infrastructure and sophisticated communications links to ITT facilities worldwide. From the Netherlands, ITT will ship to Madrid, Paris, Milan, Stuttgart, Vienna, Antwerp, London, Oslo, Copenhagen and Stockholm. The estimated yuearly load through Rotterdam is 3,000 containers of finished goods, semiassembled products and raw materials. Air freight volume expected through Schiphol is 3,000 tons per year.

Within Europe, ITT expects to minimize air shipments by collecting inventory at a single distribution spot. Soorikian says, "That makes it possible to keep a pipeline and meet schedules without spending an inordinate amount of money for premium transportation."

In the first phase of the plan, existing Dutch transportation facilities will be used for assembly and distribution. Later, ITT's own facilities will take over as the single source of inventory for Common Market countries as well as Africa and the Middle East. In the last phase, ITT will use its centers in the Netherlands to store parts and do repairs.

"Right now," Soorikian says, "it's not bad service in Europe, but it's located in many points. We're hoping to be able to provide at least the same level of service but not with inventory scattered throughout so many different places. When we go into the repair area, then we will have all the components and repair parts in one place. Right now repair is scattered; we hope to concentrate it."

Soorikian sees no barriers to implementing phases two and three because "it is easy to establish bonded and freeport facilities in Holland. Configuration of high-tech equipment for exports and imports will be performed under freeport conditions."

The new ITT distribution center is expected to create 200 to 300 new jobs and provide millions of dollars of new business for Dutch transportation companies.

Joint venture in switches

AT&T and PHILIPS TELECOMMUNICATIONS, B.V.
Hilversum

AT&T developed the digital switch; Philips is modifying it for application in CEPT and CCITT networks. The result is the 5ESS-PRX, a digital exchange product offered by the joint venture company formed out of the communications and electronics industry giants.

They decided a realignment of forces was necessary to produce economies of scale in manufacturing, aggressive research and development capabilities and a stable supplier environment to service customers. The joint company, launched early this year, intends to develop, manufacture and market systems for public telecommunications networks for countries worldwide.

Philips will internationalize AT&T's basic switch, the 5ESS, by modifying such things as the physical cabinet, the power requirements and the interface to maintenance operations. Philips also contributes its national organizations — marketing groups so assimilated into the host country that most citizens believe the company to be native. These sales organizations theoretically can respond quickly to the needs of local telecommunications authorities.

"Fifteen years ago, we were a happy industry," says F.C. Kuznik, vice-president of marketing. "We were mature, conservative management. That all is gone."

The estimated $60 billion world telephony market cannot support the massive development costs associated with a new switch, Kuznik says, for most companies. A European company going alone would need to win 100% of several major countries just to recover development costs.

In 1982, AT&T owned 23% of the switching equipment market and Philips 2%. Kuznik puts the cutoff point for recovery of cost by the new joint venture at 15% of the market.

In this venture, AT&T provides the developed product and Philips, by virtue of being a Dutch company, eases the way through the European Economic Community.

Kuznik sees a tremendous hunger for high technology in Europe. Yet there are obstacles. "We are nowhere near open telecommunications as in the U.S. But costs are becoming so that maybe someday . . . At some point, governments are going to say they can't afford to back public telephone systems.

"In Holland," Kuznik continues, "there is no capital gains tax, so no way to write off a loss. If you invest in something and it flops, you are in trouble. Of course, profits are not taxed, either, but who would risk his savings?"

One other advantage Philips gets from the venture is access to AT&T's Unix. "We have Unix as used internally at Bell Labs," Kuznik says, "which is one or two steps ahead of what is available commercially."

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1. **BUSINESS/INDUSTRY (Circle One)**
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User ______
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor ______

2. **OCCUPATION/FUNCTION (Circle One)**
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
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41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other ______

3. **COMPUTER INVOLVEMENT (Circle all that apply)**
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-182

IBM facility set to grow

IBM INTERNATIONAL OPERATIONS
Uithoorn

Thirty-three thousand networked terminals and 130 international telecommunications lines service this suburban Amsterdam location that includes IBM's second largest typewriter plant and its second largest European programming facility.

J. Schoonenberg, director of international operations, says, "We can do complex things here that others have trouble doing. That is our added value. We offset high labor costs through quality produced on time. It took us awhile to show the outside world. Last year IBM took the decision for us to grow. All future development of financial applications worldwide will now take place here."

Uithoorn employs 600 in its work force, which will grow to 700 soon; 400 are programmers and analysts.

Uithoorn had prime responsibility for development of DOS. It is the site of one of seven computer systems that make up the data base for Retain, the Remote Technical Assistance and Information Network, an internal IBM network linking engineers worldwide. Currently, 20,000 are registered users, 350 of whom can access Retain at any time. Any problem related to DOS is automatically routed to the "problem determination and fix group" in Uithoorn.

This facility also is a site for the Hone (Hands-on Network Environment) system, which supports 32,000 regular users, 1,100 of whom can log on simultaneously for support in selling and installing IBM systems.

Current product

Andre du Croix, Information Network Services development manager, describes a current product — a system relating Prolog and Business System 12.

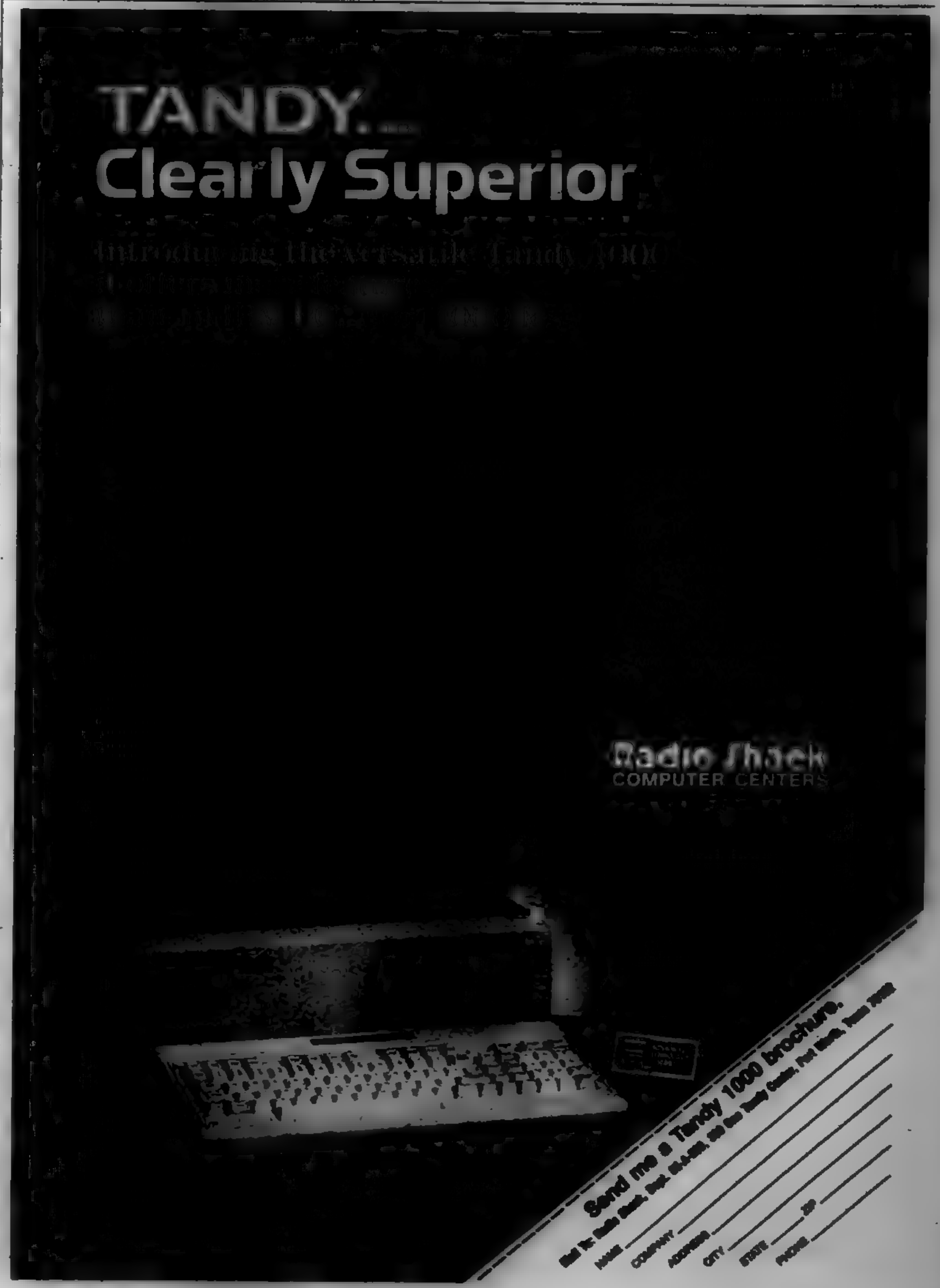
"We're trying to link logic programming and relational data bases. It should be possible to support a version of logic programming that runs directly on the data base itself without further need for interfacing," du Croix says. "The advantage is that the full power of relational data base facilities becomes available to the logic programmer.

"This is not a commercial product," du Croix emphasizes. "It's for IBM internal use only."

BS12 is the new relational data base system. It takes its name from the number of relational commands. One of the first applications will be used with the Exshare Databank, a data base on securities of international stock market exchanges. Users can get information from any of the exchanges displayed on their screens.

ALRIGHT! QUIT CLOWNING AROUND AND LET'S GET DOWN TO BUSINESS!

IBM's Uithoorn facility had prime responsibility for development of DOS.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Nijmegen**

DEC management asked itself a question back in 1981: How could the company better supply its installed base in Europe, which now numbers 100,000 computers? Supplying directly from the U.S. was too time- and money-consuming.

A site on the continent was needed. The Netherlands was chosen.

Analysis of DEC's decision-making process points up Holland's advantages as a distribution site. The company first identified the variables in its business needs: stable business environment; proximity to efficient transportation; workers with international business sense; trained high-technology people; high-quality telecommunications possibilities; and close proximity to the concentration of DEC revenue-producing locations.

"We felt subsidies were the last consideration," says Simon Dijkhuizen, general manager at the Nijmegen facility. "Operational factors were most important. The UK was considered too peripheral and Ireland too high a risk as well as too peripheral."

Potential countries numbered four: Belgium, France, Germany and Holland. The selection criteria were broken down to the categories of distribution, personnel, telecommunications and financial.

The Netherlands equalled or surpassed its three competing countries in each element of distribution, ranging from Customs attitude (Holland's famous "five-second Customs" processing), banking facilities, transport network and cost and so on.

In terms of the personnel criteria, Dijkhuizen says, Nijmegen sits across from Europe's largest semiconductor plant run by Philips Information Systems, Inc. and still has no problem finding workers. That isn't surprising in a region of the Netherlands suffering 31% unemployment.

The Netherlands fared worst in the area of telecommunications, being judged by DEC as adequate but not superior in international voice and data capabilities, satellite transmission, degree of regulation and cost.

As for financial incentives, Dijkhuizen notes that there were "com-

DEC chose the Netherlands as the supply center for its European customers.

**Simon Dijkhuizen
General Manager
Nijmegen Parts Center**

Robert Campbell
General Manager
Software Distribution

pelling reasons to open another facility in Ireland, which offers tax holidays of 20 years sometimes. But we chose to optimize around distribution."

In the Netherlands, a company can individually negotiate tax rules with the government. A distribution center such as at Nijmegen services profit centers in Europe and in doing so has costs but no real profits. The "cost-plus" method of taxation is used. A percentage, normally negotiated between 10 and 25, of the cost of the distribution center to do business is subject to the corporate tax rate. DEC negotiated a 10% level.

The Nijmegen facility receives about 30 tons a month of defective parts from European subsidiaries for repair. The town isn't particularly close to Schiphol Airport or Rotterdam harbor, the two prime locations in any distribution strategist's plans. But there are tax benefits to locating further east in the Netherlands, and 90% of the parts come to Nijmegen by truck rather than by air or sea.

More recently, DEC decided to centralize its European software distribution system in Nijmegen, with American Robert Campbell as manager. He says, "The Dutch work ethic is extremely high; the workers are industrious, conscientious, aggressive. They're much more interested in details than Americans. I was shocked that assemblers and materials handlers were so interested in the details of business."

When DEC relocated the European Software Distribution Center to Nijmegen, Campbell experienced a few cultural work differences. On one Friday he asked a secretary to work overtime on Saturday morning and receiving a most amazed look. He discovered that workers expect management to plan better, to ask ahead of time for weekend work. They guard their time off.

About the workers council legislated by Dutch law into the management lives of corporations, Campbell says, "It frightened the life out of me in the beginning. It really isn't like a union — it's a partner."

Software development is distribution-sensitive, and DEC looked at Ireland, Spain and the UK as central sites. The software center began in Galway, but demand could not be met from that Irish location.

"Galway isn't serviced by a major airline," Campbell says. "Shannon is primarily a tourist airport. You can't get anything out of Ireland. There was growing market pressure for fast turnaround of 48 hours. It's possible now to get our product in the hands of users anywhere in the continent within 24 hours, if necessary."

Working toward OSI

NCR SYSTEMS ENGINEERING
Utrecht

NCR Corp.'s presence here is small — a $7 million investment at offices employing 125. The importance of the development work goes much beyond the figures.

European countries are leading proponents of the International Standards Organization's Open Systems Interconnection (OSI) model, which attempts to make compatible local and long-haul networks. "The work is being done here," says NCR's P. Van Roekel, "to prepare the company for products to meet the OSI model. It's coming."

According to Van Roekel, the Systems Engineering group at Utrecht is also leading the move within NCR to IBM's Systems Network Architecture (SNA) communications marketplace. We have developed here high-speed modems for connecting to IBM." These modems apparently work with IBM's SNA modems.

Mirlan is a mid-range local-area network being developed jointly by NCR on the communications end (transceiver and channel designs) and Intel Corp. on the controller side (local-area network controller design). The first products from this project are expected early in 1985. Mirlan reportedly can run on cabling schemes from both IBM and AT&T.

Mirlan's objectives are:

- Low cost per connected device.
- Suitable for coaxial and twisted pair wiring.
- Designed for transaction-type systems.
- Based on international standards.
- Use of international standards (IEEE 802.3).
- Capable of covering 3,600 meters' distance.
- Design available to the industry.
- Workstations removable without taking the system down.

Currently, the coaxial system for Mirlan is operational. Samples of the transceiver in development by NCR are expected by the third quarter of 1985. Samples are available now of Intel's controllers.

Until now, when you operated the PC in the terminal emulation mode, keys had to be redefined.

For inexperienced users, that could be both awkward and time-consuming.

What's more, it's always required quite a few keystrokes to engage a PC-to-mainframe function such as file transferring.

The result again was an increase in the chance for human error.

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Venray

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The 2,100 employees of Rank Xerox in Venray produce copiers and output devices, specifically the world supply of processors for the Xerox Corp. 1045 and the output modules for the Xerox 1075. Goods are distributed to 80 destinations in 50 countries.

Rank Xerox at Venray typifies full-blown manufacturing resource planning (MRP) principles. It is a "just-in-time" plant linked to automated handling of parts and control of the supply lines.

According to A. Noordjik, manager of general services, the company uses the transport network to buffer incoming parts flow. Trucks can be speeded up or slowed down throughout Europe so that they arrive at their specified hour. The "window" for suppliers to deliver their parts is zero to three days.

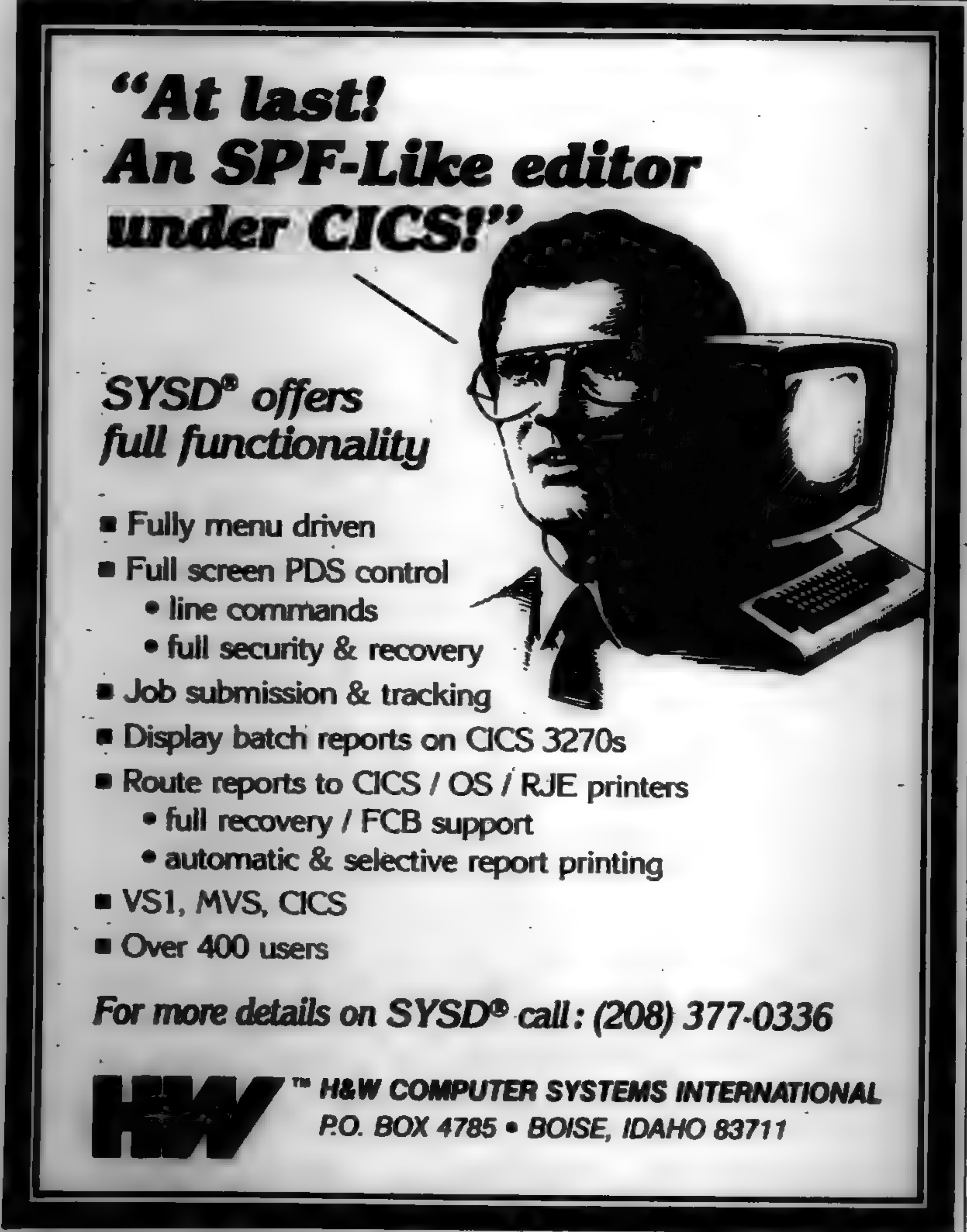
Venray is one of the most advanced Xerox units. Power for automating the manufacturing control is furnished by an IBM 3083 for the Xerox Management Program, a Data General Corp. MV 10,000 (2x) for the Automated Material Control System, a DEC PDP-11/23 and Zilog, Inc. 80 (6x) for the cranes and shuttle cars, as well as the automatic guided vehicles.

No-inspection policy

Rank Xerox reduced from 4,000 to 600 the number of its parts suppliers and instituted a no-inspection policy. The assembly line reject rate of 1,500 per million now compares with 10,000 in 1982. Inventory was reduced from nearly three months' worth to about 23 days. By year's end, 80% of the supply will be just in time.

It took four years to educate suppliers of the 40,000 parts coming in of the necessity of delivering on time. The operating philosophy is: If you can control the external supplier, you don't need extensive inventory.

In the change to an automated manufacturing facility and with the decision to use Xerox Computer Services, located nearby, for computing power, the DP department at Rank Xerox, Venray, dropped from 150 to 5.



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Portables on the factory floor

The factory floor has become a primary target in the corporate battle to improve productivity.

By John Balga

Until recently, hand-held computers were little more than advanced calculators with limited use of variables, programming languages and memory. They were, however, useful for making quick calculations and running small "canned" programs. But the past few years have witnessed the global acceptance of the personal computer and a growing interest in more powerful hand-held computers.

The new hand-held computers offer the user many of the features of a personal computer in addition to several unique extras. A typical hand-held configuration will support a display of anywhere from one to 25 lines, full keyboard functions, random-access memory,

an integrated printer, communications capabilities and some form of optical reader (bar code, magnetic stripe or punched card).

As far as software is concerned, a full operating system with a programming language (usually Basic) is included in read-only memory (ROM). Recent advances in ROM-based software will provide word processing, electronic spreadsheet, data base management, telecommunications, calculator functions and file utility functions. Units are powered by rechargeable batteries, which provide a minimum of eight hours of operation. All this capability is then bundled into a lightweight, compact package that can be held and operated in a person's hand.

Several manufacturers are producing hand-held computers appropriate for factory applications.

> *Erroneous and inefficient data transfers occur primarily in operations where the communication between worker and supervisor takes place on paper.*

Among the most popular units are the Hewlett-Packard Co. Model 75C, the HP 110 and the Tandy Corp. Model 100. Prices for a complete system range between $1,000 and $2,000, depending on options.

In addition to generic hand-held computers, specialized hand-held computers, called portable data entry terminals, have entered the market. Some of these terminals are programmed in a low-level language (commonly Forth) to conserve on memory requirements. Manufacturers of portable data entry terminals include MSI Data Corp. and Telxon Corp.

Many applications have greeted the hand-held computer with open arms (and hands) because of one key advantage other systems cannot offer — mobility. One application area that critically requires mobility is the factory floor.

Immediate rewards

The factory floor has become a key target in a company's fight for improving productivity. In many cases, productivity can be immediately increased by acquiring and distributing accurate data quickly. Erroneous and inefficient data transfers occur primarily in operations where the communication between worker and supervisor takes place on paper. Human inscription is extremely vulnerable to misinterpretation. In addition, the paper on which data is recorded can be lost or destroyed.

Hand-held computers in such applications have eliminated keypunching by allowing direct input of the data into the system. Also, as data is being entered, input can be checked to eliminate virtually all errors. Once the data is accumulated, it can be transmitted to a host computer for calculations and report generation. The results of such a system are realized immediately.

Some of the more common applications in which hand-held computers have prospered on the factory floor include order picking, warehouse receiving operations, inventory control and front-line control.

Order picking

An order picking application tells workers which orders must be processed and where the orders are physically located. This operation is commonly implemented by conveying the order information on paper. A worker must retrieve the paperwork from a supervisor prior to picking any orders. When the task is complete, the paperwork is returned to the supervisor and new orders are distributed.

This application can be effectively converted into a hand-held computer application. At the start of a shift, an order picker retrieves a hand-held computer containing order processing that must be performed during the shift by each worker. The order information is downloaded by a host computer and arranged to optimize the worker's route.

A worker starts up the device by entering an employee number, which will serve as a key to display only orders relevant to that worker. The computer then displays the order number, quantity of parts, location of parts and perhaps quickest route to the destination. If more information is required, the worker may request the system to display it.

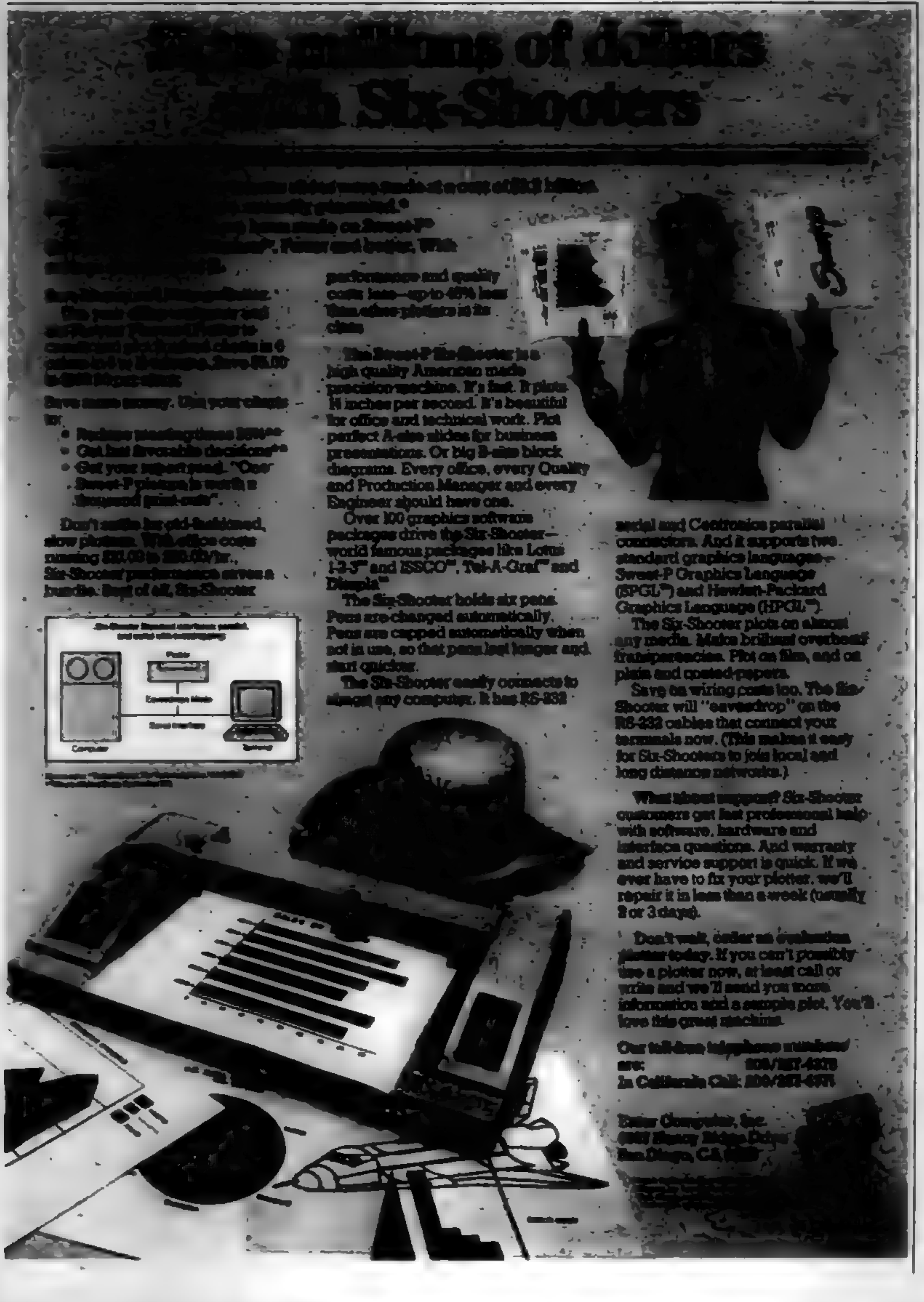
As a worker completes an order, the completion data (actual number of parts picked and number of parts remaining at location) is entered into the computer before the next order is displayed. A time-of-day stamp is automatically recorded in the hand-held computer in order to track the productivity of each worker.

At the completion of a shift, the worker returns the device to the supervisor, who then uploads any recorded data to the host. The data is processed into report format and immediately forwarded to supervisors as well as upper management. Any orders not processed are requeued for picking in the next available shift.

This approach to order picking allows a worker the mobility to process orders efficiently, while eliminating the requirement to keypunch the status of each order.

Warehouse receiving operation

A warehouse receiving operation revolves around fork-truck activity. As a delivery is accepted at the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performance and quality costs less—up to 45% less than other plotters in its class.

The Sweet-P Six-Shooter is a high quality American made precision machine. It's fast. It plots 14 inches per second. It's beautiful for office and technical work. Plot perfect A-size slides for business presentations. Or big B-size block diagrams. Every office, every Quality and Production Manager and every Engineer should have one.

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receiving dock, the supervisor instructs the fork-truck operator where to store the delivery, either verbally or as a note scribbled on a piece of paper. The operator proceeds to stock the delivery and returns for another run.

To improve this kind of operation, a hand-held computer can be installed on the fork truck. Before each shift, information concerning the current status of the warehouse facility and expected deliveries is downloaded into the hand-held computer. Upon receiving a shipment, the operator enters the number and/or description of the delivery. The computer will then determine and display the desired location for the delivery.

Once at the specified location, the fork-truck operator keys in the actual storage location, and the time of day is automatically recorded. In addition, the computer generates a label identifying the contents of the delivery, vendor information and the date of delivery. The label is then applied to the shipment to enable a visual inventory inspection. At this stage, a label can also be generated to serialize important inventory items.

The input information is uploaded to a host computer following the completion of a shift. This data is then used to update the available storage facilities in the warehouse as well as inventory counts.

The installation of a warehouse receiving system will eliminate the requirement of having a routing supervisor at the receiving dock. In addition, making received goods available to manufacturing quickly may eliminate the problem of running out of raw materials.

Inventory control

Inventory control is probably the most prominent application for hand-held computers. The process of counting inventory obviously requires mobility. Therefore, the paper-and-pencil approach was ideal and is still the primary method of acquiring inventory counts.

Initial inventory counts are based on the data received from the warehouse receiving operation. As the inventory is distributed and depleted, inventory counts are decreased. The inventory tallies are keypunched periodically into a host computer in order to generate inventory reports.

The issue of timely information is important here. If the inventory levels are to be maintained above a critical level, the deleted inventory counts must be recorded immediately following a shift, and management must provide the respective reports shortly thereafter. A timely inventory feedback procedure may eliminate stock outages as well as reduce the amount of inventory required.

The application of hand-held computers offers a solution to this problem. Hand-held devices containing current inventory data can be provided to each worker. The computer guides the worker to particular items that must be accounted for. The worker inputs the quantity of items at that particular location. If there is a discrepancy between the expected and actual number of items, the device will prompt the worker to recount the items and record occurrence. At the completion of the inventory, the recorded data is uploaded to a host computer and inventory reports are generated.

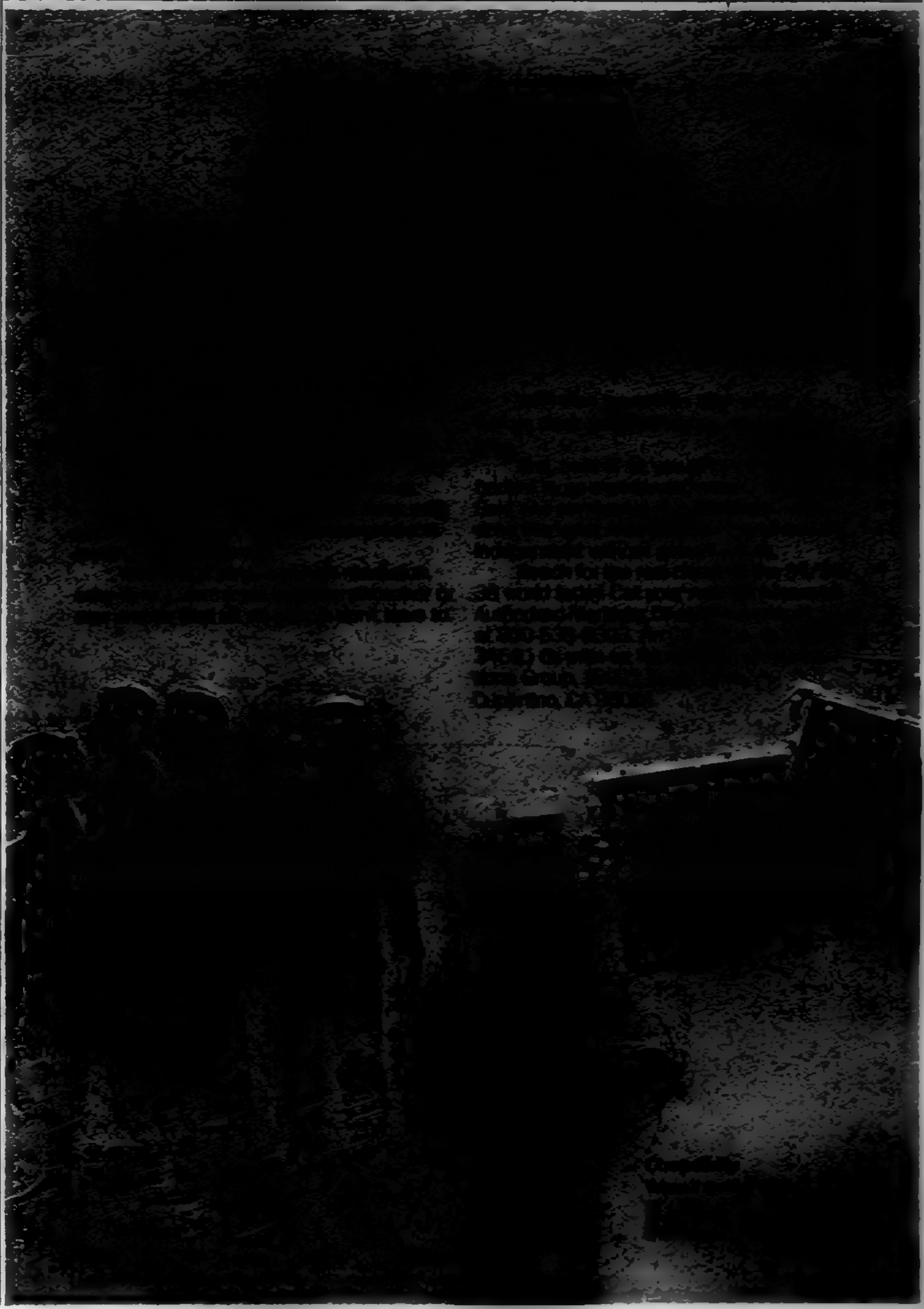
Front-line control

Factory-floor operations use various systems to track the rate of production. A common approach to this problem has been to require a supervisor to inspect the production of each workstation at selected time intervals and record the accumulated results.

The accumulated production is then compared with an expected calculation of output. If a discrepancy exists, the supervisor must then track down the cause of the shortage or surplus. Each problem and any action taken to remedy it is recorded in a production log.

The production readings and problem reports are handed over to a keypunch operator at the completion of a shift. The data is entered into a host computer, which generates production reports for management, usually on a weekly basis. During this keypunch phase, human encryption errors and keypunch errors may introduce fluctuations in the actual production that will either cover up or increase the number of problems.

The problem with this



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> *In general, technology for portable data entry terminals has been slow in reaching the industrial marketplace. Many small companies have come along to foster the technology.*

approach lies in the time it takes to acquire and process production data. Any production problems will exist for at least a week before they are filtered to management.

And by the time management investigates a problem, it may no longer be apparent, and other problems may exist.

A hand-held computer can provide for automatic recording of production output, and any required performance analysis can be calculated immediately for review.

With this system approach, the supervisor is prompted to inspect production, a verification is performed on all data input by the supervisor.

Expected output is calculated automatically, based on the operation and manpower applied, an on-line analysis is performed and the keypunch requirement is eliminated.

Bringing in a portable

General Electric Co. uses a portable computer for data entry in a shop-floor pilot project involving eight workstations. The system enables a supervisor to analyze performance on-site. In this front-line control operation, all the necessary questions are displayed by the terminal, a search is conducted for errors and calculations are performed automatically. At the end of the shift, all performance data is transferred to a host computer for further processing and data logging.

The first step in designing this system was to establish its flow. Then hardware and software specifications could be determined.

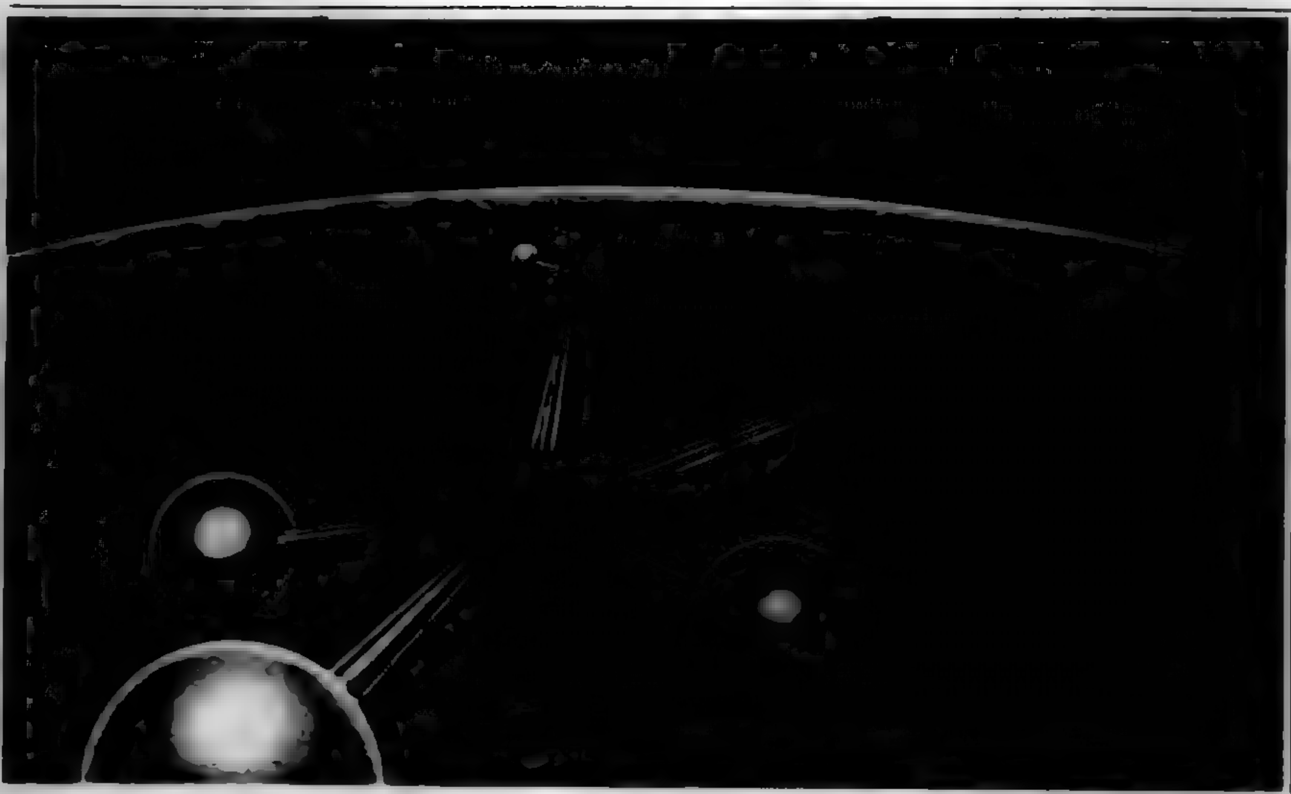
Given a production schedule, the supervisor would initiate the terminal every day by entering the type of operation being performed, the manpower for each operating station and the expected production rate for each station. At select times during the day, the supervisor would record the actual production output at each operating station via prompting by the terminal. If the output rate fell below expectation, the terminal would immediately display the variance and query the supervisor to identify the problem as well as what actions would be taken to remedy the situation.

Upon termination of the work shift, the portable data entry terminal would transmit all recorded information concerning the operation's activities to a host computer, where it would be converted and stored in a resident data base.

Hardware selection

With the system flow defined, two pieces of hardware had to be selected: a host computer and the portable data entry terminal. Initially, the only major constraint was cost, which was set at a maximum of $5,000 for the host computer hardware, $2,000 for the hand-held terminal.

The selection criteria for the host computer were kept general: a reliable microcomputer system that could support external data communications and could use a large selection of development and application software. The IBM Personal Computer was selected to perform the host computer functions because of its interface options and the amount of commercial software. Among its available adapter cards are RS-232 asynchronous communications, parallel I/O and graphics display. The estimated price for the Personal Computer was $4,000.



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Meeting the Communications Challenge of the 80's

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The terminal selection process developed into a major egg hunt. In general, technology for portable data entry terminals has been slow in reaching the industrial marketplace. Many small companies have come along to foster the technology. The selection criteria were based on obtaining a device that supported a conventional full alphanumeric keyboard (without second function key entry), data transmission capability and a large display window.

The HP75C was finally selected. A recent entry in the HP portable line, the 75C weighs 26 oz. and measures 10 in. by 5 in. by 1.25 in. Powered by nickel-cadmium batteries, it contains a 48K ROM-based operating system with Basic, which supports up to 24K bytes of RAM, a 32-character LCD and a typewriter keyboard. External hardware, such as printers, video monitors and communications links, can be added to the system using adapters attached on the HP-IL. A fully loaded HP-75C lists at $1,895.

Applications software design

The front-line control system design was now out of the woods. The only remaining task was to develop the data acquisition and data transmission software. The front-line control system software is divided into three modules: initialization, data collection and data transfer.

Initialization is performed before the beginning of each shift. The supervisor selects a model number of the given production process being performed, and the corresponding data is loaded into the shift data file. The data for each workstation is then displayed for the supervisor to confirm or to update.

After the initialization is complete, an appointment file containing time intervals for monitoring production output is loaded. When the real-time resident in the HP-75C reaches a set time, a beeper sounds, reminding the supervisor to monitor workstation production.

For each workstation, the system prompts for the cumulative production output. The expected output is computed for the elapsed time and compared to the actual output for that time interval. Any shortage causes the system to prompt for further information concerning the shortage, such as possible cause, persons notified, action taken and an optional description.

For both the initialization and data collection process, input is checked for certain obvious user mistakes, such as alpha input in lieu of numeric. Input that passes this review is then echoed by the HP-75C for confirmation so that logical errors can be corrected.

After acquiring all the production data for a given shift, the hand-held system is connected to the Personal Computer for data transmission. Initiating the data transfer programs at the HP-75C and at the Personal Computer will result in uploading the production data.

If any errors occur in data transmission, the supervisor is notified and the necessary steps displayed on the Personal Computer screen. Otherwise, a data file is created for the daily data and appended to the data file for the current fiscal week. Only if the supervisor signifies to the HP-75C that the data transmission for that day was successful will the HP purge the data files for that shift.

> *Besides reminding the supervisor when and what to enter, the portable system had to perform all the usual number of checks and double-checks of a data collection system.*

The transferred data files are converted into data interchange format (DIF) at the Personal Computer. The DIF files can then be directly accessed by various commercial software packages compatible with this format.

Such packages include electronic spreadsheets (Software Arts, Inc.'s Visicalc, Microsoft Corp.'s Multiplan), data base utilities (Ashton-Tate's Dbase-II, Visicorp's Visi File and Visi Dex), project scheduling (Visi Schedule) and plotting software (Visi Plot/Visi Trend, Decision Resources' Chart-Master).

System software development

Developing software for the hand-held system was a unique experience. Programming on a portable computer requires the acceptance of several limitations. Even with the 8K memory expansion module, programs and data files could only occupy a limited 24K bytes of storage space. Exceeding this limit resulted in a "locked" condition, in which no system commands could be executed, not even deleting files to free memory.

Yet, it was more than simply scaling everything down. Besides reminding the supervisor when and what to enter, the portable system had to perform all the usual number of checks and double-checks inherent in a data collection system. The area of human engineering was especially demanding.

Because the display line was only 32 characters long, each prompt had to be as concise as possible without being cryptic. In order to provide enough information, longer prompts were displayed in sections, with a timed delay in between.

At the same time, the system had to be kept as streamlined as possible, so that it did not become cumbersome to use. As with any system, it was a question of balance.

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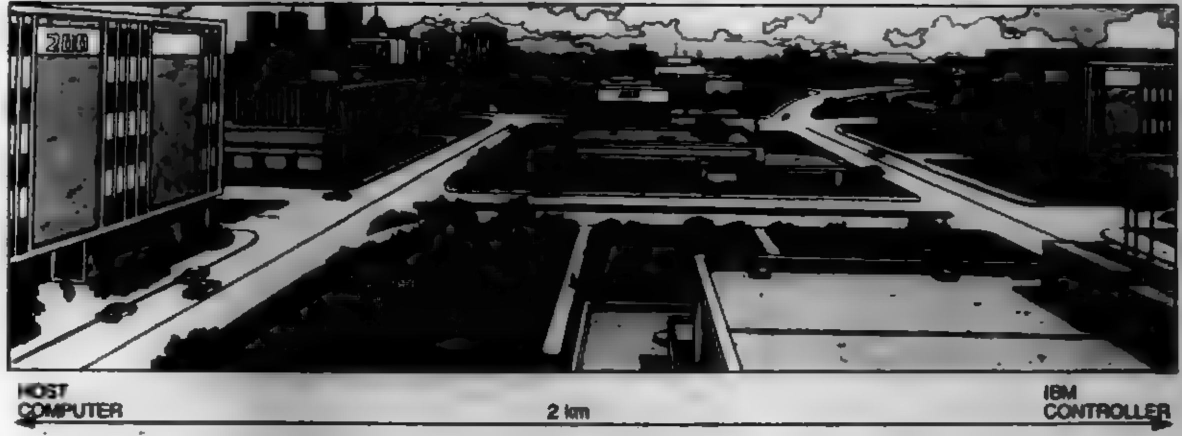

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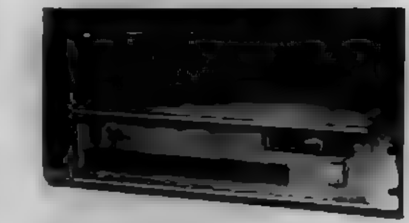

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The development of the IBM software was built around two factors: the method of data transfer and the rigid requirements of the data interchange format. Because of the nature of the data transfer, there was a high risk of losing individual characters. To prevent this loss, the input loop was limited to as few checks as possible.

At first, it was decided simply to check for a character and directly store it in an array. Trying this out with several cables proved how dangerous this approach was. Because the port frequently picked up noise from the cable as incoming characters, the input array was quickly filled with garbage data before the HP-75C had signalled the end of transmission. Although it increased the chance that a character might be missed, a second check was added to the loop. Only those characters of decimal code 122 (lower case z) or less were stored in a vector array. Termination of the transmission was signalled by two bell characters in a row on the rather reasonable assumption that it would be unlikely that chance (and noise) would produce two such characters in a row.

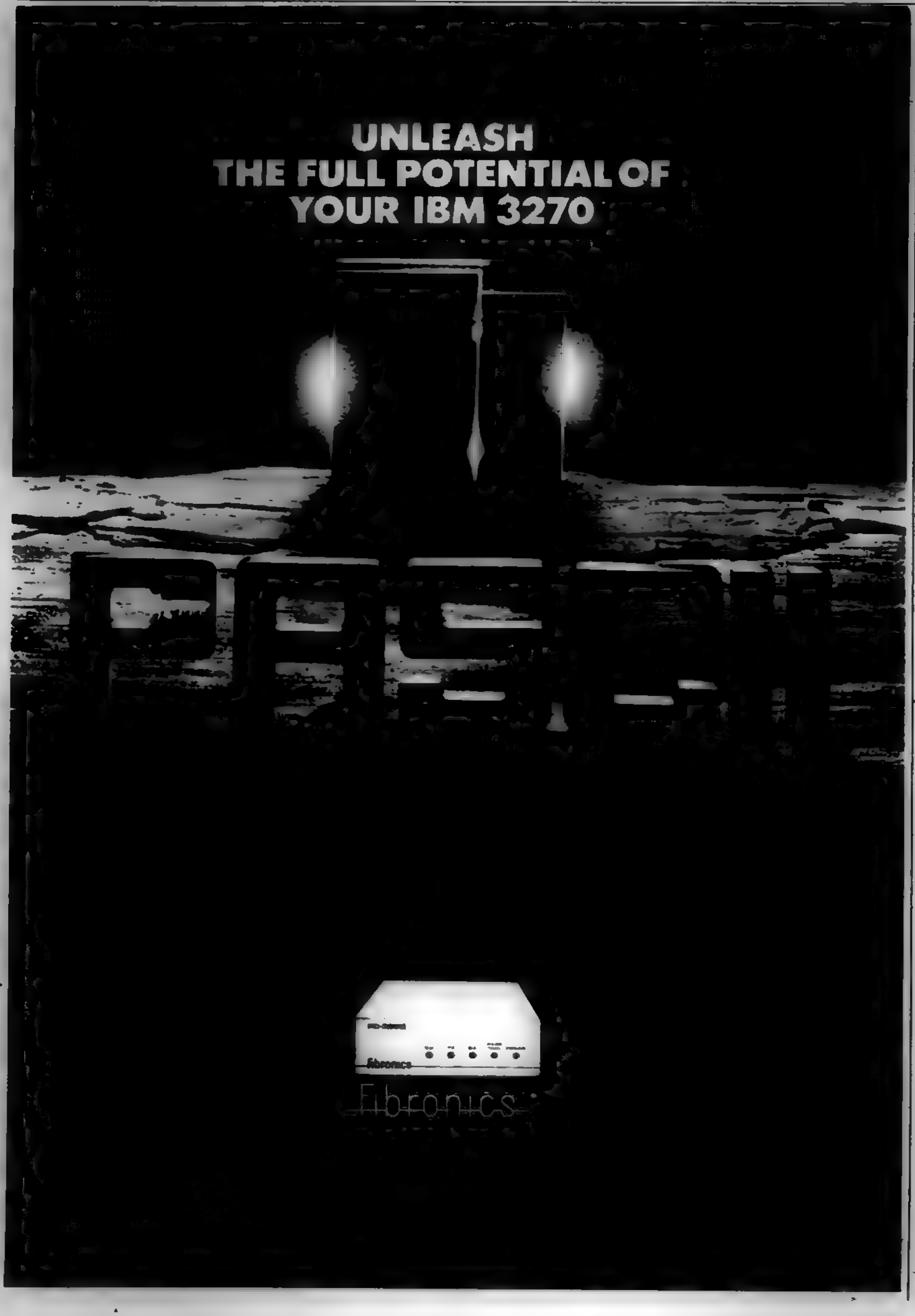
After the termination characters were received, the program separated the characters into words. This second loop converted the decimal codes to characters and concatenated the characters until a carriage return was reached. The word, minus the carriage return, was then stored in a second array, still as a string. Because the DIF file organization was somewhat irregular, a third loop wrote the individual DIF records.

The DIF format itself is very particular in its construction, with checks and double-checks for each data record. Special header records declare the number of rows and columns in advance. Each row is then marked by its own (BOT) header record. Individual data elements consist of two records. The first contains two numbers: the type of element (whether numeric, string or header) and a numeric value. The second record contains a string. If the element is numeric, the value in the first record is the value of the element and the string contains a "V." If the element is a string, the numeric value is ignored and the contents of the element are found in the second record. Finally, the end of data is marked by a special EOD record.

Strict requirements

Beyond this double-layered description, the programmer must beware of yet more. That innocuous-looking string record has strict requirements. Certain special headers require a null record surrounded by double quotes (" "). The BOT and EOD header labels and the V for numeric records must not be surrounded by quotes. The string for string elements varies. Strings containing any special characters (blanks, commas and so on) must be in double quotes, while a single word can do without. Files whose contents conflict with this are considered invalid and are not recognized by Visicalc.

In order to create a valid DIF file, a parallel format array was set up, containing the type and string length for that DIF record. As each string of the string array was read, the appropriate form of record was written, converting strings to numbers where necessary and



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fitting strings to the proper length.

Hardware interfacing

The next step in the system design was to integrate the host computer with the portable data entry terminal.

Establishing communications between the two proved to be a nightmare. Since HP announced a May 1984 release date for the RS-232C interface on the HP-75C, the decision to use HP's General Purpose Input/Output (GPIO) interface for data communications was not difficult. The GPIO interface enables unidirectional or bidirectional communications with either an 8- or 16-bit parallel bus structure.

The IBM Personal Computer list of hardware options does not contain a parallel communications interface. It does, however, contain two parallel printer adapters, the Monochrome Display/Parallel Printer Adapter and the Parallel Printer Adapter (1505200). Further investigation into the technical reference manual revealed that both adapters "can be used as a general input/output port." Logic diagrams showed that the parallel adapter designs are not identical and both adapters only support parallel output.

The one-line display, in many instances, does not provide the user with enough information.

The Parallel Printer Adapter contains the required hardware to perform parallel input, but an inherent design feature must be altered. (Heat up those soldering irons.)

After the adapter is modified, parallel input is enabled by writing a 20H to the Personal Computer's write control register.

In addition, when connecting the HP GPIO Interface to the IBM Parallel Printer Adapter, several communications lines need to be crossed in order to maintain signal continuity.

The HP GPIO supports various handshaking options (strobed, full handshake, half handshake) in transmitting or receiving data. The strobed option was selected for this application.

In this application, the data will always be uploaded from the HP-75C to the IBM Personal Computer.

On the HP-75C end, the data will be transferred in Ascii format to the GPIO interface via the HP-IL/GPIO interface adapter.

The initial response has been positive. However, the users have expressed dissatisfaction with the size of the hand-held device, claiming it from workstation to workstation.

Another complaint concerned using commercial software packages to access and manipulate the production data. While an experienced user of the application software can retrieve information he needs, the novice manager often is intimidated by the package. Therefore, a customized data base/spread-sheet application program would offer user friendliness in addition to protecting access to privileged information.

Other users of hand-held systems have expressed dissatisfaction with one-line displays and physical dimensions. The one-line display, in many cases, does not provide the user with enough information and frequently causes disorientation when he must enter multiple-line input parameters.

Some users find it awkward or uncomfortable to hold the computer in one hand and key in data with the other.

Nevertheless, the elimination of human inscription and keypunching have substantially decreased the number of input errors. The increase in productivity is immediate.

As the price of hand-held computers continues to decline while convenience and number of functions increase, more applications opportunities will surface in automating factory procedures.

About the author

John Balga is a technical researcher for a major diversified corporation. He is also a lecturer in engineering at the University of Bridgeport, Conn.

SCIENCE/SCOPE

Satellite images have led to the discovery of a large Mayan city hidden for centuries by the jungles of Mexico's Yucatan peninsula. Scientists uncovered over 100 possible ancient sites by studying false-color images provided by Landsat earth resources satellites. Jungles typically are made to appear bright red in these pictures. The ruins appeared pink or light red, because foliage had not grown as densely over the sites as it had in the neighboring jungle. The Landsat images also revealed the existence of vast farmed fields that may prompt new theories of how the ancient civilization was able to feed itself. The imaging instruments aboard the Landsat satellites, called multispectral scanners, were built by the Santa Barbara Research Center, a Hughes Aircraft Company subsidiary.

A U.S. Army laser device has been made less costly and more reliable by manufacturing its housing assembly in a new way. The improvements were made to the Ground/Vehicular Laser Locator Designator, which determines the distances to targets and pinpoints them for laser-homing weapons. The original housing assembly was made from a number of aluminum sections bonded together. The Value-Engineered housing is a one-piece fiberglass-nylon structure cast under high pressure. The changes stem from technology that was not available at the time the original contract was signed. Under the Department of Defense Value Engineering program, Hughes will share in the savings. The Value Engineering program is designed to encourage employees to look at the functions of a product and develop alternatives that cost less, perform better, and improve reliability.

A new vector network analyzer for millimeter-wave devices lets microwave designers make broad-band measurements at frequencies up to 110 GHz. The Hughes system uses a downconverter technique to convert a millimeter-wave signal into a frequency suitable for measurement on the Hewlett-Packard 8410 microwave vector network analyzer. The system permits analysis of all four S-parameters after a single insertion of the device under test, either in real time or, for enhanced accuracy, by computer-control using error-correcting software.

Development times for semicustom very large-scale integrated (VLSI) circuits have been cut from greater than one year to 20 weeks at an ultramodern computer-aided training and design center at the Hughes facility in Newport Beach, California. Utilizing advanced design automation software, a comprehensive library of predesigned logic functions (called Macros), and preprocessed wafers, the new facility is helping engineers design chips with 2,000 to 8,000 gates and with as many as 180 pins. New 3-micron dual-layer metal HCMOS processes are applied to both standard cell products and state-of-the-art gate arrays. Skilled design engineers and education specialists at the Newport Design Center provide training and technical support for IC designers throughout the company.

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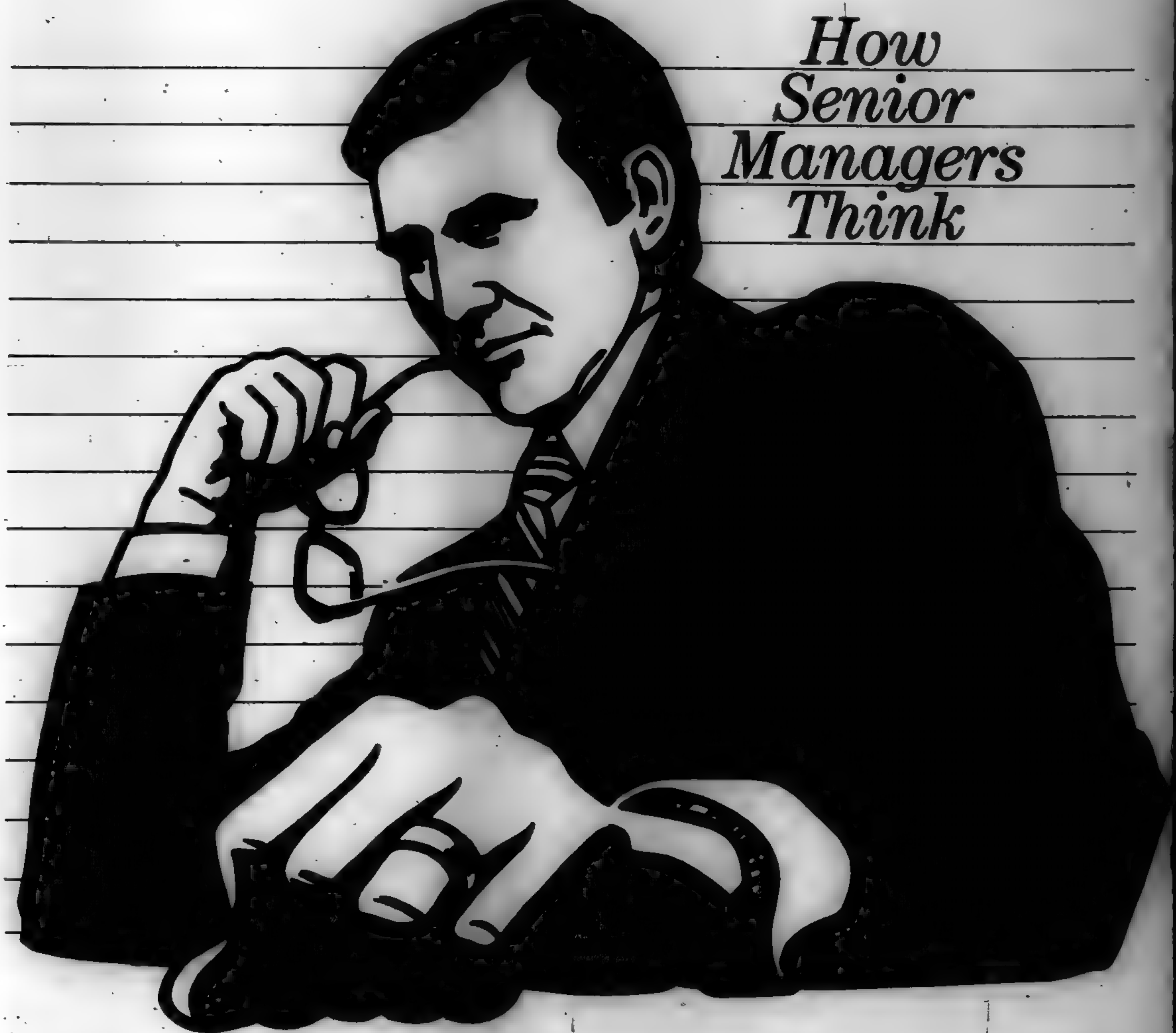
How Senior Managers Think



By Daniel Isenberg

If you communicate with senior managers or aspire to move up through the ranks, you can benefit from knowing what concerns them and how they combine intuition and rationality to solve problems.

> *"It is not enough to have a good mind. The main thing is to use it well."*
>
> — Rene Descartes

Jim LeBlanc phoned Steve Baum, who formerly worked in his division, to ask about the chief executive officer's new corporate task force on quality control that wanted to meet with Jim. Jim, the head of the industrial equipment division of Tanner Corp., thought that Steve, now director of technology, could help him figure out why the task force wanted to meet with him in two weeks.

"It's because you're doing so damn well

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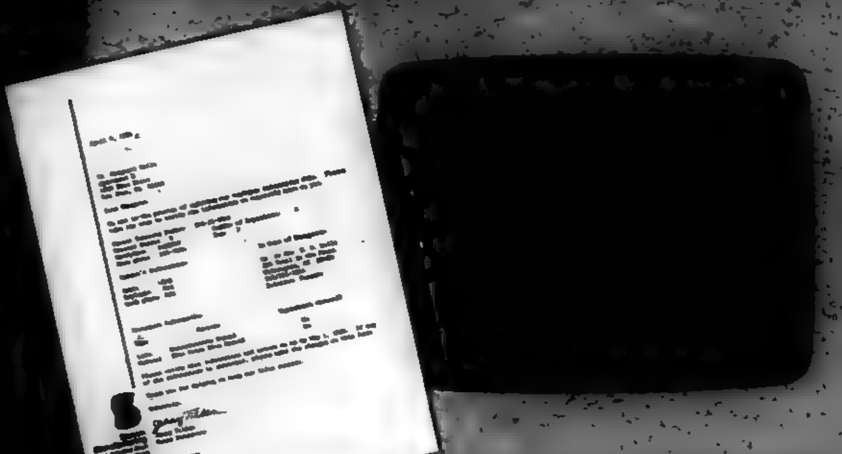

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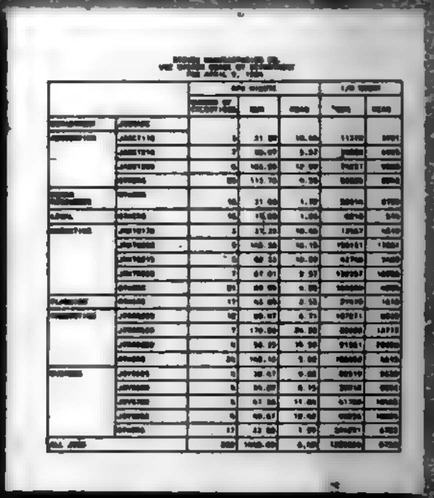

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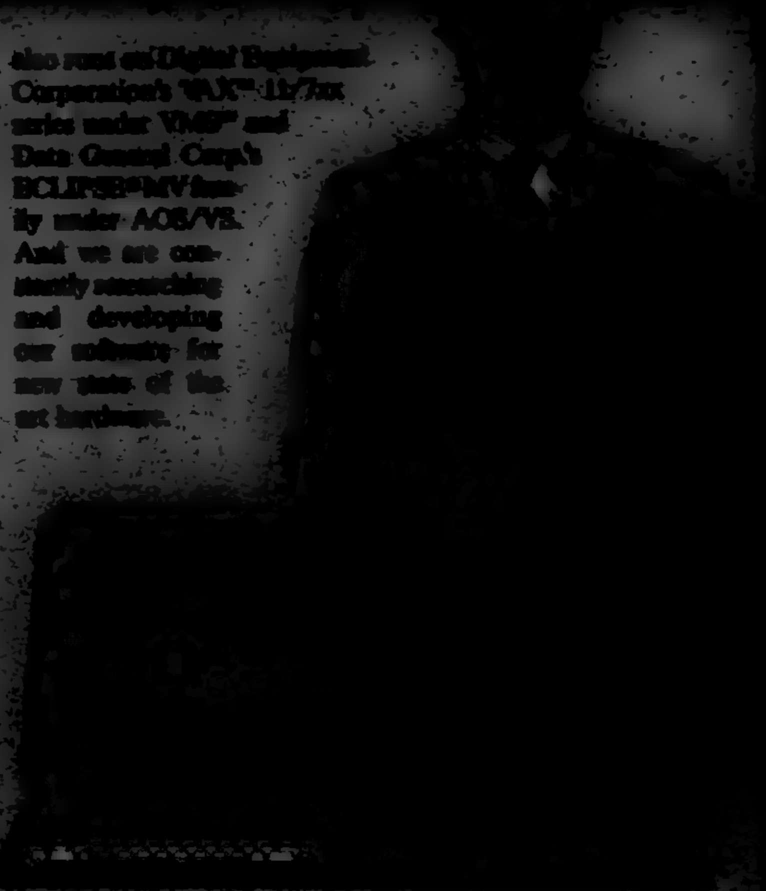

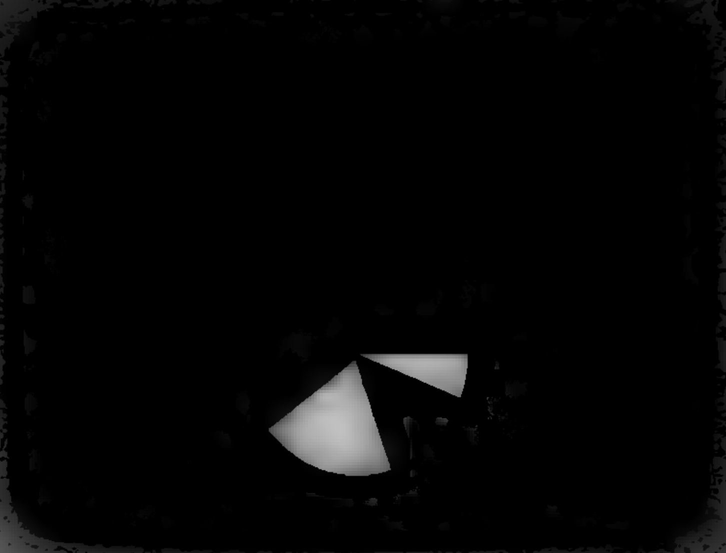

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down there, boss!" Steve replied.

"Gee, thanks. By the way, Steve, what's the agenda for Singer's staff meeting for next week?" [Singer was the president and Jim's boss.]

"Well, we're going to talk about the reorganization and look at the overhead reduction figures for each division. Then Singer's going to report on last week's executive committee meeting and his trip to Japan."

"How did it go?"

"His telex from Osaka sounded enthusiastic, but he just got in last night, and I haven't seen him yet."

"Well," said Jim, "I guess we'll just have to see, but if you hear something, call me right away because if Osaka comes through I'm going to have to hustle to get ready, and you know how Bernie hates to shake is. Now, about the task force . . ."

In the space of three minutes, Jim LeBlanc got a lot done. In addition to collecting critical information about a task force that the CEO, with unusual fanfare, had personally commissioned one month ago, he also began to plan his approach to the upcoming staff meeting. He decided not to try to get a presentation by his marketing people on opportunities in the Far East on the agenda.

Sensing that Singer was optimistic about the Osaka trip, Jim decided that he should get his people ready for the possibility that the deal would materialize, which meant pulling engineers off another project for a while.

What were the thinking processes that allowed Jim to get so much done so pointedly and so rapidly? What was going on in his mind during his conversation with Steve? How, given the incomplete and uncertain information that Steve gave him, did Jim conclude that the Japan deal was imminent?

Thought processes

For the past two years I have studied the thought processes used by more than a dozen very senior managers while on the job. The managers that I studied ranged in age from their lower 40s to their upper 50s, in managerial experience from 10 to 30 years and in current job tenure from four months to 10 years. Their companies ranged from $1 billion divisions in Fortune 100 companies to $10 million entrepreneurial companies just beginning to take hold in the marketplace.

Company products included low- and high-technology goods, and markets ranged from rapidly expanding to precipitately deteriorating. All but two of the executives were responsible for the overall performance of their business units. As all had been frequently promoted throughout their careers and were considered excellent performers across the board, they were a representative sample of today's successful business executives.

Two findings about how senior managers do not think stand out from the study. First, it is hard to pinpoint if or when they actually make decisions about major business or organizational issues on their own. And second, they seldom think in ways that one might simplistically view as "rational"; in other words, they rarely systematically formulate goals, assess their worth, evaluate the probabilities of alternative ways of reaching them and choose the path that maximizes expected return. Rather, managers frequently bypass rigorous, analytical planning altogether, particularly when they face difficult, novel or extremely entangled problems. When they do use analysis for a prolonged time, it is always in conjunction with intuition.

Obviously, decisions do get made in organizations, and these are frequently justified by data and logic. In particular, when viewed retrospectively over a long time period, effective executives often appear quite rational. Yet when studying their concurrent thinking processes, being "rational" does not best describe what the manager presiding over the decision-making process thinks about nor how he thinks.

I have a fourfold purpose in this article. First, I want to present a more accurate and empirically grounded description of what goes on inside the minds of senior managers (see sidebar on ID/32). Second, I hope to offer a more accurate description of managerial thinking that should help provide a beginning language for talking about these elusive mental phenomena. Third, I hope that this language will also help to relieve some managers of the inconsistency between their view of how they are "supposed to" think and the thinking processes that, through experience, they have learned are actually quite effective. Fourth, I want to take advantage of successful senior managers' experiences to explore the managerial implications of their thinking processes.

What they think about

Senior managers tend to think about two kinds of problems: how to create effective organizational processes and how to deal with one or two overriding concerns or very general goals. These two domains of thought underlie the two critical activities in which John P. Kotter found general managers engaged: developing and maintaining an extensive interpersonal network and formulating an agenda.

The primary focus of on-line managerial thinking is on organizational and interpersonal processes. By "process" I mean the ways managers bring people and groups together to handle problems and take action.

Whether proposing a change in the executive compensation structure, establishing priorities for a diverse group of business units, consolidating redundant operations or preparing for plant closings, a senior executive's conscious thoughts are

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foremost among the processes for accomplishing a change or implementing a decision: "Who are the key players here, and how can I get their support? Whom should I talk to first? Should I start by getting the production group's input? What kind of signal will that send to the marketing people? I can't afford to lose their commitment in the upcoming discussions on our market strategy."

> ***Successful senior managers think a lot about interpersonal processes and the people with whom they come in contact. They try to understand the strengths and weaknesses of others, the relationships that are important to them and their agendas and priorities.***

During the first months of his tenure, one area general manager I studied asked all of his business unit management teams to evaluate their own units. Subsequently, the area manager and his staff spent a day or more with each team discussing the whole area, each business unit within it and how the two interrelated.

Although the area manager was concerned with the substance of the business-unit priorities, uppermost in his mind was a series of process concerns: How could the review process help managers be increasingly committed to their goals? How could the process help managers to become increasingly aware of the interdependencies among business units? How did his business unit managers use their people in reviewing their business units? How much management depth existed in the units?

In addition to thinking about organizational processes, successful senior managers think a lot about interpersonal processes and the people with whom they come in contact. They try to understand the strengths and weaknesses of others, the relationships that are important to them and what their agendas and priorities are.

For example, the CEO of a small high-technology company spent more than an hour with his personnel director, a woman he rated as having performed excellently so far and whom he saw as having great potential although still inexperienced. At the time of the discussion, the CEO was considering adopting a new top-management structure under which the personnel director would report to another staff member rather than directly to him.

The CEO explained the proposed change to the personnel director, pointing out that it was not definite and that he was soliciting her reactions. Managers' "maps" of people provide them with guides to action. In this case, because of his sense of the personnel director's needs, the CEO slowed the reorganizing process so that the people who reported to him could deal with the various issues that arose.

The CEO elaborately described to me his awareness of the personnel director's concern at being new and at being a woman, and her desire to be in direct contact with him. He also understood her worry that if she reported to someone lower than him, people would perceive that the new personnel function was not very important, and she would lose power.

Overriding concern

The stereotypical senior executive pays a great deal of attention to the strategy of the business, carefully formulates goals, lays out quantified and clear objectives and sets about to achieve these objectives in the most efficient way. Whereas senior executives certainly attend to specific strategies and objectives some of the time, in their day-to-day reality specific objectives lurk in the background, not in the forefront of their thoughts.

Approximately two-thirds of the senior managers I studied were preoccupied with a very limited number of quite general issues, each of which subsumed a large number of specific issues. This preoccupation persisted for anywhere from a month to several years and, when in effect, dominated the manager's attention and provided coherence to many of his chaotic and disorganized activities.

The general manager of one large division of an automotive company, for example, used the word "discipline" more than a dozen times in the course of a two-hour interview. For him, this concept embodied his deep concern for creating order and predictability in a division that, in his view, had become too loose before he took it over.

His concern for discipline appeared in a number of diverse actions — strongly discouraging his subordinates' fire-fighting mentality, criticizing their poor preparation for corporate reviews, introducing rigorous strategic planning, encouraging time management, putting out a yearly calendar with divisional and corporate meetings printed on it, publishing agendas for many of these meetings up to a year in advance and, by keeping recent reports in the top drawer of his desk, forcing himself to review frequently the division's activities and performance.

Regardless of its substance, the overriding concern weaves its way in and out of all the manager's daily activities, at times achieving the dimensions of an all-consuming passion.

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After his first 100 days in office, an area general manager described his experience turning around a subsidiary in these words:

"The personal cost of achieving our top priorities has been huge. I dropped all outside activities. Now I have a feeling of just having emerged, like a chap who's been taken by a surf wave and rolled. Suddenly he comes up and can look at daylight again. It has been like a single-minded rage or madness. At the end of the 100 days, somehow I have awakened. It was overwhelming."

Of course senior managers do think about the content of their businesses, particularly during crises and periodic business reviews. But this thinking is always in close conjunction with thinking about the process of getting others to think about the business. In other words, even very senior managers devote most of their attention to the tactics of implementation rather than the formulation of strategy.

How managers think

In making their day-by-day and minute-by-minute tactical maneuvers, senior executives tend to rely on several general thought processes such as using intuition; managing a network of interrelated problems; dealing with ambiguity, inconsistency, novelty and surprise; and integrating action into the process of thinking.

Generations of writers on the art of management have recognized that practicing managers rely heavily on intuition. In general, however, people have a poor grasp of what intuition is. Some see it as the opposite of rationality, others use it as an excuse for capriciousness, and currently some view it as the exclusive property of a particular side of the brain.

Senior managers use intuition in at least five distinct ways. First, they intuitively sense when a problem exists. The chief financial officer of a leading technical products company, for example, forecast a difficult year ahead for the company and, based on a vague gut feel that something was wrong, decided to analyze one business group. "The data on the group was inconsistent and unfocused," he said after doing the analysis. "I had the sense that they were talking about a future that just was not going to happen, and I turned out to be right."

Second, managers rely on intuition to perform well-learned behavior patterns rapidly. Early on, managerial action needs to be thought through carefully. Once the manager is fluent at performance, however, and the behavior is programmed, executives can execute programs without conscious effort. In the words of one general manager:

"It was very instinctive, almost like you have been drilled in close combat for years and now the big battle is on, and you really don't have time to think. It's as if your arms, your feet and your body just move instinctively. You have a preoccupation with capital expenditure, a preoccupation with people and one with productivity, and all this goes so fast that you don't even know whether it's completely rational or it's part rational, part intuitive."

After a while a manager can perform a sequence of actions in a seamless fabric of action and reaction without being aware of the effort.

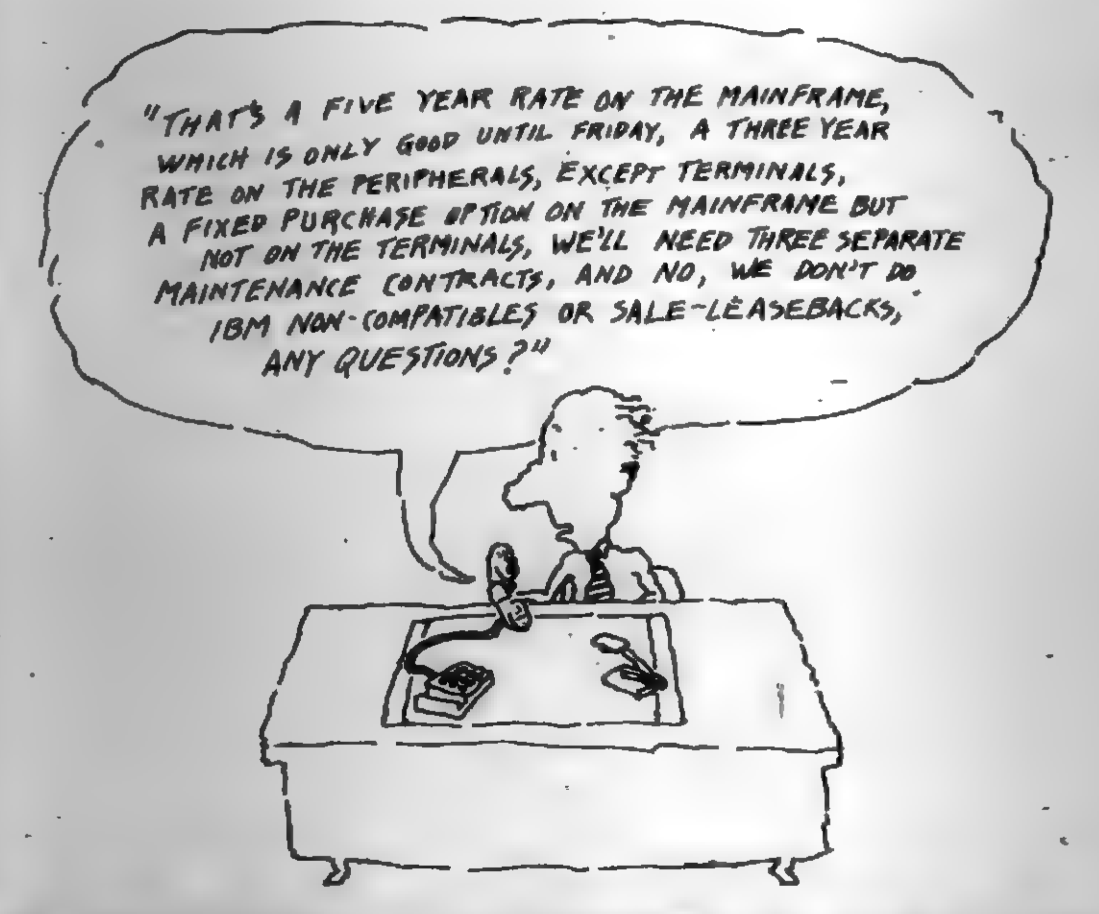
Intuition here refers to the smooth automatic performance of learned behavior sequences. This intuition is not arbitrary or irrational but is based on years of painstaking practice and hands-on experience that builds skills. After a while a manager can perform a sequence of actions in a seamless fabric of action and reaction without being aware of the effort.

A third function of intuition is to synthesize isolated bits of data and experience into an integrated picture, often in an "aha!" experience. In the words of one manager: "Synergy is always nonrational because it takes you beyond the mere sum of the parts. It is a nonrational, nonlogical thinking perspective."

Fourth, some managers use intuition as a check (a belt-and-suspenders approach) on the results of more rational analysis. Most senior executives are familiar with the formal decision analysis models and tools, and those that occasionally use such systematic methods for reaching decisions are leery of solutions that these methods suggest that run counter to their sense of the correct course of action.

Conversely, if managers completely trusted intuition, they'd have little need for rigorous and systematic analysis. In practice, executives work on an issue until they find a match between their "gut" and their "head." One manager explained to me, "Intuition leads me to seek out holes in the data. But I discount casual empiricism and don't act on it."

Fifth, managers can use intuition to bypass in-depth analysis and move rapidly to come up with a plausible solution. Used in this way, intuition is an almost instantaneous cognitive process in which a manager recognizes familiar patterns. In much the same way that people can immediately recognize faces that were familiar years ago, administrators have a repertoire of familiar problematic situations matched with the necessary responses. As one manager explained: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"My gut feeling points me in a given direction. When I arrive there, then I can begin to sort out the issues. I do not do a deep analysis at first. I suppose the intuition comes from scar tissue, getting burned enough times. For example, while discussing the European budget with someone, suddenly I got the answer: It was hard for us to get the transfer prices. It rang a bell, then I ran some quick checks."

By now it should be clear that intuition is not the opposite of rationality, nor is it a random process of guessing. Rather, it is based on extensive experience both in analysis and problem solving and in implementation, and to the extent that the lessons of experience are logical and well-founded, then so is the intuition. Further, managers often combine gut feeling with systematic analysis, quantified data and thoughtfulness.

It should also be clear that executives use intuition during all phases of the problem-solving process: problem finding, problem defining, generating and choosing a solution and implementing the solution. In fact, senior managers often ignore the implied linear progression of the rational decision-making model and jump opportunistically from phase to phase, allowing implementation concerns to affect the problem definition and perhaps even to limit the range of solutions generated.

Problem management

Managers at all levels work at understanding and solving the problems that arise in their jobs. One distinctive characteristic of top managers is that their thinking deals not with isolated and discrete items but with portfolios of problems, issues and opportunities in which many problems exist simultaneously. These problems compete for some part of the manager's immediate concern, and the issues are interrelated.

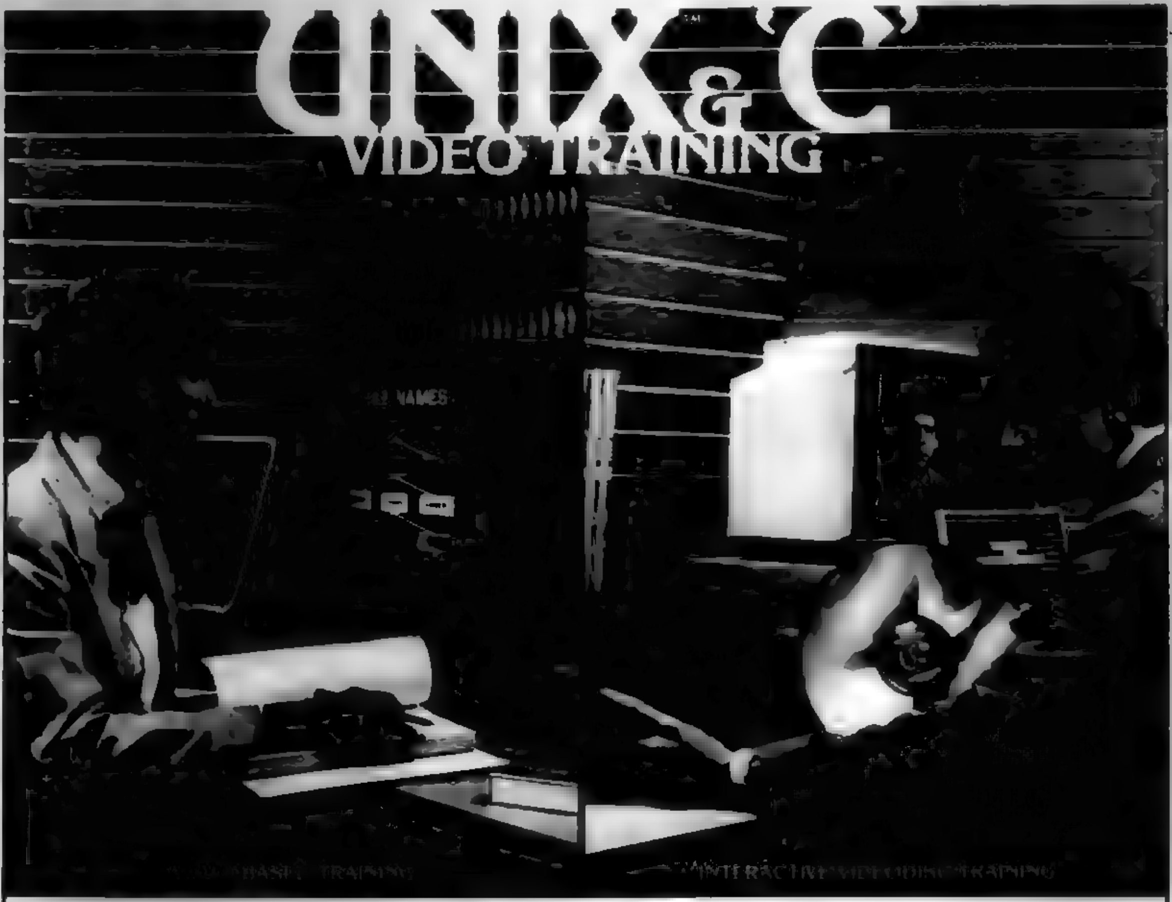
The cognitive tasks in problem management are to find and define good problems, to map these into a network and to manage their dynamically shifting priorities. For lack of a better term, I call this the process of problem management.

Defining the problem. After learning of a state health organization threat to exclude one of its major products from the list of drugs for which the state would reimburse buyers, top executives in a pharmaceutical company struggled to find a proper response. After some time, the managers discovered that the real problem that was not the alleged drug abuse the availability of the drug on the street caused. Rather, the problem was budgetary: The health services department had to reduce its budget drastically and was doing so by trimming its list of reimbursable drugs. Once they redefined the problem, the pharmaceutical executives not only could work on a better, more real problem, but also had a chance to solve it — which they did.

In another case, a division general manager discovered that, without his knowledge but with the approval of the division controller, one of his vice-presidents had drawn a questionable personal loan from the company. The division manager told me how he defined the problem: "I could spend my time formulating rules to guide managers. But the real fundamental issue here was that I needed to expect and demand that my managers manage their resources effectively." Although he recognized the ethical components involved, he chose to define the problem as concerned with asset management rather than cheating. Because asset management was an issue the division frequently discussed, the manager felt that it was more legitimate and efficacious to define the problem in this way.

Making a network of problems. By forming problem categories, executives can see how individual problems interrelate. For instance, a bank CEO had a network of at least 19 related problems and issues that he

(Continued on ID/36)



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Some good and bad news about cognition

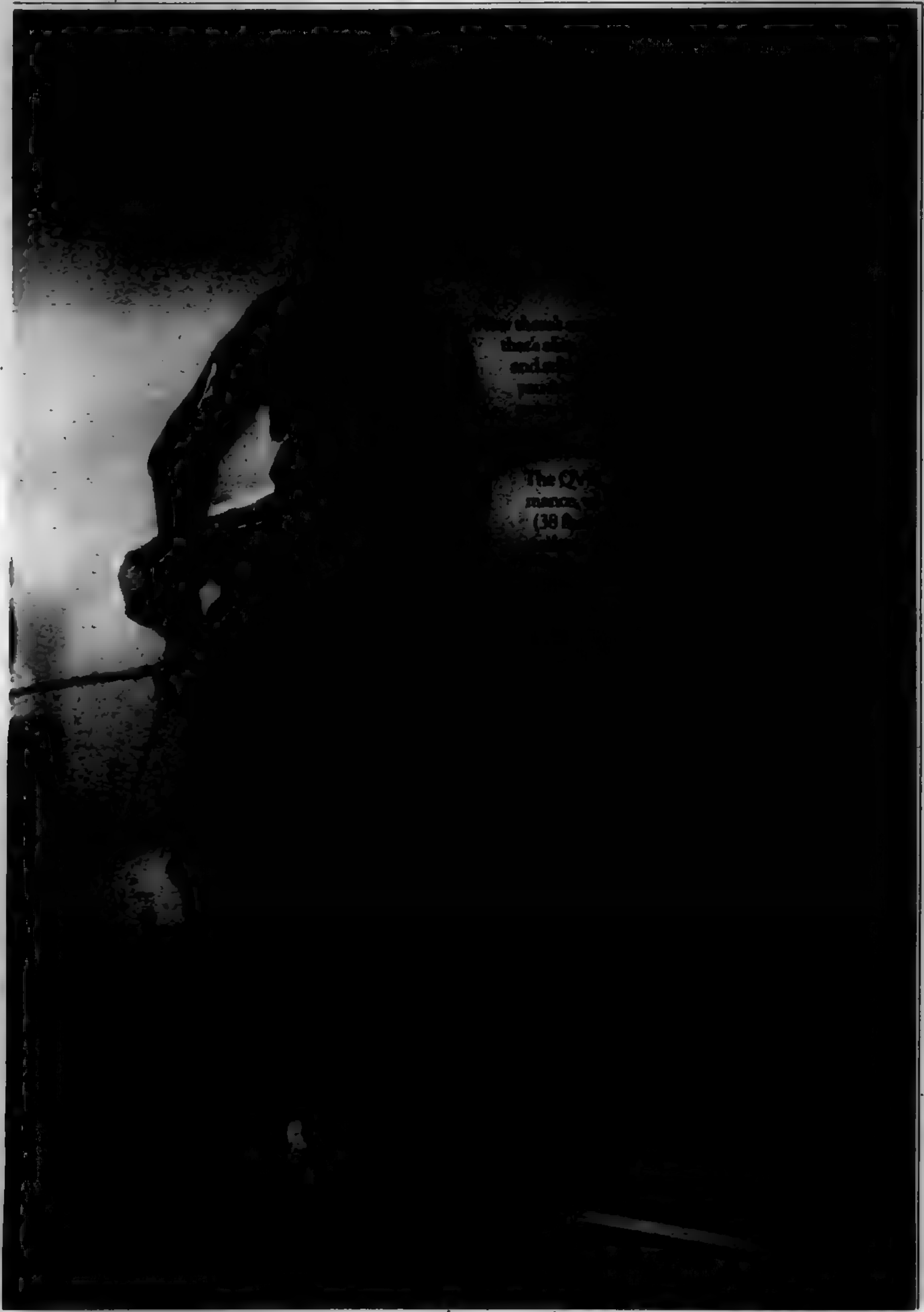
Although the study of cognition is not new, in the past 30 years the popularity and practical importance of the cognitive sciences have increased dramatically, adding to our knowledge of the capabilities and limitations of the human mind. The news is both "good" and "bad" in terms of our accuracy as judges and decision makers.

The good news is that each of us possesses a wide range of cognitive capabilities, including many that even the most powerful computers cannot match. For all intents and purposes, the long-term storage capacity of the human memory is unlimited, capable of storing perhaps trillions of bits of information.

Furthermore, much of this memory is almost immediately accessible.

The human mind is also capable of performing very complicated simulations, such as giving directions to someone on how to get to an office from an airport or rehearsing an upcoming meeting. We are also capable of making huge inferential leaps with rarely a hitch.

Try interpreting the following sentences: "The manager prepared the forecast using an accepted inflation estimate. He knew that it was imprecise but figured that it was better than no projection at all." Who is "he"? What is "it"? What does "projection" refer to? We know what these sentences mean, yet to interpret them correctly required the reader to make a number of inferences, which he usually makes with unhesitating accuracy.



Finally, we are capable of using our unlimited memory, our rapid retrieval system and our unconscious rules of inference to attain extremely high levels of skill, such as playing chess, analyzing stocks, conducting performance appraisals or speaking a language. These skills do not come easily, requiring years of experience and many thousands of hours of practice.

Nevertheless, when we use them we compress years of experience and learning into split seconds. This compression is one of the bases of what we call intuition as well as of the art of management.

The same cognitive processes that underlie our greatest mental accomplishments also account for incorrigible flaws in our thinking. For instance, we easily believe that salient events occur more frequently than they really do.

For example, despite the fact that dozens of examples exist where missed budgets did not lead to termination, managers interpret Sam's being fired for not making a budget as, "There is a good chance that division heads who do not meet budgeted profit objectives will get axed."

Hindsight bias

A second family of flaws arises from our overconfidence in our own expertise at making complex judgments. Various cognitive biases such as the "hindsight bias," our retrospective confidence in judgments that we hesitated about making at the time ("I *knew* it wouldn't work when she first proposed it"), and our tendency to search for confirming but not for disconfirming evidence of our judgments, conspire to exaggerate that belief.

And finally, research has shown that when presented with data, we are not very good at assessing the degree of relationship among variables — even though this skill is critical for successful management. Unless the relationships are very obvious, we tend to rely on preconceptions and perceive illusory correlations.

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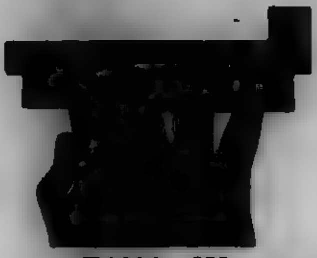

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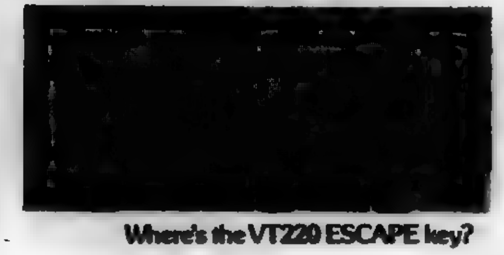

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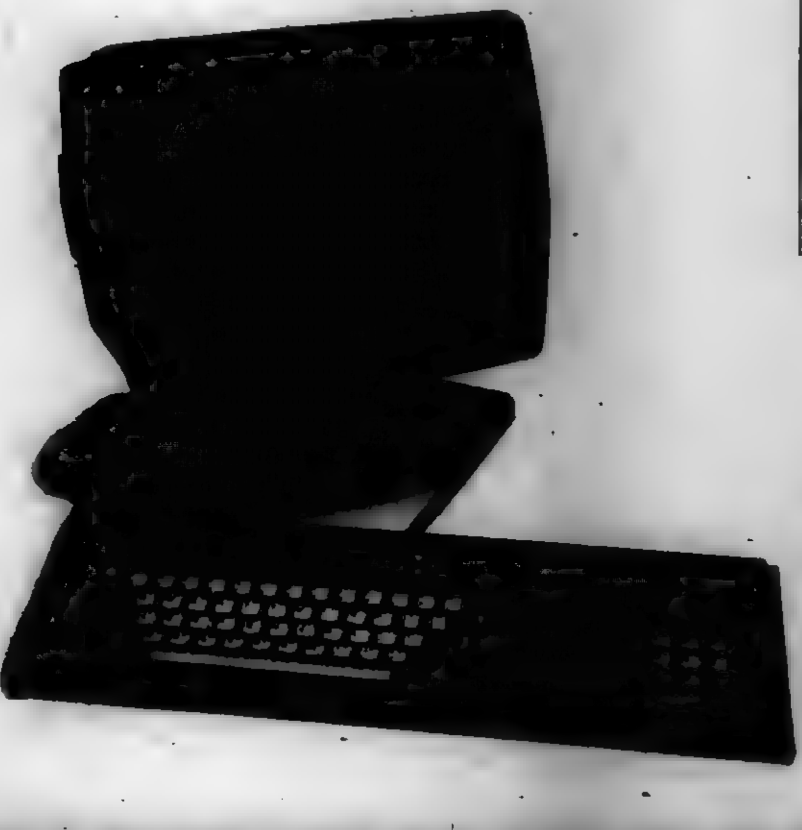

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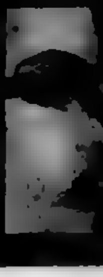

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IN DEPTH/HOW MANAGERS THINK

(Continued from ID/30)

was concerned about. Among these were: establishing credibility in international banking, strengthening the bank's role in corporate banking, increasing the range of financial services and products, being prepared to introduce new products in response to competitors' innovations, developing systems to give product cost information, reducing operational costs, standardizing branch architecture and utilizing space efficiently.

The bank CEO classified these problems in terms of broad issue categories. He found that many were related to the issue of expanding and broadening the bank's competence beyond consumer banking in which it was already firmly established. A second overarching issue was standardization of the bank's many branches with regard to architecture, physical layout, accounting systems and so on.

Having an interrelated network of problems allows a manager to seize opportunities more flexibly and to use progress on one problem to achieve progress on another, related issue. The bank CEO likened himself to a frog on a lily pad waiting for the fly — the problem or issue — to buzz by. Having a mental network of problems helped him to realize the opportunities as they occurred.

Choosing which problems to work on. Although managers often decide to work on the problem that seems to offer the best opportunities for attack, determining which problems they ought to tackle can be hard. One manager commented:

"I have to sort through so many isues at once. There are 10 times too many. I use a number of defense mechanisms to deal with this overload — I use delaying actions, I deny the existence of problems or I put problems in a mental queue of sorts. This is an uncomfortable process for me. My office and responsibility say I need to deal with all of these issues, so I create smoke or offer some grand theory as my only way to keep my own sanity. One of the frustrations is that I don't want to tell my people that their number one problems have lower priorities than they think they should get."

In my observations, how managers define and rank problems is heavily influenced by how easy the problems are to solve. Very shortly after perceiving that a problem exists, managers run a quick feasibility check to see if it is solvable.

Only if they find it is solvable will they then invest further energy to understand its various ramifications and causes. In other words, managers tend not to think very much about a problem unless they sense that it is solvable. Contrary to some management doctrines, this finding suggests that a general concept of what is a possible solution often precedes and guides the process of conceptualizing a problem.

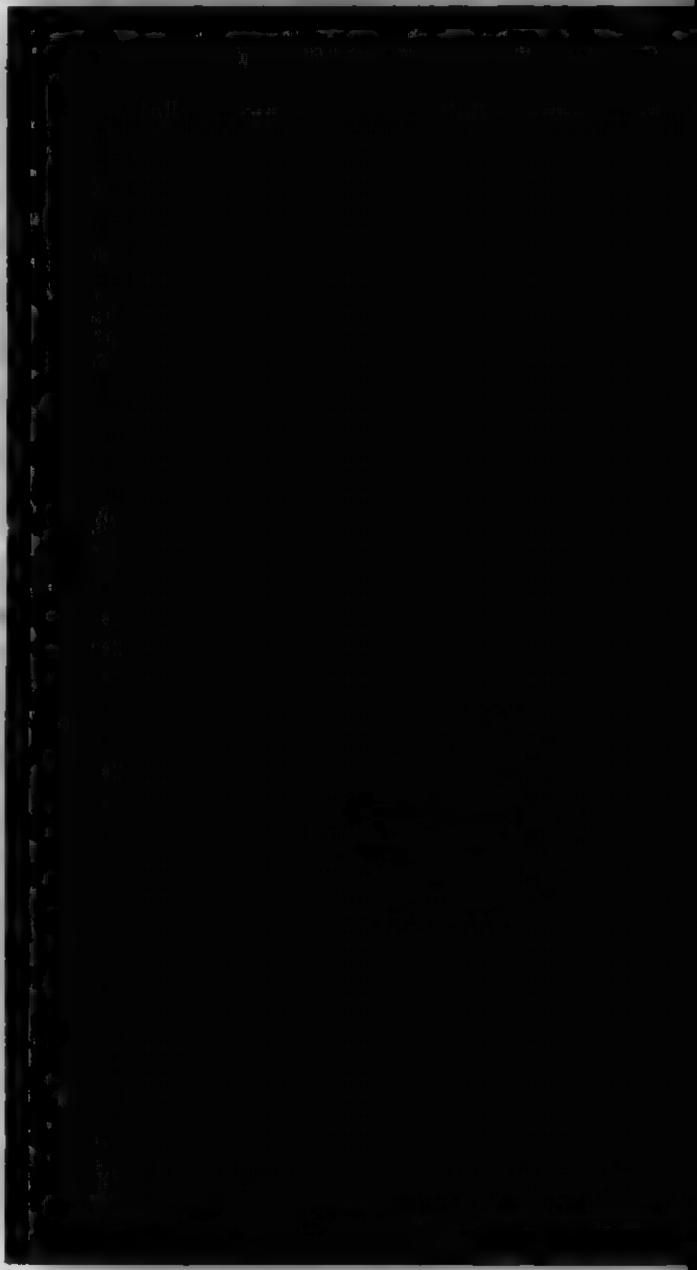
Thus, the two stages of problem analysis and problem solving are tightly linked and occur reiteratively rather than sequentially. By going back and forth between these two cognitive processes, managers define the array of problems facing them in terms that already incorporate key features of solutions and thus make it easier for them to take action.

Mental map

One outcome of this process is that managers have an organized mental map of all the problems and issues facing them. The map is neither static nor permanent; rather, managers continually test, correct and revise it. In the words of one CEO, the executive "takes advantage of the best cartography at his command but knows that that is not enough. He knows that along the way he will find things that change his maps or alter his perceptions of the terrain. He trains himself the best he can in the detective skills. He is endlessly sending out patrols to learn greater detail, overflying targets to get some sense of the general battlefield."

Tolerating ambiguity. The senior managers that I observed showed an ability to tolerate and even thrive on high degrees of ambiguity and apparent inconsistency. One top executive said:

"I think ambiguity can be destroying, but it can be very helpful to an operation. Ambiguities come from the things you can't spell out exactly. They yield a certain freedom you need as a chief executive officer not to be nailed down on everything. Also, certain people thrive



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> *Rather than deny, downplay or ignore disconfirmation, successful senior managers often treat it as friendly and, in a way, cherish the discomfort surprise creates.*

on ambiguity, so I leave certain things ambiguous. The fact is we tie ourselves too much to linear plans, to clear time scales. I like to fuzz up time scales completely."

Because demands on a manager become both stronger and more divergent as responsibility increases, the need to tolerate apparent ambiguity and inconsistency also increases. For example, the top manager has to deal with stakeholders who may have adversarial roles. By responding positively to one set of demands, the manager automatically will create other conflicting sets of demands.

The reason I have called the inconsistency "apparent" is that senior managers tend to have ways of thinking that make issues seem less inconsistent. For example, the president of a leading high-technology company was considering whether to exercise or forgo an option to lease land on which to build expensive warehouse space for one of the divisions at the same time as the division was laying off workers for the first time in its history.

"To spend a half- million dollars on keeping the land and building warehouse space while the plant is laying off people looks terrible and makes no sense," he said, "but if next year is a good year, we'll need to be in a position to make the product."

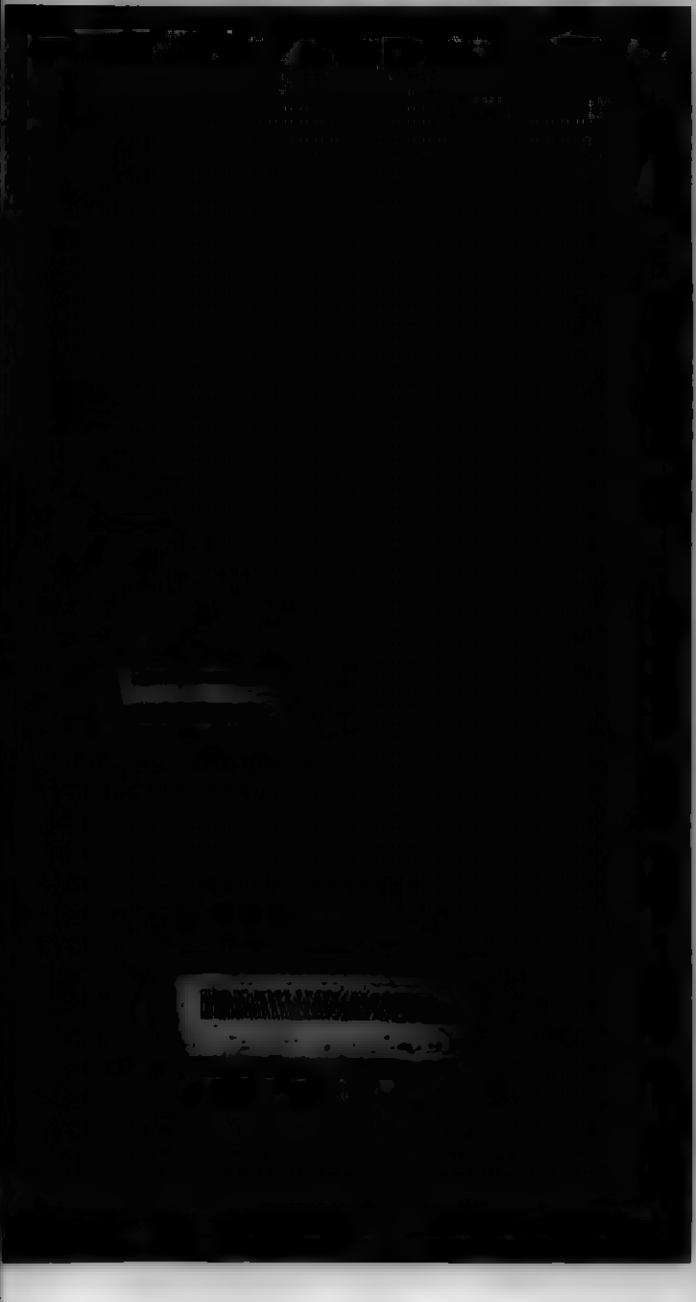
Perceiving and understanding novelty. The managers I observed dealt frequently with novel situations that were unexpected and, in many cases, were impossible to plan for in advance. For example, one division general manager found himself with the task of selling his division, which was still developing a marketable product.

In response to its shareholders, the corporation had shifted its strategy and thus decided to divest the fledgling division. How should the general manager look for buyers? If buyers were not forthcoming, would the corporation retain a stake to reduce the risk to potential new partners? How should he manage his people in the process of selling? Should he, himself, look for a new position or commit himself to a new owner? These were some of the unique questions the division head faced while selling his own division, and there was no industry experience to give him clear answers.

In general, the human mind is conservative. Long after an assumption is outmoded, people tend to apply it to novel situations. One way in which some of the senior managers I studied counteract this conservative bent is by paying attention to their feelings of surprise when a particular fact does not fit their prior understanding and then by highlighting, rather than denying, the novelty.

Although surprise made them feel uncomfortable, it made them take the cause seriously and inquire into it — "What is behind the personal loan by my vice-president of sales that appears on the books? How extensive a problem is it?" "Why did the management committee of the corporation spend more than an hour of its valuable time discussing a problem three levels down in my division?" "Now that we've shown the health services department beyond a reasonable doubt that this drug is not involved in drug abuse, why don't they reinstate it on the list?"

Rather than deny, downplay or ignore disconfirmation, successful senior managers often treat it as friendly and, in a way, cherish the discomfort surprise



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nce isn't a luxury.

> ***But is it possible for imperfectly rational managers to design even more perfectly rational systems? The answer is a qualified yes. There is evidence that with help people can design systems that are better than they are at making judgments.***

creates. As a result, these managers often perceive novel situations early on and in a frame of mind relatively undistorted by hidebound notions.

What to do

Having looked at the inner workings of the managerial mind, what insights can we derive from our observations? Literally hundreds of laboratory and field studies demonstrate that the human mind is imperfectly rational, and dozens of additional articles, offering arguments based on every field of study from psychology to economics, explain why. The evidence that we should curtail our impractical and overly ambitious expectations of managerial rationality is compelling.

Yet abandoning the rational ideal leaves us with two glaring problems. First, whether managers think in a linear and systematic fashion or not, companies still need to strive toward rational action in the attainment of corporate goals, particularly in their use of resources. Second, we still need to spell out what kinds of thinking processes are attainable and helpful to senior managers.

Of course, rationality is desirable and should be manifest in the functioning of the company. One alternative to the vain task of trying to rationalize managers is to increase the rationality of organizational systems and processes.

Although organizational behavior is never completely rational, managers can design and program processes and systems that will approach rationality in resource allocation and employment.

Decision support systems are one source of organizational rationality. These generally computerized routines perform many functions ranging from providing a broad and quantitative data base; to presenting that data base in easily understandable form, to modeling the impact of decisions on various financial and other criteria, to mimicking expert judgment such as in the diagnosis and repair of malfunctioning equipment or in oil field exploration.

Strategic planning

Another rational process that many businesses employ is strategic planning. Nonrational or partly rational managers can devise, implement and use a plan that systematically assesses a company's strengths and weaknesses, logically extrapolates a set of its competencies, proposes a quantitative assessment of environmental constraints and resources and performs all these tasks in a time-sequenced, linear fashion.

Of course, companies have used rational systems for information gathering, strategic planning, budgeting, human resource planning, environmental scanning and so forth for a long time. But I see these systems not only as useful but also as a necessary complement to a manager's apparent inability to be very systematic or rational in thought.

But is it possible for imperfectly rational managers to design even more perfectly rational systems? The answer is a qualified yes. There is evidence, for example, that with help people can design systems that are better than they themselves are at making judgments.

Creating organizational systems to improve on their own behavior is not new to managers. In order to still hear the beautiful sirens yet prevent himself from being seduced by the music and throwing himself into the sea, Ulysses ordered his men to block their own ears with wax, bind him to the mast and to tighten his bindings if he ordered them to let him go. Although Ulysses begged his sailors to release him, they obeyed his original orders, and Ulysses succeeded in both hearing the sirens and surviving their perilous allure.

Programming rationality into the organizational functioning is important for another reason: Rational systems free senior executives to tackle the ambiguous, ill-defined tasks that the human mind is uniquely capable of addressing. Many senior managers today face problems — developing new products for embryonic markets, creating new forms of manufacturing operations, conceiving of innovative human resource systems — that are new to them and new to their companies and that they can deal with only extemporaneously and with a nonprogrammable artistic sense. In fact, it may even seem paradoxical that managers need to create rational systems in order to tackle creatively and incrementally the nonrecurrent problems that defy systematic approaches.

In the literature on managerial behavior, there is disagreement as to

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ADDS

Given the great uncertainty of many of the management or business issues that they face, senior managers often instigate a course of action simply to learn more about an issue

how much or how often senior managers engage in thoughtful reflection. Many executives that I studied do make time for in-depth thinking, sometimes while they are alone, sometimes with their peers or subordinates and sometimes in active experimentation.

Furthermore, most senior managers I studied constantly maintain and sharpen their intellectual abilities in order to better analyze their current or past experiences. Rigorous thinking is a way of life for them, not a task they try to avoid or expedite superficially.

These senior managers read books outside their fields, engage in enthusiastic discussions of political and economic affairs, attend academic lectures and management seminars and tackle brainteasers such as word problems, chess and crossword puzzles. One company president I studied is a regular theatergoer who can discuss Shakespearean and contemporary plays at great length, while another often [redacted] to float around in his con-[redacted]

These activities are valuable not only for their content but also for the thinking processes that they establish, develop and refine. Whether managers indulge in such blue-sky, irrelevant activities at work or outside, they are developing critical mental resources that they can then apply to problems that arise in their jobs.

One of the implications of the intuitive nature of executive action is that "thinking" is inseparable from acting. Since managers often "know" what is right before they can analyze and explain it, they frequently act first and think later. Thinking is inextricably tied to action in what I call thinking/acting cycles, in which managers develop thoughts about their companies and organizations not by analyzing a problematic situation and then acting, but by thinking and acting in close concert. Many of the managers I studied were quite facile at using thinking to inform action and vice [redacted]

Given the great uncertainty of many of the management or business issues that they face, senior managers often instigate a course of action simply to learn more about an issue: "We bought that company because we wanted to learn about that business." They then use the results of the action to develop a more complete understanding of the issue. What may appear as action for action's sake is really the result of an intuitive understanding that analysis is only possible in the light of experience gained while attempting to solve the problem. Analysis is not a passive process but a dynamic, interactive series of activity and reflection.

One implication of acting/thinking cycles is that action is often part of defining the problem, not just of implementing the solution. Frequently, once they had begun to perceive the symptoms, but before they could articulate a problem, the managers I studied talked to a few people to collect more information and confirm what they already knew.

The act of collecting more data more often than not changed the nature of the problem, in part because subordinates then realized that the problem was serious enough to warrant the boss's attention. Managers also often acted in the absence of clearly specified goals, allowing these to emerge from the process of clarifying the nature of the problem.

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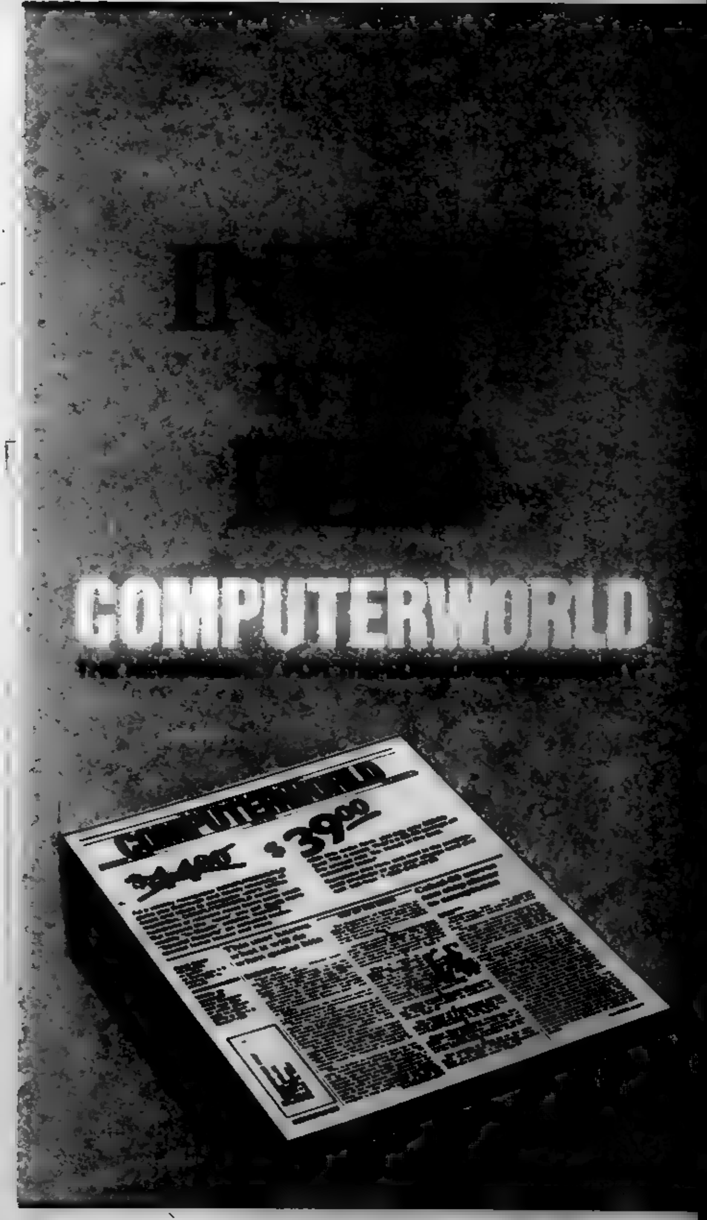
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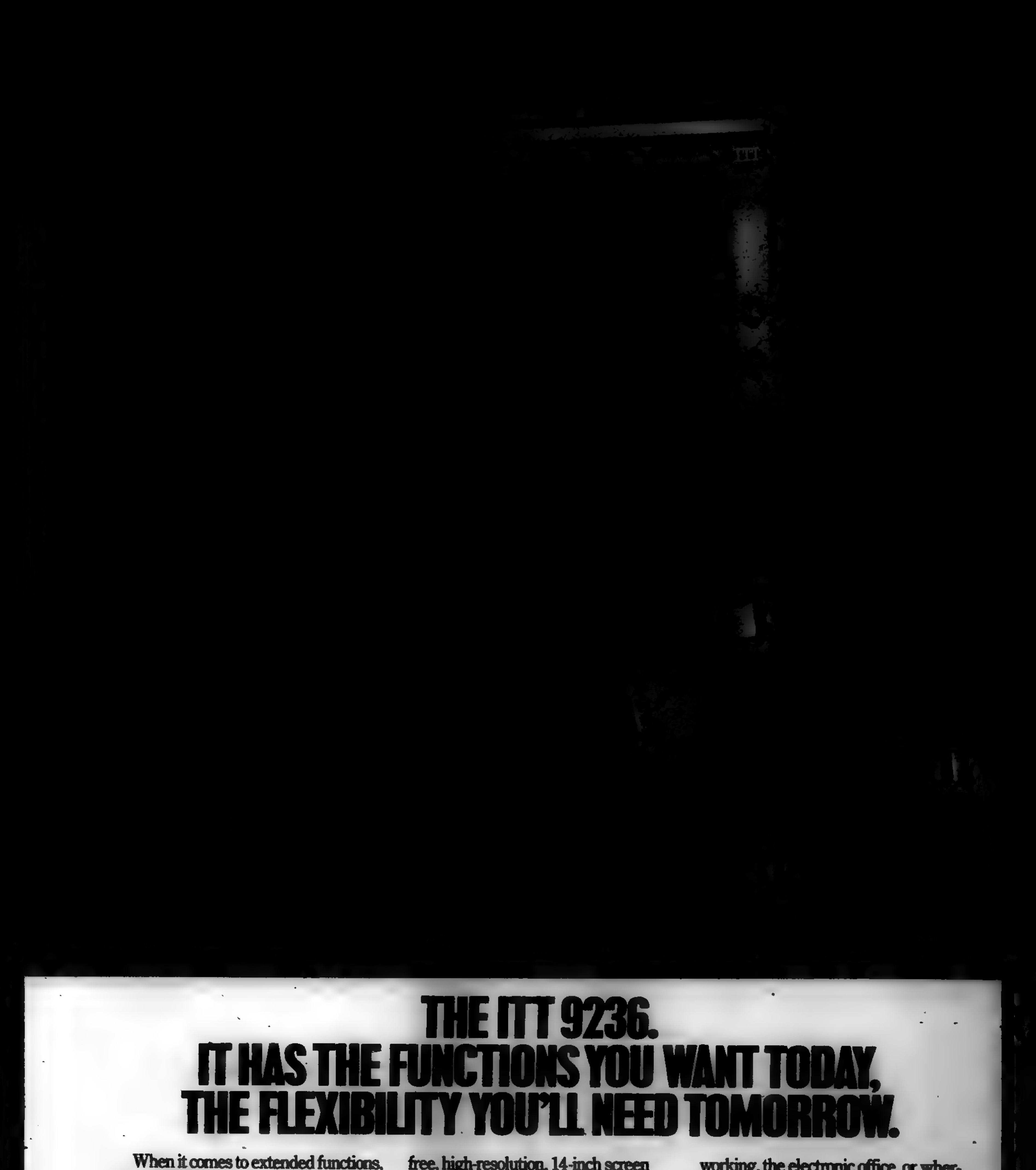

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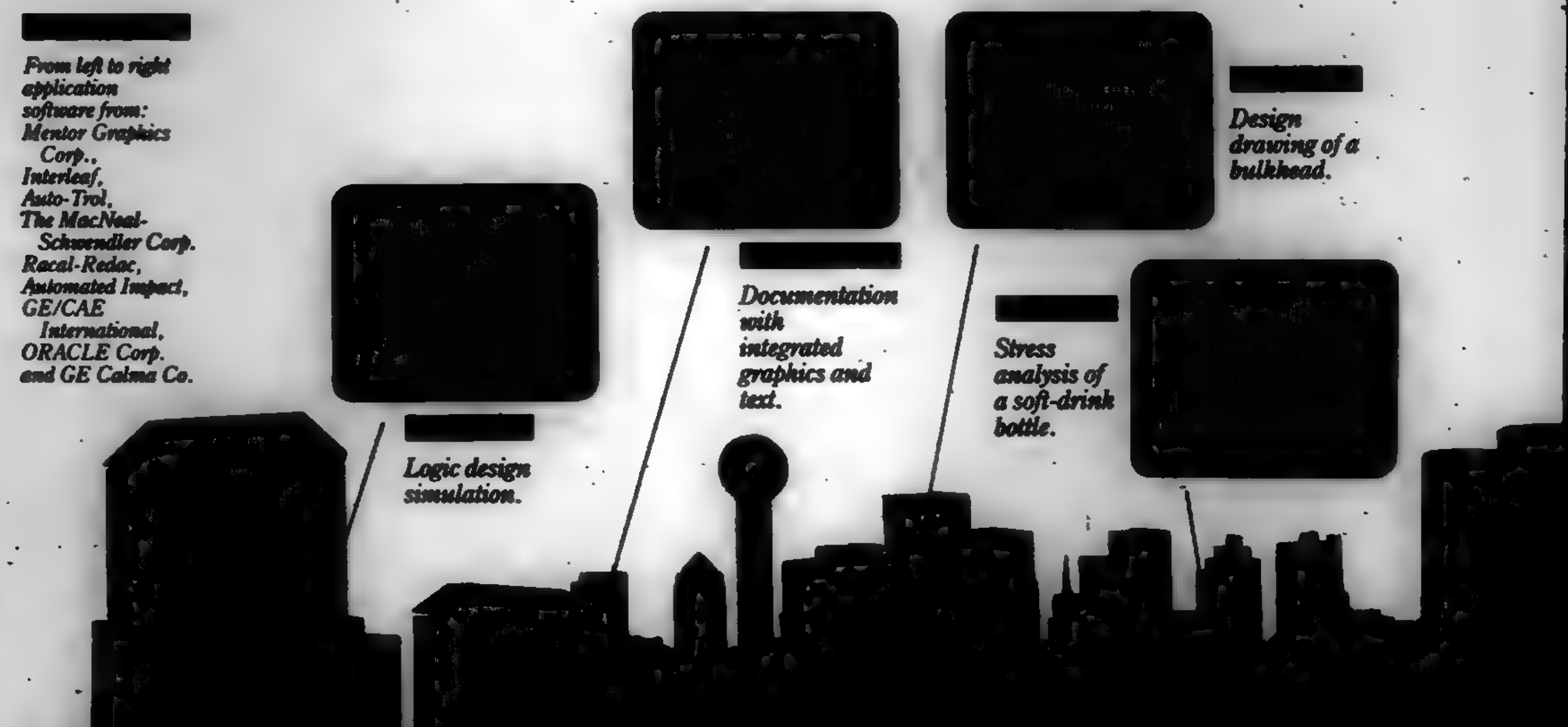

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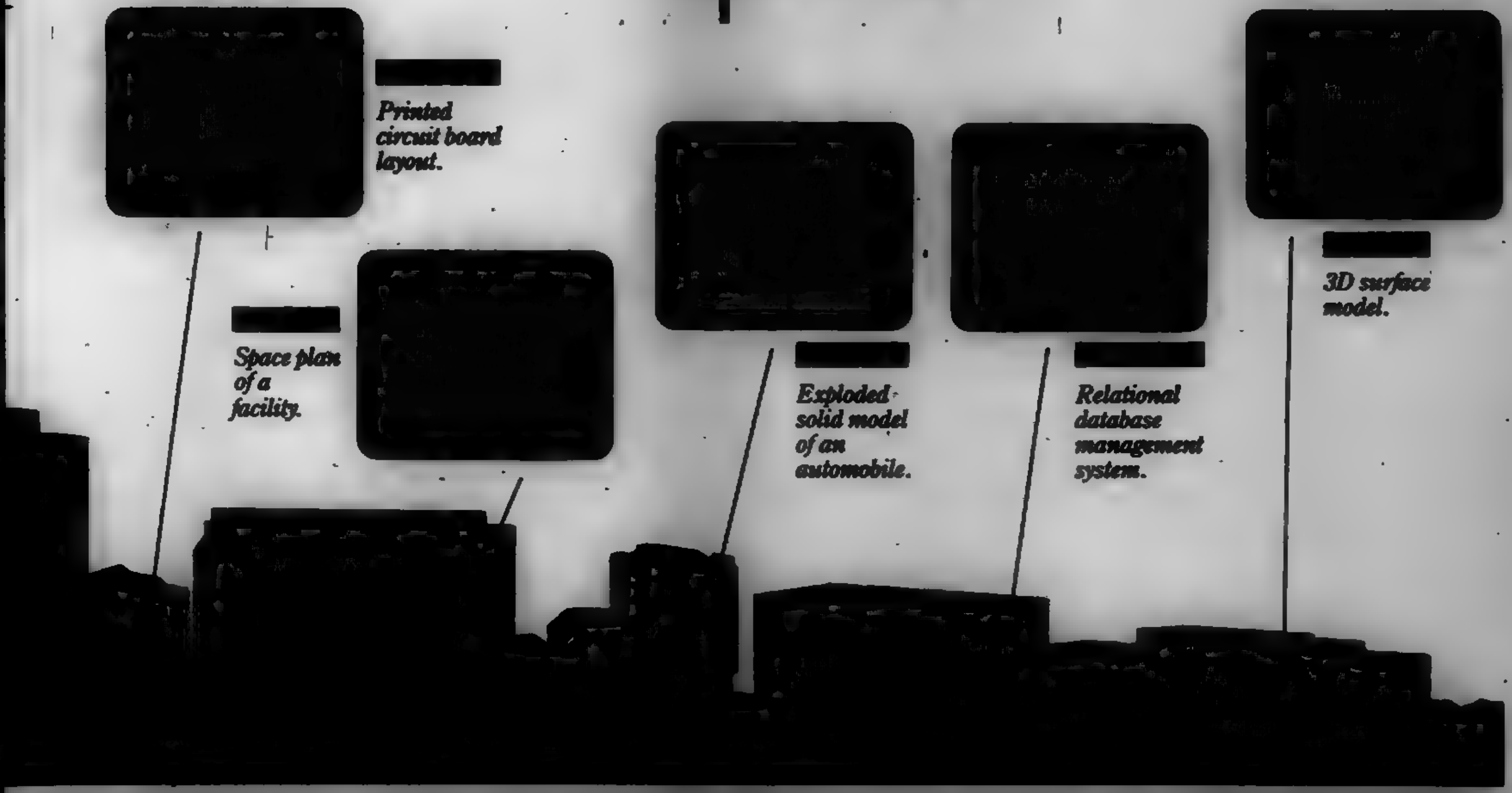

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Yet how often do managers push their subordinates to spell out their goals clearly and specify their objectives? A creative subordinate will always be able to present a plausible and achievable goal when pressed, but in the early stages of a tough problem it is more helpful for managers to provide a receptive forum in which their people can play around with an issue, "noodle" it through and experiment. Sometimes it will be necessary for managers to allow subordinates to act in the absence of goals to achieve a clearer comprehension of what is going on and even at times to discover rather than achieve the organization's true goals.

All managers would like to accomplish more in less time. One of the implications of the process of mapping problems and issues is that when a manager addresses any particular problem, he calls a number of related problems or issues to mind at the same time. One by-product is that a manager can attain economies of effort.

For example, when working on a problem of poor product quality, a division manager might see a connection between poor quality and an inadequate production control system and tackle both problems together. To address the issues, he could form a cross-functional task force involving his marketing manager, who understands customers' tolerance for defects. (One reason for bringing him in might be to prepare him for promotion in two or three years.) The manager might intend the task force to reduce interdepartmental conflicts as well as prepare a report that he could present to corporate headquarters.

Managers can facilitate the process of creating a problem network in many ways. They can ask their staff to list short- and long-term issues that they think need to be addressed, consolidate these lists and spend some time together mapping the interrelationships. Or they can ask themselves how an issue fits into other nonproblematic aspects of the company or business unit. How does product quality relate to marketing strategy? To capital expenditure guidelines? To the company's research and development center with a budget surplus? To the new performance appraisal system? To the company's recent efforts in affirmative action? To their own career plans?

Managers should never deal with problems in isolation. They should always ask themselves what additional related issues they should be aware of while dealing with the problem at hand.

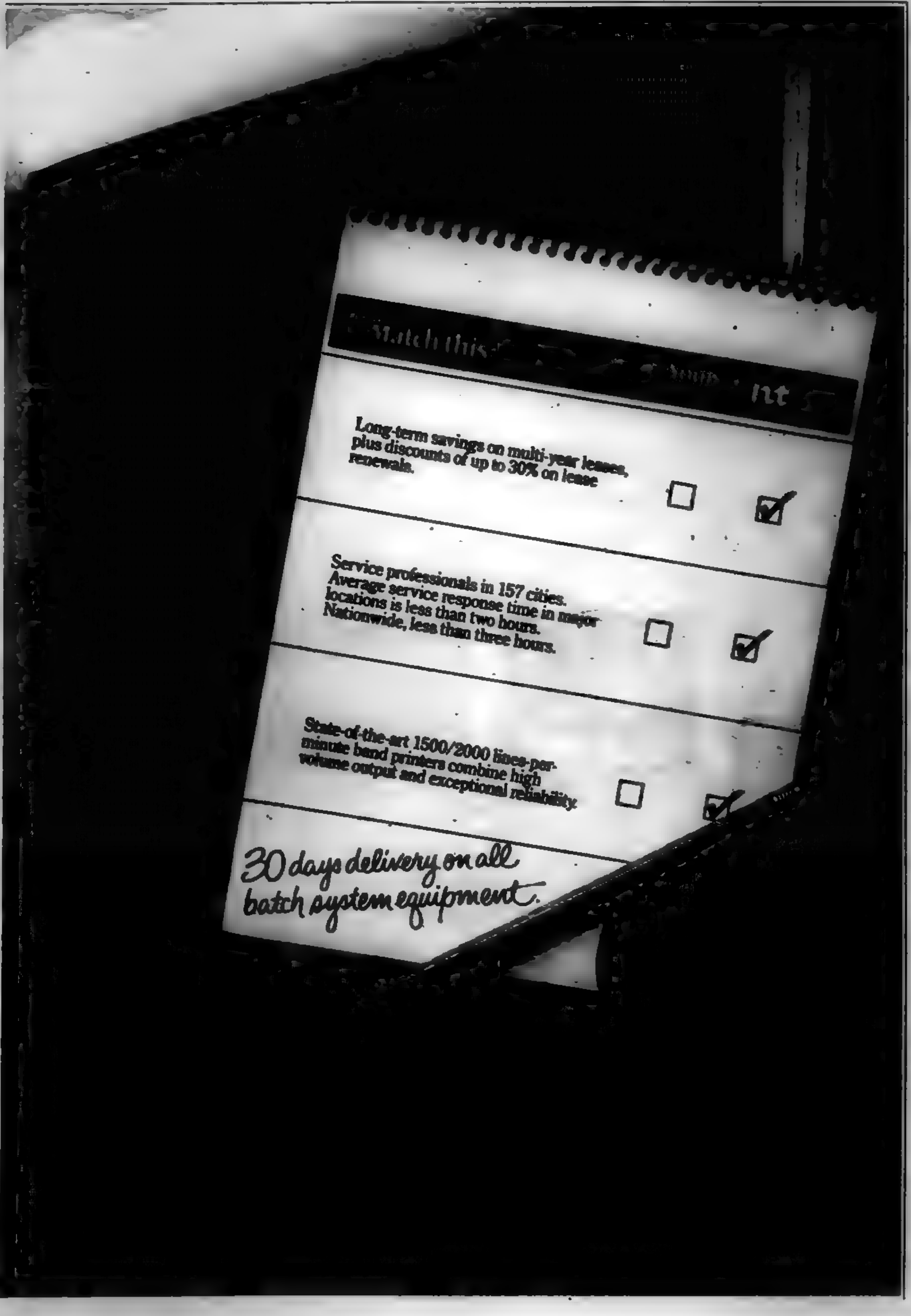
Some suggestions

These suggestions on how managers can improve their thinking emerge from my study of senior managers' thought processes:

- Bolster intuition with rational thinking. Recognize that good intuition requires hard work, study, periods of concentrated thought and rehearsal.
- Offset tendencies to be rational by stressing the importance of values and preferences, of using imagination and of acting with an incomplete picture of the situation.
- Develop skills at mapping an unfamiliar territory by, for example, generalizing from facts and testing generalities by collecting more data.
- Pay attention to the simple rules of thumb — heuristics — that you have developed over the years. These can help you bypass many levels of painstaking analysis.
- Don't be afraid to act in the absence of complete understanding, but then cherish the feelings of surprise that you will necessarily experience.
- Spend time understanding what the problem or issue is.
- Look for the connections among the many diverse problems and issues facing you to see their underlying relationships with each other. By working on one problem you can make progress on others.
- Finally, recognize that your abilities to think are critical assets that you need to manage and develop in the same way that you manage other business assets. ‡

About the author

Daniel Isenberg is assistant professor of business administration at the Harvard Graduate School of Business Administration. He is currently completing a study of the thinking processes used by 12 division heads in six corporations.



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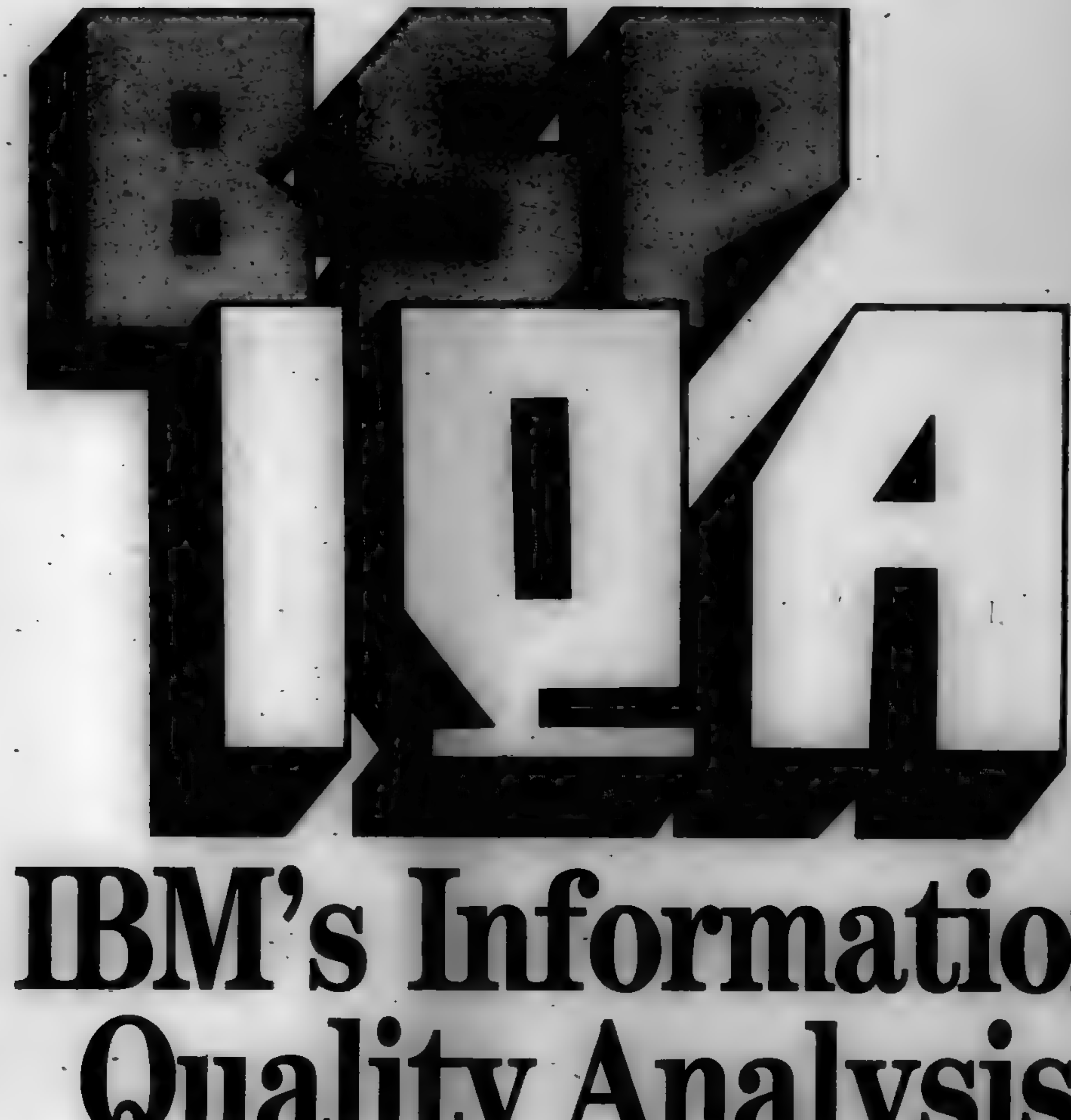


IBM's Information Quality Analysis

By John Vacca

IBM's Information Systems Services brought out a service last August called Information Quality Analysis (IQA), an automated version of its Business Systems Planning (BSP) strategic planning methodology.

The IQA process, like its predecessor, examines the flow of data and information used to make decisions in an organization and attempts to identify data that is missing, inaccurate, late, incomplete, underautomated or improperly distributed.

As in BSP, the data input for the IQA process is provided by joint user, management and information system department participation. However, with IQA, the analysis itself is assisted by IBM simulation software, providing for more rapid diagnosis of problem areas and allowing for faster formulation of an information systems plan that addresses both short- and long-term needs. The analysis is intended to provide, within a few weeks, the critical facts needed to improve the quality of information.

IQA was developed by IBM Belgium and has been used by more than 400 European and U.S. customers during the past five years. After having been performed at several U.S. pilot locations and inside IBM, the service is now available to IBM customers who need to bring their information systems activities in line with their current business operations and plans.

An IQA is led by an IBM Information

Systems Services team leader and staffed by its customer and services personnel. The studies take five to seven weeks and produce reports on the quality of data in each functional area of the corporation as well as recommendations for improvement.

Even though IQA is similar to the BSP process, it takes considerably less time and is supported by an integrated set of APL programs called Panda. The Panda software automates the data entry, data base creation, data manipulation and data anlysis functions.

This software, which runs under the VM/CMS and MVS/TSO environments, is part of the IQA service offering and is not available as a separate program product.

In addition to assisting in the development of a strategic plan, the data collected can provide information for the development of applications and data architectures.

A study team composed of IBM customer executives and Information Systems Services representatives conduct group session interviews to identify user information needs and evaluate user satisfaction with existing data.

From the information supplied and analyzed, the study produces statistics on how IBM customer personnel view the data they use to make decisions. These statistics might include the following:

- The amount of essential vs. nonessential data.
- The amount of computerized vs. noncomputerized data.
- An analysis of the quality of the data; for example, the amount of data deemed satisfactory and the amount of data adversely criticized or missing.

For the unsatisfactory data, the IQA identifies problems with reliability, content, delays and missing items. This analysis points to problem areas and helps to identify work to be done.

Objectives of IQA

The most common objective of an IQA is to provide critical information for the formulation of a strategic plan for information systems. While most executives would agree that information systems are essential for effectively managing their business, these systems must work in concert with the overall business plan in order to achieve their objective of being a real business asset.

An IQA can be an important step to ensure that the goals and plans of the business are accurately reflected in the information system department strategic plan.

Companies can obtain the following benefits:

- Executives can become confident that the information systems department's strategic plan is in concert with the business plan.
- A nonorganizational view of the business, which is based on information and information flow, may broaden the perspective of the IQA participants.
- IQA results can be used for specific actions tailored to an individual company's situation. It can serve as the starting point for reorganizations, staff reductions, redefinition of roles and responsibilities and other actions that might benefit an entire organization.

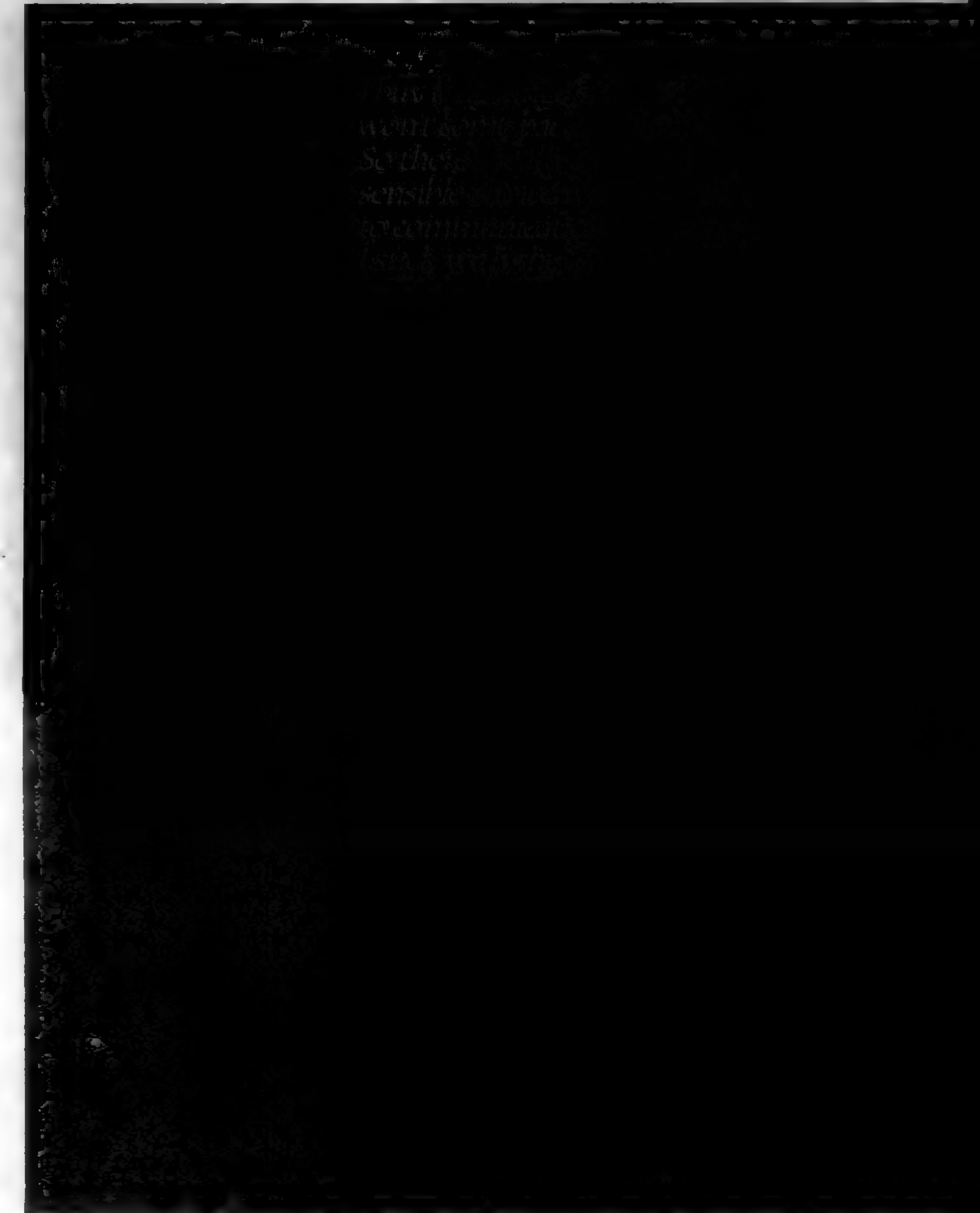
The IQA is conducted by personnel of the enterprise being studied. It is guided by the IBM consultants and aided by a computer program used to assist in the diagnosis of the data collected. The analysis is, therefore, internal and also possesses a high degree of objectivity. It is built on business processes and information flow that are independent of organizational structures and personal and political pressures.

IQA methodology

The IQA study has four phases. Phase 1 is called the enterprise analysis. The objective of this phase is to identify the following:

- Business processes of the company.
- People who should be interviewed who can identify the information required to exercise the business processes.
- The data classes into which the identified information may be categorized.

The personnel involved in this phase are the IQA consultant (the IBM person responsible for directing the analysis), the consultant's assistants and the IQA team (the customer managers who report to the sponsor). The IQA administrator (the customer representative responsible for interacting with IBM on a day-to-day basis) and administration



assistants are needed in this phase to handle calendar, logistics and secretarial work.

This phase generally requires a full 40-hour week of commitment by all participants. An off-site location is desirable.

Phase 2 is called the enterprise survey. The enterprise survey phase is divided into five parts:

- General briefing.
- Group interviews.
- Data entry.
- Validation.
- Data encoding.

The general briefing is conducted by the sponsor (the customer representative who has commissioned the IQA) and the IQA consultant for all of the interviewees (customer personnel selected during the enterprise analysis phase who are representative of the people who perform each business process). This one-hour meeting has as its objective the motivation of the interviewees and an explanation of their role and their responsibilities.

The group interviews are conducted by the IQA consultant or consultant assistant. Six interviewees should be in attendance and one IQA team member. The objective of this two-day interview is to have each interviewee identify the business processes in which he is involved and identify the information he requires for each of those processes.

In addition, the interviewees also critique the information. The IQA team member records the business process of origin for the information items identified and the data class of the information. Motivation, clarification and continuity are also supplied by this high-level manager.

Data entry is organized and supervised by the customer administrative assistants. Information collected on forms during the group interviews is entered on IBM 3270 terminals using Panda, the APL program tool. Approximately three hours of data entry time per interviewee is required. Data entry should be started immediately after each group interview is completed.

Validation is accomplished through the use of Panda, which will print a detail of each interviewee's responses. This report is reviewed by the interviewee and returned so corrections can be made by data entry personnel.

Data encoding occurs after all the group interviews have been completed. The objective of this two-day process is to normalize the information items identified. Normalization is accomplished by collecting the data class information accumulated by the IQA leaders during the group interviews and assigning a unique information item code to each unique piece of information identified. This information and the origin process codes are then entered using Panda.

Phase 3 is the study diagnosis. It begins with the IQA consultant using Panda to produce some initial statistics and matrices and to cluster the business processes into subsystems based on an analysis of the relative strength of information exchange. These findings are presented to the IQA team, which will spend from two to five full days together with the IQA consultant doing its own analysis.

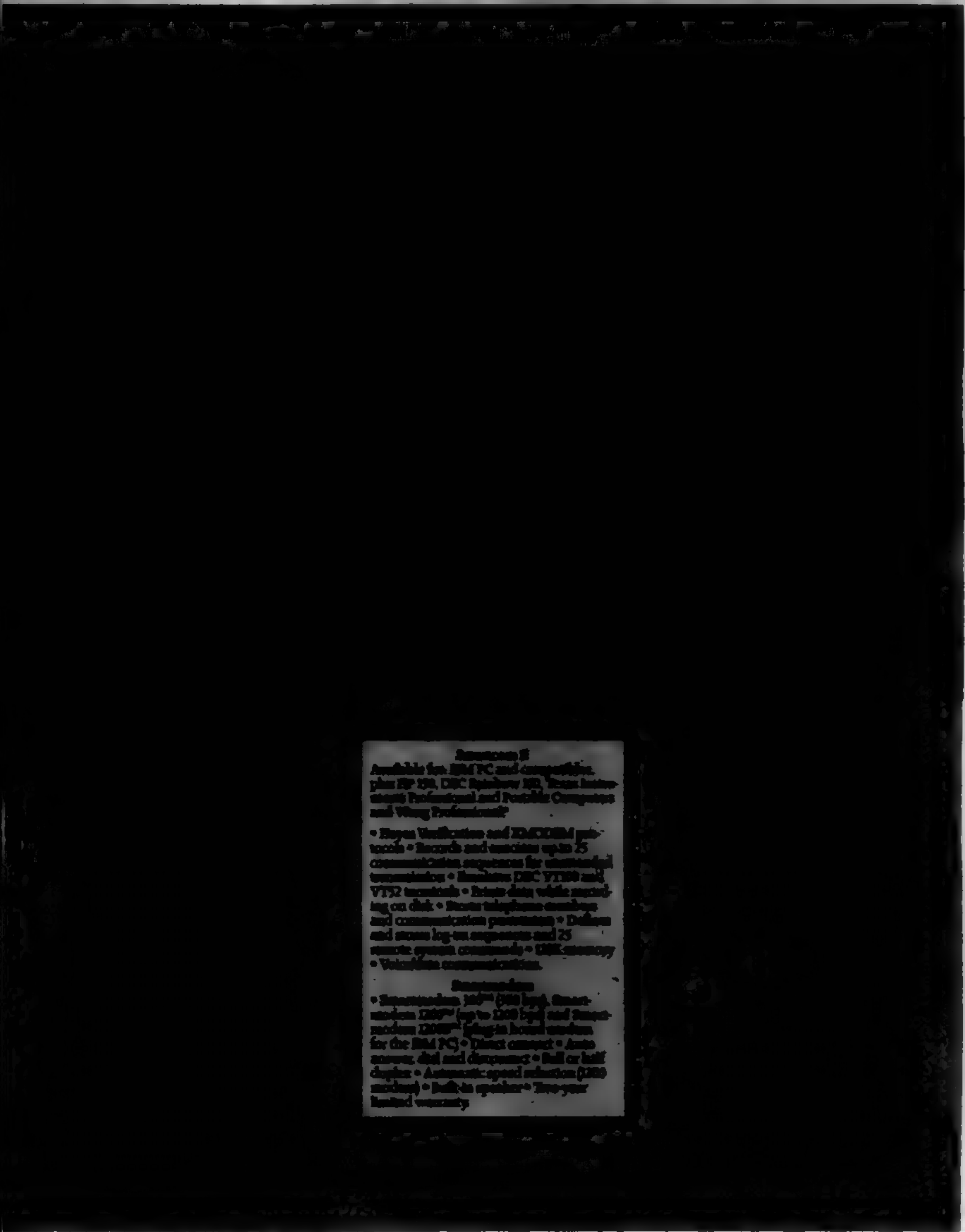
Additional computer runs are common during this phase. The diagnosis concludes with the development of an action plan by the IQA team and the designation of a member to draft a final report to be presented to the sponsor. An abbreviated feedback report to the interviewees is also recommended.

Phase 4 is called the IQA management report. A summary is drafted by one of the IQA team members. At a half-day meeting, this report is reviewed by the assembled IQA team. A presentation to the sponsor is made in the presence of the IQA team shortly thereafter.

The benefits of IQA extend beyond the formalized strategic plan and other action plans formulated by the IQA team. Going through the process has been identified as a benefit in itself. The introspective nature of the process stimulates each participant to reexamine his own roles and objectives, often giving rise to new energy and job interest.

About the author

John Vacca is a freelance writer and consultant in the area of information management and computer security. Vacca is a DP policy and systems analyst for Myers and Stauffer, CPA, in Topeka, Kan.



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COMMUNICATIONS

DATA STREAM/JOHN DIX

Application not equal to voice/data technology

The widespread integration of telephones with personal computers or terminals may be inevitable, but the products now available are still ahead of the market.

There are generally three types of voice/data integration products now available: telephone/terminals like Northern Telecom, Inc.'s Displayphone; personal computer add-ons like Rolm Corp.'s Juniper and Wilcom, Inc.'s Asher; and telephone/personal computers like Rolm's Cedar.

Presumably, the integration of telephones with computers or terminals will serve to unclutter desks, enhance the functionality of the mated devices and pump up users' productivity — that elusive measure by which so-called office automation devices are justified.

Unclutter desks? Possibly. Make the devices more functional? In some cases. Boost productivity? Only if you have to explain the purchase to your boss.

Ironically, telephone/terminals — an older technology never well received and presumably superseded by telephone/computers — may eventually prove to be the most useful and widely used device.

Consider the alternatives, like Rolm's Cedar. This device combines an IBM Personal Computer with a full-feature, multiline digital phone and includes a speakerphone. Cedar's capabilities include Digital Equipment Corp. VT100 terminal compatibility, IBM 3270 emulation, communications at speeds up to 19.2K bit/sec, prestored terminal profiles, single-button logon capabilities, telephone directory, one-button dialing and simultaneous voice/data support. This squat, neatly packaged workstation costs $4,245.

But who needs one? The price, roughly $1,000 over a comparable personal computer (without the phone), would confine the device's market to managers who do not already have a personal computer and think a neat desk is worth the added expense.

Cedar does obviate the need for modems when interconnected over a special digital link with a Rolm private branch

See PHONE page 96

PE adds Everyware enhancements for IBM link

By James Connolly
CW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp. today announced eight enhancements and new products for its Everyware line of communications products designed to interconnect its own computers and IBM systems.

The announcements include Ethernet support for interconnection of PE 3200 series superminicomputers running the company's AT&T Unix-based operating system Xelos, additional communications capabilities for PE equipment connected to IBM Systems Network Architecture (SNA) systems, a terminal server that links RS-232C devices to Ethernet and an Ethernet link for the PE 7350A supermicrocomputer. That supermicro was also announced today (see story page 107).

The company said that its IEEE 802.3 Ethernet support for Xelos-based systems appears to be unique in that it allows direct cabling of workstations to superminicomputers, the 3200 series running PE OS/32 and Xelos, an operating system based on AT&T Unix System V. The support is through PE's Ethernet Data Link Controllers (EDLC), hardware interfaces and transceivers providing connection to Ethernet cable.

The Ethernet Terminal Server (ETS) reportedly enables devices such as terminals, personal computers and printers to access Ethernet through RS-232C interfaces. The ETS resides between Ethernet and the devices. It allows connection of up to 32 RS-232C devices in increments of eight through a single Ethernet interface. The company said the ETS handles Ethernet addressing for the devices and allows users to access multiple hosts.

Pennet Plus PE 7350A, a board for the PE 7350A, is said to allow the supermicro running the Unisoft Corp. Uniplus port of AT&T Unix System III to access Ethernet and other portions of PE's Pennet Plus networking product. Pennet Plus, an open systems network, is said to allow connections through Ethernet, SNA, CCITT X.25 packet-switching and the International Standards Organization Open Systems Interconnect model.

PE, which last year introduced Pennet Plus with support for Ethernet, SNA and IBM bisynchronous emulation, also announced in this release expanded SNA and bisynchronous support. This includes support of IBM SNA Host Command Facility

See PE page 92

■ Interlan, Inc. announced products to interconnect two local-area networks and to manage networks/90

■ Wow Enterprises introduced software that transfers binary files over asynchronous lines from an IBM mainframe to IBM Personal Computers/91

■ 3Com Corp. cut prices and announced enhancements for its line of Ethernet products/91

■ NEC America, Inc. introduced a multispeed, auto-dial modem and a modem for use with personal computers/91

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BBN announces PAD line for IBM interfacing

CAMBRIDGE, Mass. — BBN Communications Corp., a subsidiary of Bolt Beranek and Newman, Inc., has announced a family of IBM-compatible packet assemblers/disassemblers (PAD) for interfacing IBM equipment with BBN Communications packet networks.

The Model C/10 PADs reportedly support IBM host and terminal equipment using IBM's System Network Architecture/Synchronous Data Link Control (SNA/SDLC), 3270 Bisynchronous, 2780/3780 Bisynchronous protocols and asynchronous transmissions.

The units are designed to attach directly to IBM equipment without modification to the existing IBM hardware and software. The C/10 PAD is said to support 32 BSC/SDLC synchronous multidrop lines and concentrate traffic over one or two X.25 links operating at up to 64K bit/sec.

The C/10 PAD was intended to allow dispersed IBM terminals and hosts to communicate via a BBN Communications X.25 packet-switching network and to let users access multiple IBM hosts and applications from a single terminal.

Polling and selection of remote peripherals reportedly is performed locally by the C/10 PAD, eliminating polling traffic from the X.25 network. Monitoring and control of the C/10 PAD is said to be from a locally attached terminal or from a centralized network control facility. Remote diagnostics support is provided by a dedicated service port on all C/10 PADs, according to the vendor.

Modular design is said to allow the user to configure a C/10 PAD system with as few as four or as many as 32 host/terminal ports.

Delivery is scheduled for April. Prices range from $4,350 for a four-line configuration to $24,500 for a 32-line configuration.

BBN Communications is located at 70 Fawcett St., Cambridge, Mass. 02238.

DEC launches Ethernet products for broadband nets

MAYNARD, Mass. — Digital Equipment Corp. has announced that it is the first computer manufacturer to offer full Ethernet functions, including a 10M bit/sec data rate over broadband cable.

The company introduced a broadband Ethernet transceiver called Decom and a broadband Ethernet frequency translator called Deftr. The products are said to enable up to 1,024 Ethernet nodes to be interconnected over a broadband net at distances up to 3,800 meters apart.

The products were designed to connect to DEC's Ethernet controllers for DEC VAX-11 superminicomputers, PDP-11 minicomputers and Professional 300 microcomputers. They also can be connected to DEC's router, gateway and terminal server products and the DEC Local-Area Interconnect (Delni) clustering device.

The Decom and Deftr are targeted at installations using broadband cabling for video, data and voice communications and run under DEC's Phase IV Decnet networking software.

Decom is said to be available for dual- and single-cable broadband installations and to provide connections for up to eight Decnet/Ethernet devices when used in conjunction with Delni.

Deftr reportedly is used in conjunction with Decom in single-cable installations and lets Decom transmit at one set of frequencies and receive on another. The company said Deftr is unnecessary in dual-cable situations.

DEC's broadband products reportedly attach to conventional CATV cabling and components, use the Ethernet carrier-sense multiple access with collision detect protocol and require an 18 MHz bandwidth.

Decom and Deftr will be available in the spring of 1985. According to the company, Decom costs $4,250, and Deftr costs $4,500.

DEC is located in Maynard, Mass. 01754.

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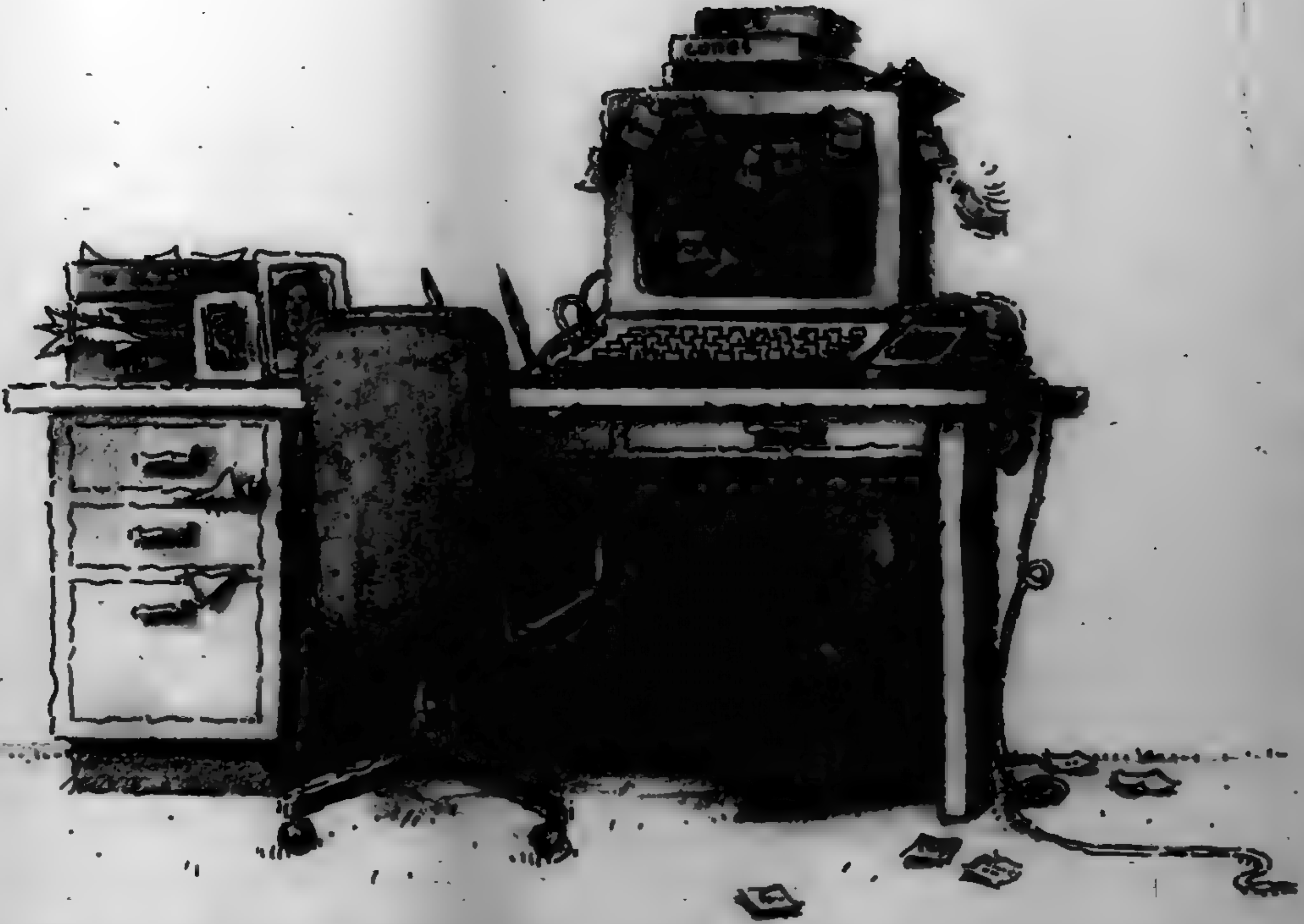

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NAS gateway connects micros in dissimilar nets

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) recently departed from its traditional product direction with the introduction of a Systems Network Architecture (SNA) gateway processor that reportedly permits communications between IBM Personal Computers and compatibles in dissimilar local networks.

The Advanced Systems (AS)/Gateway also enables the same personal computers to share modems and exchange data with host processors, according to Jerry Samstad, NAS' director of network systems.

Unlike NAS' IBM-compatible mainframes and external storage modules, which originate in Japan, AS/Gateway is manufactured in the U.S. and is a product of the American vendor's own development efforts. The decision to produce the communications unit domestically allowed NAS to take advantage of the microprocessor expertise of its parent company, National Semiconductor Corp., Samstad said.

The SNA gateway processor is built around National Semi's 32016 microprocessor and consists of two printed circuit boards. One of the boards emulates IBM's 3274 remote cluster controller, manages all communications protocols in an SNA environment and directs all I/O traffic entering or leaving a gateway, according to the vendor.

The other board manages Synchronous Data Link Control protocols and permits data to be passed back and forth between gateways and central mainframes, Samstad said.

Because it is compatible with the IBM Personal Computer's form-factor bus, AS/Gateway can accept various kinds of local networking interface boards, the vendor said. The NAS processor thus allows micros on, for example, a token-passing type of local network to communicate with personal computers connected through Ethernet, Samstad said.

In addition, AS/Gateway reportedly enables micro users to gain access to both their own and other organizations' CPUs, whether housed locally or remotely.

Capable of operating in either an asynchronous or an SNA communications environment, the gateway permits local networks to share up to eight modems, with access to the devices allocated on a first-come-first-served basis, the vendor said.

AS/Gateway costs $6,000 plus an additional $125 for each personal computer node connection. Software maintenance and updates will sell for an additional $1,000 per gateway, according to NAS.

NAS is headquartered at 800 E. Middlefield Road, Mountain View, Calif. 94040.

Interlan unveils internet router, network utility

WESTFORD, Mass. — Interlan, Inc. has announced two Ethernet network products, the Network Communications Server/Internet Router (NCS/IR), used to interconnect independent local networks, and the Network Management Utilities that runs on the IBM Personal Computer.

The NCS/IR is said to provide transparent data transmission for both interactive and file transfer sessions between two physically separate Ethernet local-area networks without the need to know the overall network topology.

Internetwork routing is reportedly done with XNS Internet Protocols. The internet router provides for asynchronous communications between networks supporting Interlan's NTS10 Terminal Servers and host Integrated Terminal Servers used with Digital Equipment Corp. VAX-11 systems running VMS, according to Interlan.

The internet router also allows Interlan's Ethernet Direct Connect for the IBM Personal Computer to access systems and resources on a remote Ethernet and supports file transfers between distributed personal computers, VAX-11 VMS and AT&T Unix systems.

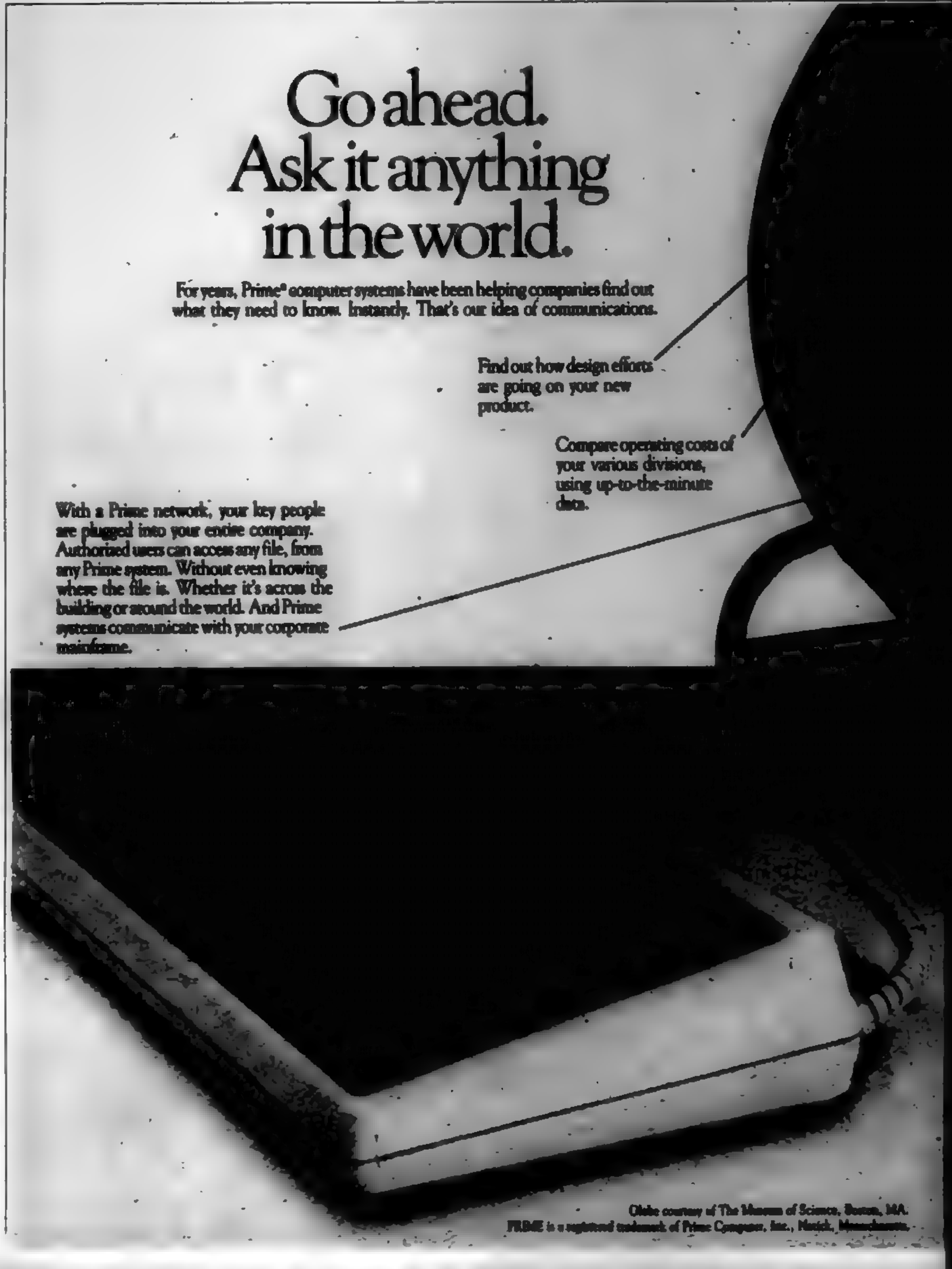
The NCS/IR supports two 9.6K bit/sec links via an RS-232 interface or 224K bit/sec connections via V.35 or RS-449/RS-422 interfaces.

Scheduled for delivery this month, the 9.6K bit/sec connection NCS/IR costs $6,650. The 224K bit/sec capability will be available at no incremental cost in the second quarter of 1985.

The Network Management Utilities reportedly provides the network operator with tools for controlling a collection of servers on Ethernet. They run on the IBM Personal Computer family and compatibles and allow the management station to service boot requests from any server on the network.

The utilities include a controller board and diagnostic software. They are scheduled for shipment this month at $1,000.

Interlan is located at 3 Liberty Way, Westford, Mass. 01886.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PRIME is a registered trademark of Prime Computer, Inc., Natick, Massachusetts.

Binary file package debuts

PALO ALTO, Calif. — WOW Enterprises has introduced a software product said to permit the transfer of binary files between IBM mainframes and IBM Personal Computers over an asynchronous communications link.

The Missing (Async) Link is intended for use with the IBM 3101 Emulation Program and converts IBM CMS and TSO host files to and from the same transmission format that is supported by Fileconv, a utility supplied with the IBM program, the vendor said. The conversion is said to include data compression, cyclic redundancy checksum characters and efficient encoding of binary data as printable characters that require four characters to represent each 3-byte group.

The program consists of host system programs for CMS and TSO that convert native host system files for transmission in Ascii over an asynchronous communications link, using the same encoded format that is used by the IBM 3101 Emulation Program for transmission of IBM Personal Computer files, the vendor said. The program is distributed on diskette and includes special procedures for installation of the object programs on CMS and TSO host systems from the IBM Personal Computer.

Price is $96.

WOW Enterprises is located at 1500 Middlefield Road, Palo Alto, Calif. 94301.

3Com enhances Etherseries

MOUNTAIN VIEW, Calif. — 3Com Corp. has announced enhancements to its Etherseries local-area network software, an extended warranty on its Etherlink hardware and price reductions of 18% to 70%.

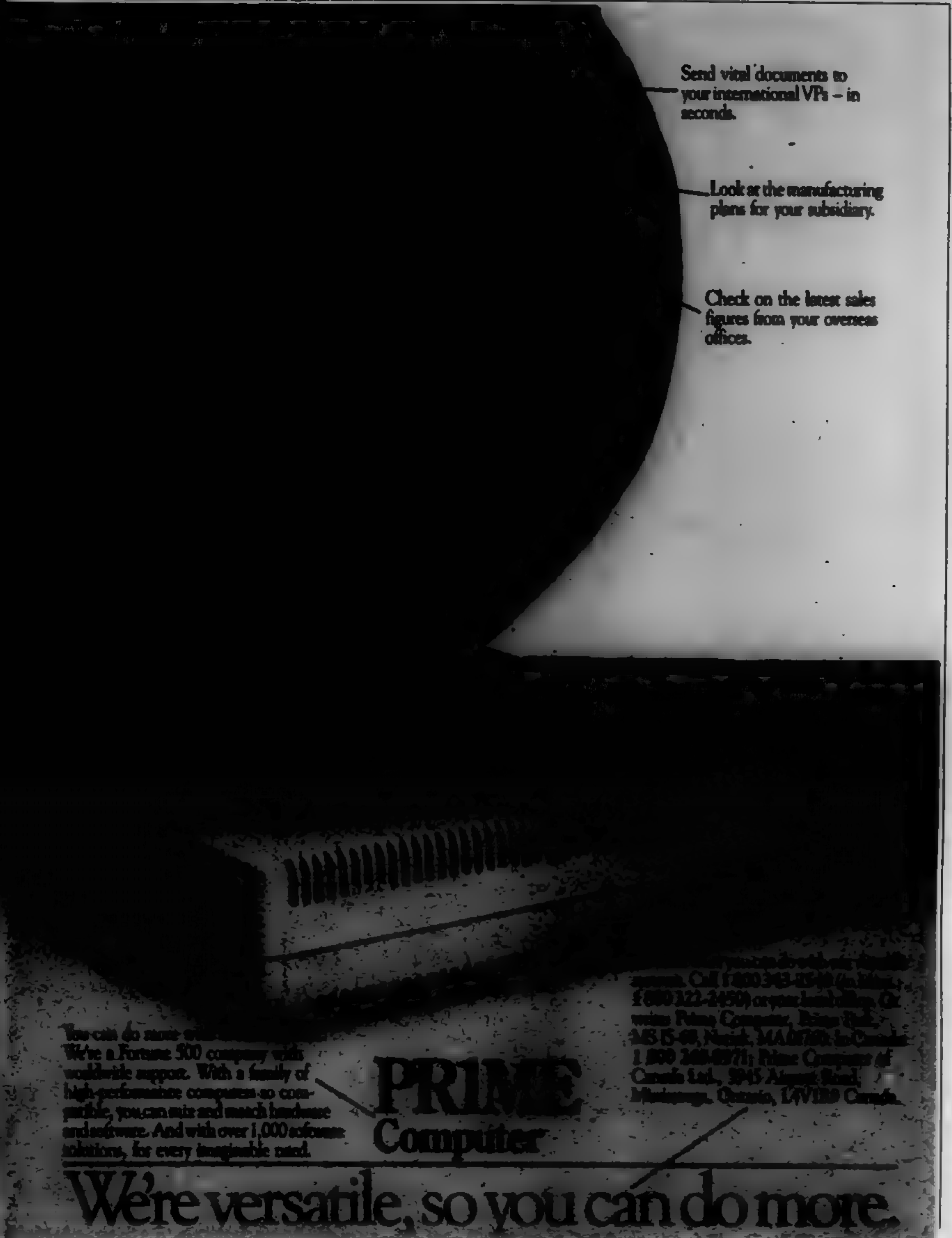
The Etherseries 2.4 enhancements include support for the IBM Personal Computer AT and the IBM PC-DOS Release 3.0 operating system; Ethermenu, a menu system designed to restrict access to network functions and to allow custom-designed menus for frequently used applications; laser printer support; and an Ethershare upgrade that allows a standard mode server to support Ethermail, multiple third-party hard disks and connection between the local user and other servers.

The company said the warranty on the Etherlink network adapter has been increased from 90 days to one year. 3Com also said that the software warranties will remain at 90 days.

The price changes are Ethershare/PC, down from $595 to $395; Etherprint/PC, down from $500 to $150; Ethermail down from $750 to $550; and Etherlink down from $795 to $650.

Software upgrades for current users of Etherseries range from $49 to $99.

3Com can be reached at P.O. Box 7390, 1365 Shorebird Way, Mountain View, Calif. 94039.



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NEC America offers autodial, micro modems

LAS VEGAS — At the recent Comdex/Fall '84 show, NEC America, Inc. unveiled two modems, a multiple-speed device with autodial and logon capabilities and another designed for personal computer use.

The NEC DSP2430II modem is said to be AT&T-compatible at 300 and 1,200 bit/sec and conform to the international CCITT V.22 standard at 2,400 bit/sec.

The autodial modem also has automatic logon capabilities and can store up to 12 numbers with optional logon messages. These logon commands can be protected with use of the device's password feature which can accommodate passwords of up to eight characters.

Used with PBX dialing

The device's ability to detect second dial tones enables the DSP2430II to be used with private branch exchange (PBX) dialing. The modem will be available in January at a price of $1,095.

The NEC Data Modem N1230 is a 1,200 bit/sec full-duplex autodial modem said to be AT&T 212-compatible. It reportedly has a Hayes Microcomputer Products, Inc.-compatible mode that enables it to operate with the major data communications software available but has built-in intelligence and storage capabilities that make it suitable for use with terminals.

Users that need Hayes- or Apple Computer, Inc.-compatible modems can use the N1230 in conjunction with the appropriate software, enabling a personal computer to control the modem directly. The device is said to have storage enough for 12 telephone numbers with logon sequences.

Host of accessible features

A host of features, such as password security and number editing functions, are accessible from the personal computer keyboard.

Available in January, the N1230 will cost $450 in single quantities, according to the vendor.

For more information, NEC America is located at 8 Old Sod Farm Road, Melville, N.Y. 11747.

CONTROLLERS

NCR COMTEN, INC.
Comten T-7362

NCR Comten, Inc. has introduced a disk for its 3690 communications processor systems that reportedly stores system software load modules and memory dumps.

According to the company, the Comten T-7362 is a 29M-byte integrated fixed-disk drive that can capture data when the system fails and restore a downed system by automatically reloading the communications processor. Console commands can be issued to the disk to display a table of contents, delete any file, format a disk or display disk file records, the company said. The disk reportedly can be installed into any Comten 3690 communications processor running under the Comtem COS/S2/90 communications operating system.

The price of the product, including one 29M-byte disk drive, controller and interface adapter is $4,450, according to the vendor.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

VOICE/DATA COMMUNICATIONS

WESTERN TELEMATIC, INC.
SS-16

Western Telematic, Inc. has announced a 16-port, RS-232 smart switching device designed to let users create their own port-to-port local network.

The SS-16 reportedly allows computer port expansion, computer sharing and linking of terminals, modems, printers and computers.

It is said to use menu-driven commands for selecting ports, disconnecting and displaying port activity.

Each of the ports can be configured for independent transmission rates from 150 bit/sec to 19.2K bit/sec. Parity conversion and handshake protocol and ports can be selected by number, name or group with up to eight simultaneous connections, according to a spokesman for the vendor.

It costs $1,895.

Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

See VOICE page 93

PE

from page 87

(HCF) and Distributed Systems Executive (DSX) applications for its Series 3200 systems.

The HCF Support software package running on the Series 3200 reportedly allows a local or remote IBM 3270 terminal in an IBM SNA network to interact with applications on the Series 3200 and to use Pennet functions. It is intended primarily to give system programmers at the IBM host site access to remote processors.

The DSX Support package is said to enable IBM host-initiated sequential file transfers between a Series 3200 and an IBM 370, 30 series or 4300 host. The 3200 is said to be managed by the IBM host as if it were an IBM 8100 distributed processing system.

The company also announced IBM 3270 terminal support, allowing connection of IBM SNA 3270 and IBM Bisynchronous 3270 terminals to a 3200 series processor via an IBM cluster controller. The support products are said to allow access to applications on the PE host or pass through to an IBM host.

Pricing for the software products are according to the size of the 3200 series processor they will run on. All except SNA/3270 Support, which will be available in January, are available now.

The original license for SNA/HCF Support costs from $1,600 to $4,500, and additional copies cost from $600 to $1,600. SNA/DSX Support costs from $1,000 to $3,000 for the original license and from $300 to $1,000 for copies; SNA/3270 Support is from $1,600 to $5,000 for the original license and from $600 to $1,600 for copies; and BSC/3270 Support is from $1,400 to $4,300 for the original and $500 to $1,400 for copies.

Pennet Plus PE 7350A is now available for $500.

EDLC-Xelos, scheduled for February deliveries, costs $3,700.

EDLC-PE 7350A, available now, costs $1,000.

The Ethernet Terminal Server, now available, costs $4,500 for the terminal portion and $5,500 for the host connection.

PE is located at 2 Crescent Place, Oceanport, N.J. 07757.

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VOICE

from page 92

MICOM SYSTEMS, INC.
Micro800/X.25i

Micom Systems, Inc. has introduced its Micro800/X.25i concentrator packet assembler/disassembler (PAD). The integral PAD lets Micom's Micro600 data private branch exchange-based Instanet local-area network users utilise X.25 networks to link their Micro600s to terminals, computers and other Micro600s.

The Micro800/X.25i can communicate with local host computers supporting X.25 software, providing up to 16 full duplex logical data channels over a single hard-wired connection to one X.25-supported computer port. Compatible with CCITT X.3, X.25, X.28 and X.29, the Micro800/X.25i supports both permanent and switched virtual circuits, plus fast select, abbreviated calling and closed user groups.

An eight-channel Micro800/X.25i is priced at $2,500, and a 16-channel version costs $4,200.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 90311.

PROTOCOL CONVERTERS

INNOVATIVE ELECTRONICS, INC.
MC 800 protocol converter

Innovative Electronics, Inc., has announced a protocol converter that is said to allow up to 24 asynchronous Ascii devices to communicate with an IBM mainframe or host computer using either Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) or Binary Synchronous Communications (BSC) protocols.

According to the company, the MC 800 appears to the host computer as an IBM 3274 or 3276 communications controller with IBM 3278/3279 terminals attached. The product is designed for computer facilities that have numerous remote sites employing only one or two 3270 terminals per site. Remote terminals, connected via asynchronous modems, can timeshare a MC 800 at the main computer site, the company said.

The product reportedly comes in port configurations of up to 24 ports and supports more than 100 types of asynchronous terminals. The MC 800 is said to be user-configurable to support all standard asynchronous bit/sec rates up to 19.2K bit/sec.

The price of the product is $3,600 for the five-port unit, according to the vendor.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

MULTIPLEXERS/ MODEMS

RACAL-MILGO, INC.
Planet Starter Pack

Racal-Milgo, Inc. has introduced a starter pack designed to create an expandable local-area network linking up to 10 word processors and personal computers.

The Private Local-Area Network (Planet) Starter Pack reportedly includes the cables, hardware and documentation needed to support up to 10 asynchronous or synchronous communications devices. According to the company, asynchronous and synchronous devices may be on the same network but not interconnected.

The network was designed to allow expansion to Racal-Milgo's Planet network with a capacity of 250 stations.

It also is said to offer Planet's features, including port selection, queuing, resource sharing, closed user groups, password, priority and automatic network restoral after a power failure.

Using a token-ring configuration with baseband, the Planet Starter Pack features a 19.2K bit/sec transfer rate and supports RS-232, V.24 and V.28 devices.

According to the company, it supports all major protocols with the aid of a protocol and code translator and provides communications among most major word processing systems and personal computers.

The Planet Starter Pack costs $9,995, according to the vendor spokesman.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

TELEPROCESSING PRODUCTS, INC.
TP-214

Teleprocessing Products, Inc. has announced its TP-214 four-channel statistical multiplexer, designed to support asynchronous terminals in synchronous networks.

The TP-214 is said to allow connection of four asynchronous terminals with input speeds from 110 bit/sec to 9,600 bit/sec to a synchronous modem, to one or more ports of a multiport synchronous modem or to a digital service unit.

The company said a typical use would be providing four 2,400 bit/sec asynchronous data paths over one 2,400 bit/sec modem.

The desktop device costs $1,350.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063.

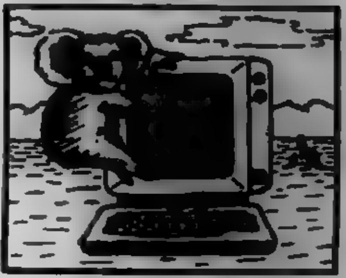
LOCAL-AREA NETWORKS

PROTEON, INC.
Infrared link

Proteon, Inc. has introduced an infrared communications link for use with its local network to interconnect buildings or for use in electronically noisy environments such as a factory or automated warehouse.

Continued on page 96

We've cornered the Australian computer market for you.



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The IBM PC market is booming in Australia. By the end of 1984, almost 20,000 units will have been sold. **Australian PC World** — the only computer magazine for IBM PC users in Australia — premiered this March in response to the growing demand. Total distribution has already topped 16,000. And newsstand sales are vigorous from Sydney to Perth.

Forecasters predict that the Australian government and businesses will increase their usage of microcomputers by 170% over the next two years. **Australian Micro Computerworld** is the only monthly magazine covering this market. Written for both single-unit and networked users, most of our 12,000 readers are skilled professionals involved in the selection or design of systems and networks.

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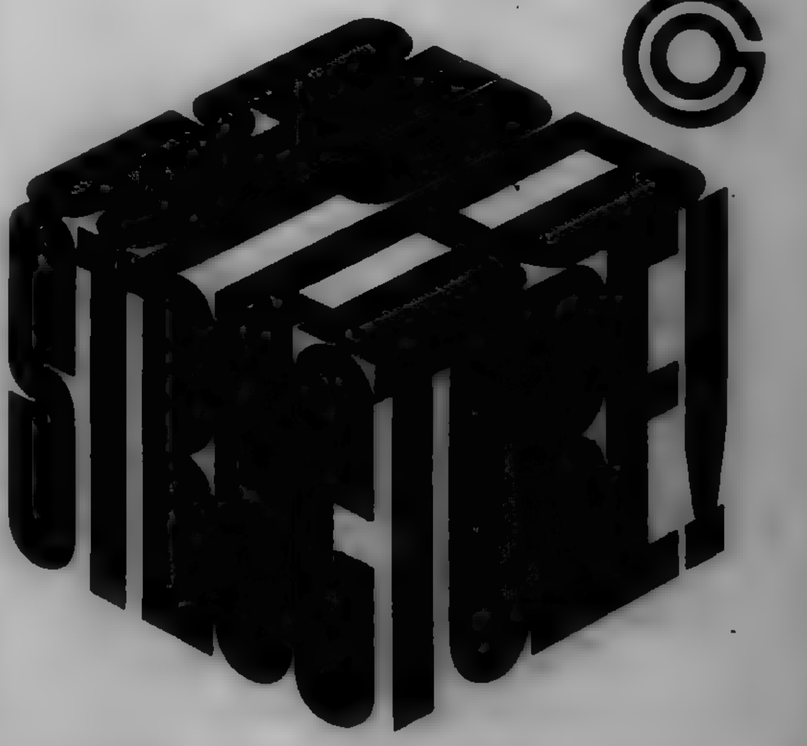

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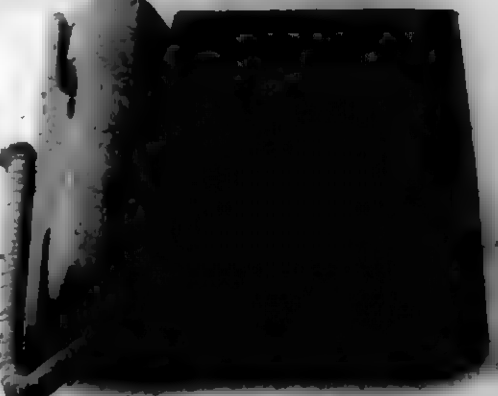

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Continued from page 93

The infrared link is intended as an alternative to physical cable connections in Pronet, the company's token-passing local network. The infrared devices reportedly can link Pronet networks together or act as a connecting medium in a single star-shaped ring.

Information can be transmitted at 10M bit/sec for up to 250 meters, depending upon weather conditions. Snow and rain have a minimal disruptive effect, Proteon said.

The infrared device reportedly includes a microprocessor that analyzes the link's performance and ensures the integrity of the data transmitted.

A two-unit link is priced at $17,000.

Proteon, 4 Tech Circle, Natick, Mass. 01760.

AUXILIARY EQUIPMENT

PLEX TECHNOLOGIES
Convert

Plex Technologies has announced a serial-to-parallel converter designed to allow computers with RS-232 serial ports to drive Centronics Data Computer Corp.-compatible printers.

The Convert is said to have a standard DB-25S female, 25-pin connector for the serial output and a standard Centronics-type 36-pin ribbon connector for the parallel input.

The transmission rate is user-selectable, with eight rates available from 150 bit/sec to 19.2K bit/sec.

It costs $99.95, the vendor said.

Plex Technologies, 2308 Fourth St., Berkeley, Calif. 94710.

VG SYSTEMS
Remote communications options

VG Systems has announced remote communications options for its VG 9250 color raster and VG 8250 stroke computer-aided design and manufacturing display stations.

The options reportedly enable multiple topologies to be configured, including point-to-point communications, multidrop coaxial lines, a gateway network for remote display stations over a multidrop coaxial network and a multicity, multidrop network over telephone lines. The VG 9250 is being shipped with the multidrop capability.

The gateway option, needed only on the first display station in the network, costs $3,000.

VG Systems, 21300 Oxnard St., Woodland Hills, Calif. 91367.

PHONE from page 87

exchange (PBX) and does facilitate communications, particularly with other Cedars. But at that cost, the user must make do with a non-IBM-style keyboard and be confident that he won't need to add a hard disk, which Cedar does not support.

At simpler levels, consider where telephones sit on desks compared with where keyboard devices sit.

Every time Cedar users want to use the device they will have to drag the thing to the middle of their desks.

More practical solution

It would seem that a more practical solution would be to retain telephones — which everybody already has — and update personal computers to get Cedar-like communications functions.

This measure would enable use of full-size personal computers and appeal to a broader market base — the thousands of people who already have personal computers.

Products of this ilk are coming from two sources: PBX vendors and manufacturers of personal computer add-ons.

When Cedar was announced, Rolm also unveiled Juniper, a $1,360 software and board option for IBM Personal Computers, Personal Computer XTs and compatibles. This device supports most Cedar capabilities — one-touch dialing for voice and data conversations, prestored terminal profiles, VT100 compatibility and 3270 emulation — including the important ability to use the voice and data devices simultaneously.

Less useful than Juniper are the third-party personal computer add-ons. These boards fit in an expansion slot within a personal computer and often do away with the need for a phone.

Instead, a handset — no base — is directly attached to the personal computer from which the "telephone" is dialed or answered. While it provides an electronic telephone directory and facilitates computer logon procedures, the productivity benefits of these devices are elusive at best.

'Too integrated' problem

Telephone/terminals suffer from the same "too integrated" problem of the Cedar and these personal computer add-ons. These devices are too small — both in screen size and keyboard — to be used as a normal terminal would. But to be fair, that was never the intended use for these devices.

It is possible, however, that the application will someday catch up to technology. Telephones are, after all, messaging devices. A telephone/terminal would extend electronic mail to personnel without terminals and make the integration of text and voice messaging systems more desirable and functional. Additionally, such a device could be used to access corporate videotex systems, when and if these systems are ever embraced.

According to industry sources, AT&T will release its own integrated voice/data workstation in January. This device reportedly will have a built-in speakerphone, built-in modem, 3270 emulation and a new touchscreen technology on which an image of a keyboard can be displayed.

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SYSTEMS & PERIPHERALS

Users cool to quality WP units, still prefer multifunction micros

By John Desmond
CW Staff

FRAMINGHAM, Mass. — While dedicated word processors generally offer higher quality output than microcomputers outfitted with word processing software, users seem to prefer multifunction micros for office automation applications. In fact, a market research firm here has significantly altered its market growth predictions for dedicated word processors in light of slumping 1983 sales figures.

International Data Corp. (IDC) predicted that in 1983, the compound annual growth rate in a five-year period for stand-alone word processors would be 27%. But the actual 1983 figures showed only a 10% growth rate.

According to a revision of an earlier report titled "Word Processor Marketplace," IDC stated that since stand-alone micros can perform calculations and run graphics, spreadsheet and other DP software, they appear to have the edge over dedicated word processors in the office. The report defined a stand-alone word processor as a unit sold primarily for office applications with vendor-supplied word processing software. A clustered word processor was defined as one capable of accessing a central processor.

The growth rate of clustered systems was projected to be 38% for the current installed base and 22.7% for new shipments, but the actual rates were 23% for the installed base and 11% for shipments, the IDC report stated.

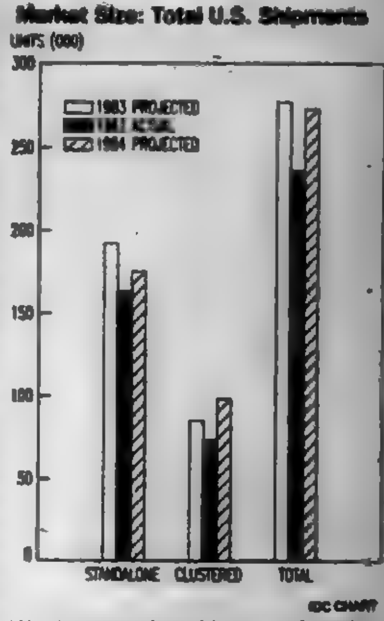
Prices for both stand-alone and clustered systems dropped as the industry tried to adjust prices to compete with the microcomputer market. IDC had forecast that stand-alone systems would cost $10,900 each in 1983 and drop to $7,500 by 1987. But according to IDC's revised report, the average price dropped to $7,720 this year, a decrease of 30% from the previous year. The $7,500 price is now expected in 1984, three years sooner than originally predicted, IDC said.

On the average, the forecast price for clustered systems was $10,000. But in 1983, the actual average price turned out to be $6,950, a 31% reduction, the report stated.

IDC originally predicted the overall shipment value of stand-alone word processors would reach over $4 billion by 1987. The market research firm now says that overall value will reach only $1.4 billion by 1988. "This is due to the increased number of personal computers doing word processing applications, the decreased cost of the word processing systems and the decreasing number of shipments," the report stated.

Manufacturing accounted for most applications, with 22.3% of the stand-alone market and 13% of the clustered market. The government was found to be the second larg-

See IDC page 105



Word processing shipments in units

NCR unveils Worksaver cluster unit

Control processor links 64 terminals

DAYTON, Ohio — NCR Corp. recently unveiled the Worksaver 3000, a cluster control processor that the company claimed allows up to 64 of the company's Worksaver line of intelligent terminals to share common file storage and applications programs. The unit can also be used as a file server, print server or communications gateway to larger processors.

Based on multiple Intel Corp. 8186 microprocessors, the Worksaver 3000 hardware was developed for NCR by Convergent Technologies, Inc. According to NCR's office systems product manager Tom Davis, the unit uses Convergent Technologies' CTOS operating system and a proprietary local-area network developed by NCR that is based on the RS-422 communicatons interface. Within this network, all peripherals, files and applications software can be shared among all users, Davis said. The vendor added that security blocks can be used to restrict file access if necessary.

Like other members of the Worksaver line, the Worksaver 3000 employs what NCR calls a Distributed Intelligence Architecture. This, Davis explained, is a concept that allows each workstation attached in a cluster to have individual use of applications software. The advantage of this architecture, Davis contended, is

See NCR page 105

- Tips for moving computers onto the factory floor/102
- A shoe manufacturer boosted inventory control with a supermini linked, via satellite, to its South American manufacturing facility/104
- NCR Corp.'s Microelectronics Division unveiled a 32-bit board-level processor that offers compatibility with Intel Corp.'s Multibus architecture/108

INSIDE

Turnkey Systems/98
Terminals/98
Board-Level Devices/98
Auxiliary Equipment/99

SHOP TALK
Ralph Spencer Poore

Data security tactics evolving for terminals

The security requirements for data communications terminals are escalating as managers become more aware of the vulnerability of terminals and the information they can access.

The methods used to compromise data transmitted to or from a terminal have become increasingly sophisticated. As a result, theft, misuse and disclosure problems have, to some degree, been countered by legislative, regulatory and judicial actions. For example, government agencies and several key businesses now require technical and procedural countermeasures for the protection of data. And more organizations now require that data communications equipment have security features before they purchase any.

Historically, there has not been a strong concern for

See SECURITY page 106

Poore is vice-president of advanced technology for Total Assets Protection, Inc., a security consulting and construction firm based in Arlington, Texas.

HARD TALK/TOM HENKEL

IBM, DEC clash to jolt '85 market

IBM and Digital Equipment Corp. have launched a processor performance war that will have a strong influence on almost every large system announced in 1985. In addition, new processors announced by both IBM and DEC have further blurred the already confused distinction between big mainframes and smaller mid-range systems and may signal a significant change in the types of work traditonally performed by mid-range CPUs.

IBM's 4381 Model Group 3 and DEC's VAX 8600 both appear to offer internal performances that challenge the performances of currently available large mainframes.

Some industry watchers seem convinced that IBM's Model Group 3 is a better deal (in a price/performance sense) than the low-end models of IBM's larger 3083 line. When it announced the 8600 in late October, DEC made a point of comparing the performance of its new processor, in a VAX cluster configuration, with IBM's top-of-the-line 3084 mainframe. DEC's move seems to indicate it plans to challenge IBM's thus far inpenetrable dominance in the mainframe processing arena with a finely tuned superminicomputer.

The intensifying dual between DEC and IBM is only the beginning of the mid-range systems performance war. Now that DEC and IBM have given power boosts to their systems, other vendors competing in the same marketplace will have to follow suit. Sperry Corp. made its move in early November when it launched the 7000/40, an AT&T Unix-based 32-bit system. In the months to come, look for similar performance enhancements from Data General Corp., Prime Computer, Inc., Wang Laboratories, Inc. and others.

The upshot of all these performance enhancements is a brewing metamorphosis that will change the traditionally held roles of large systems. Superminicomputers appear to be taking over the duties that two years ago were reserved for mainframes. Mainframes seem to be moving into a new performance domain, one that combines traditional computing power with the high-speed number-crunching capabilities formerly found in supercomputers. And multimillion-dollar supercomputers appear to be slowly gaining acceptance as a general busi-

See BATTLE page 106

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

NCR CORP.
Modular Lodging System

NCR Corp. has announced the Modular Lodging System (MLS) for its 32-bit NCR 9300 CPU, said to be capable of running front- and back-office applications simultaneously on a single processor.

MLS runs property management packages, including registration, rooms management, housekeeping and guest accounting, as well as back-office applications such as payroll, accounts payable, city ledger, travel agent accounting and general ledger. The program runs on NCR's Interactive Transaction Executive operating system.

The price for MLS with a 9300 configuration, including 2M bytes of main memory, 21 communications lines, nine CRTs, 175M bytes of disk storage and printers, is approximately $125,000, the vendor said.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio. 45479.

SCAN-OPTICS, INC.
Reliareader 536

Scan-Optics, Inc. has announced the Reliareader 536, an optical character recognition system that reportedly offers six output pockets for sorting documents after they have been read. The unit also reportedly allows users to add additional pockets in increments of six, up to a total of 30 per system.

In addition to many printer and typewriter fonts, the Alphanumeric Handprint option enables the system to read hand-printed material. It has a maximum throughput of 750 document/min.

The price of the Reliareader 536 system will start at approximately $300,000, and the system will be available in the first quarter of 1985.

Scan-Optics, 22 Prestige Park, E. Hartford, Conn. 06108.

TERMINALS

TELEX COMPUTER PRODUCTS, INC.
Telex 080 and 179 terminals

Telex Computer Products, Inc. has introduced the Telex 080, a 15-in. monochrome terminal, and its 179-color terminal, both said to offer enhanced IBM 3270 capabilities.

The two terminals reportedly connect directly to an IBM 3274 controller or Telex 274C control unit. They are said to be available in screen sizes offering 1,920, 2,560 or 3,440 char.

Both are also said to offer extended highlighting, automatic screen cutoff, volume-adjustable audio alarm and a security keylock.

The 080 is priced at $2,195. The 179 is priced at $2,295.

Telex Computer Products, 6422 E. 41st St., Tulsa, Okla. 74135.

BOARD-LEVEL DEVICES

EMULEX CORP.
UC03, UC13 host adapters

Emulex Corp. has introduced two host adapters said to provide mass storage control protocol emulation and connect Digital Equipment Corp. Q-bus or Unibus host systems to the small computer systems interface (SCSI).

The UC03 host adapter is a single, quadwide board that embeds in the standard Q-bus backplane slot of the DEC LSI-11, Micro/PDP-11 and Microvax. The UC13 is also a single, quadwide board, which plugs into a Unibus slot of the DEC PDP-11 and VAX-11 series computers.

Both the UC03 and UC13 are said to emulate DEC's mass storage control protocol in a manner completely transparent to the operating system software, the vendor said, allowing users to receive all of the mass storage control protocol benefits without the need for patches or operating system modifications.

The UC03 and UC13 allow up to four SCSI drives of any standard type or capacity to be connected to each host, the vendor said. Both adapters are said to support Shugart Corp.'s Optimem 1000, a 1.2G-byte optical disk drive.

The UC03 is priced at $1,860, and the UC13 costs $2,200, the vendor said.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

INTERNATIONAL ELECTRONICS ENTERPRISES, INC.
MK2

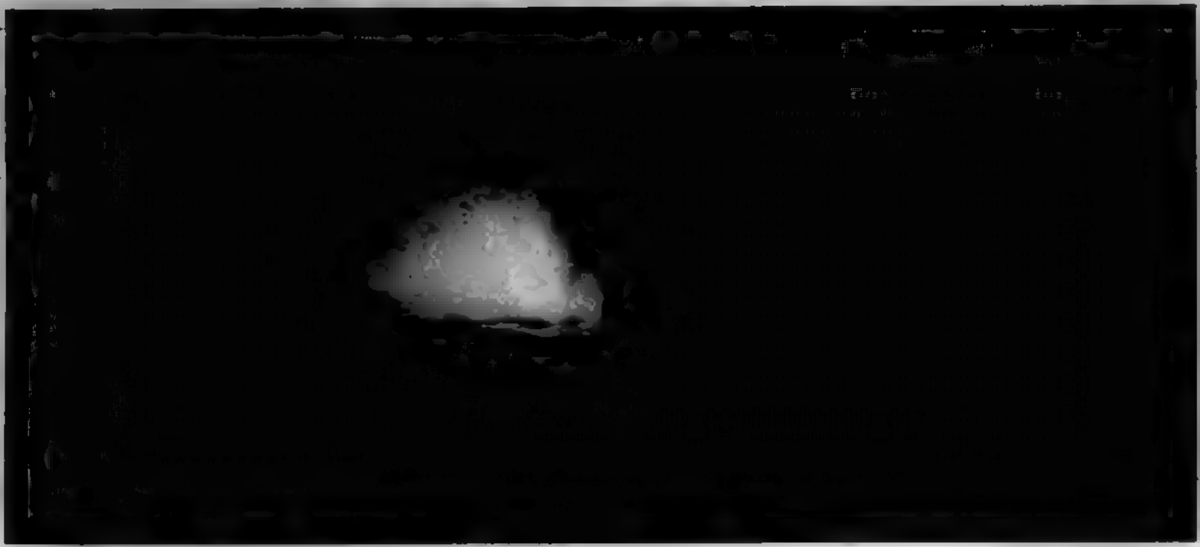
International Electronics Enterprises, Inc. has introduced a printed-circuit board said to check the alignment and operation of hard disk drives.

The MK2 disk mini-exerciser has reportedly been designed to eliminate the need for an oscilloscope when exercising or aligning disk drives. The exerciser can be used to test Control Data Corp. 9762 and 9766; Digital Equipment Corp. RMO2, RMO3 and RMO5; and Wang Laboratories, Inc. 2265 V-1 and 2262 V-2 disk drives.

The MK2 contains logic and switching circuitry said to enable an engineer to perform a complete disk alignment or exercise and check the operation of 40M- to 80M-byte or 150M- to 300M-byte disk drives. The exerciser tests seek direct or between two selected cylinders, random seek, return to zero, head select and alignment circuitry, the vendor said. Test points are provided for read/write, head alignment and ground.

The unit costs $675.

International Electronics Enterprises, 110 Agate Ave., Newport Beach, Calif. 92662.



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Planned non-obsolescence is just part of the NCR Comten story. More reasons will be found in our special executive briefing. For details, write "Data Communications Systems", NCR Comten, Inc., Department 8015, 2700 Snelling Ave. N., St. Paul, MN 55113. Or call 1-800-334-2227. In Canada, call 1-800-543-5713.

NCR COMTEN. KNOWN BY THE COMPANIES WE KEEP.

NCR
NCR Comten, Inc.

AUXILIARY EQUIPMENT

APPLIED CIRCUIT TECHNOLOGY, INC.
Winchester disk drive emulator

Applied Circuit Technology, Inc. has announced a Winchester disk drive emulator said to provide a testing standard for hard disk drives used with personal computers.

Intended for use with both 5¼-in. and smaller hard disk drives, the emulator is targeted at systems integrators and at disk drive and controller manufacturers for calibrating and verifying read/write capabilities of their units, the company said.

The emulator stores one track of data and accepts and returns up to 10,416 bytes of data during a read/write operation. After a seek test, track zero's data is returned until a write operation is performed.

The price of the emulator is $1,895, the vendor said.

Applied Circuit Technology, 2931 La Jolla St., Anaheim, Calif. 92806.

PRESTON SCIENTIFIC, INC.
Preston GM/SEL 32

Preston Scientific, Inc. has announced a parallel interface designed to link Preston's 13-bit and 15-bit data conversion systems to Gould, Inc. superminicomputers.

The Preston GM/SEL 32 reportedly provides logic terminations and compatible driver-receiver circuitry for operating Preston's analog and digital conversion subsystems from the Gould/SEL HBS controller. It is available with options for either a 16-bit or 32-bit format, according to Preston.

The 32-bit format is said to provide a data packing feature that allows converted data from Preston's 500-KHz and 1-MHz ADC systems to be assembled in 32-bit words consisting of two 15-bit conversions.

The interface costs $3,775.

Preston Scientific, 805 E. Cerritos Ave., Anaheim, Calif. 92805.

PRACTICAL PERIPHERALS, INC.
DES 2000

Practical Peripherals, Inc. has announced DES 2000 Data Encryption Service, a stand-alone data encryption unit.

The unit reportedly encrypts and decrypts data while using U.S. National Bureau of Standards encryption standards. DES 2000 features local and communication modes of operation, three levels of security and four methods of encryption, the vendor said. The product is said to limit access to an on-line computer and controls entry into specific files on a host computer.

The encryption unit reportedly operates at 10 transmission speeds ranging from 110 to 38,400 bit/sec.

DES 2000 Data Encryption Service costs $459.

Practical Peripherals, 31245 La Baya Drive, Westgate Village, Calif. 91362.

HI-SECURITY CENTRE
Data Armor

Hi-Security Centre has announced the Data Armor data encryption device, developed by Tranco Ewen, Inc., said to employ two separate encryption systems to safeguard data.

Data Armor employs the Data Encryption Standard certified by the U.S. Bureau of Standards for nonclassified data encryption. It also employs the Transcrypt data encryption program, said to allow users to select a unique key code for their data using up to a 20-digit number. Transcrypt is said to offer over four billion key codes, which the company claims makes unauthorized access impractical.

The device is said to provide phone line dial-up protection by requiring the caller to input the proper identification codes and to protect from unauthorized access by blocking all communications from a terminal that has not been used for five minutes or more.

Data Armor is priced at $999.

Hi-Security Centre, 3435 Galt Ocean Drive, Fort Lauderdale, Fla., 33308.

PRESTON SCIENTIFIC, INC.
GMAD5A A/D Conversion System

Preston Scientific, Inc. has announced the GMAD5A A/D Conversion System, for analog-to-digital conversion, said to be capable of interfacing a variety of Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. CPUs.

The GMAD5A is said to have analog conversion accuracy of up to .01% and a 15 msec/channel conversion rate. Features of the GMAD5A include automatic gain control, automatic random channel addressing, automatic repeat-channel addressing and automatic timing control.

A range of analog signal amplifiers and multiplexers can be included within the standard configuration of the GMAD5A A/D, including multichannel single-ended and differential multiplexers, fixed-gain amplifiers and filters with accuracy of .005% and sample and hold amplifiers with hold apertures of one nsec, according to the company.

Up to 128 single-ended or differential multiplexer channels reportedly can be installed within the 5¼ in. by 19-in. chassis. The price of a GMAD5A A/D Conversion System with 64 input channels is approximately $8,500.

Preston Scientific, 805 E. Cerritos Ave., Anaheim, Calif. 92805.

KEYWORD OFFICE TECHNOLOGIES, INC.
Keyword 7000

Keyword Office Technologies, Inc. has introduced its Keyword 7000 disk-to-disk data conversion device.

Continued on page 100

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Continued from page 96

Keyword 7000 reportedly allows diskettes created on one word processor to be used on other word processors or personal computers. The Keyword 7000 can interface with Wang Laboratories, Inc.'s WPS, OIS and VS product line; Xerox Corp.'s 820; the IBM Displaywriter; Lanier Business Products, Inc.'s No Problem and Super No Problem; Philips Information Systems, Inc. Micom 2000 and 3000 series; and Digital Equipment Corp.'s Decmate II.

Additionally, users only need to buy one hardware box plus software pairings that convert incompatible diskettes, the firm said.

Keyword 7000 hardware is priced at $9,995, including one software pairing. Additional software pairings are priced at $495 each.

Keyword Office Technologies, 2047 Hamilton Ave., San Jose, Calif. 95125.

DIGITAL PRODUCTS, INC.
Digital Datacollector

Digital Products, Inc. has announced Digital Datacollector, a bidirectional network/buffer said to provide a link between process control, shop or laboratory equipment and a central management analysis computer.

According to the company, the Digital Datacollector features up to eight hours of data collection buffering and the ability to download programs and instructions via user-definable commands.

The device is user-transparent and said to be capable of networking up to 16 different devices. It consists of modular, expandable RS-232C-compatible components, including all cabling, software and instruction manuals, the company said.

The price of the Datacollector ranges from $595 to $8,000, depending on configuration, the company said.

Digital Products, 600 Pleasant St., Watertown, Mass. 02172.

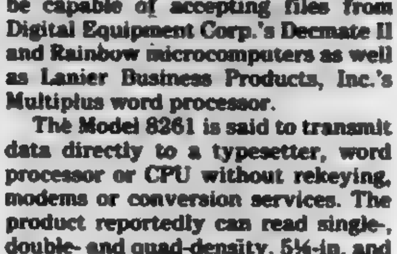
BABER, INC.
Multidisk Reader Model 8261

Baber, Inc. has announced the Multidisk Reader Model 8261, said to be capable of accepting files from Digital Equipment Corp.'s Decmate II and Rainbow microcomputers as well as Lanier Business Products, Inc.'s Multiplus word processor.

The Model 8261 is said to transmit data directly to a typesetter, word processor or CPU without rekeying, modems or conversion services. The product reportedly can read single-, double- and quad-density, 5¼-in. and 8-in. floppy disks. Existing 8161 models can be upgraded, according to the company.

The price of the Model 8261 is approximately $7,495, the company said.

Baber, 3 Northern Blvd., Amherst, N.H. 03031.



'Hi there, handsome!'

DOLCH LOGIC INSTRUMENTS, INC.
Palas 40C50

Dolch Logic Instruments, Inc. has announced its Personal Advanced Logic Analysis System, Palas 40C50, a stand-alone instrument for testing microprocessors.

The instrument has RS-232 and General Purpose Interface Bus compatibility.

Palas 40C50 features include three setup menus for recording, triggering and compare; a 9-in. CRT display; nonvolatile setup memory; up to 40 channels — 32 data and eight trigger qualifiers; support of eight- and 16-bit microprocessors; and dual-time base clocking, according to the company.

Price of the Palas 40C50 is $3,950, the company said.

Dolch Logic Instruments, 2029 O'Toole Ave., San Jose, Calif. 95131.

COMPUDYNE, INC.
Sensaphone 1000C/X

Compudyne, Inc. has introduced a computer room security monitoring device said to feature automatic voice call-out and inquiry response capability.

Sensaphone 1000C/X is said to have the capability of monitoring and reporting by telephone on environmental and electrical conditions in a computer room or secure area. The basic system monitors temperature, power status, sound level and the status of its own battery backup.

An alarm condition exists in the following circumstances: when the temperature falls outside high and low limits set by the user, when the electrical power fails for more than five minutes, when there is a sharp change in the sound level near the unit for more than [illegible] seconds and when the backup batteries in the unit are near exhaustion, the vendor said.

The price for Sensaphone 1000C/X is $[illegible].

Compudyne, 10 Deangelo Drive, Bedford, Mass. 01730.

APPLIED CIRCUIT TECHNOLOGY, INC.
Portable Test Station

Applied Circuit Technology, Inc. has announced a portable computer disk drive test device said to be designed for single-unit testing.

The desktop Portable Test Station (PTS) tests Winchester disk drives of both 5¼-in. and sub-5¼-in., the vendor said. Features reportedly include

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SYSTEMS & PERIPHERALS

two forms of test criteria: the standard, with pass/fail limits set by the disk drive manufacturer; or the conditional, with additional user-set parameters. The PTS is said to read media flaw maps that are written on disks at their manufacturing site.

The PTS, reportedly designed primarily for disk drive repair, rework and development and receiving inspection, is comprised of disk drive certification electronics with power supplies, a CRT screen, keyboard and 5¼-in. half-height floppy disk.

PTS is priced at approximately $8,000.

Applied Circuit Technology, 2931 LaJolla St., Anaheim, Calif. 92806.

DIRECT, INC.
PC2624B

Direct, Inc. has announced an interface package said to allow IBM Personal Computers to communicate with Hewlett-Packard Co. HP 3000 host computers.

According to the vendor, the PC2624B display enhancement card and diskette software provides 80- by 132-col. screen format and 27 text lines for a full 24 lines of text with two rows of function key soft labels and a file send and receive module.

The product is priced at $595, the vendor said.

Direct, 4201 Burton Drive, Santa Clara, Calif. 95054

VOYAGER DEVELOPMENT, INC.
Model SP101 antipiracy device

Voyager Development, Inc. has added an antipiracy device to its Voyager SP100 series intended for use by software developers. The Model SP101 places part or all of the protected programs in molded plug-in read-only memory (ROM) modules.

The microprocessor-based SP101 has provisions for four plug-in modules, each containing from 2K bytes to 64K bytes of user code, providing a maximum of 256K bytes of available, on-line ROM at any one time, the vendor said. Each module reportedly can protect one or more programs, or the entire 256K bytes can be used for one program.

The SP101 device connects to standard RS-232 ports and was designed so that data reportedly passes through the device output port in a transparent mode when not transmitting.

The device contains automatic transmission rate determination and will function at rates from 50 to 19.2K bit/sec, according to the vendor.

Prices start at $32.50 for the base SP101 device and vary with order quantity. Plug-in modules start at $5.50 for 2K bytes of ROM and vary with capacity and quantity, the vendor said.

Voyager Development, 412 S. Lyon St., Santa Ana, Calif. 92701.

REMOTE MEASUREMENT SYSTEMS, INC.
ADC-1 Data Acquisition and Control System

Remote Measurement Systems, Inc. has introduced the ADC-1 Data Acquisition and Control System that can be used with any personal computer with an RS-232 interface.

As an analog/digital input interface, the ADC-1 lets nearly any computer talk with sensors and instruments of all kinds.

As a computer control system, it makes six digital controlled outputs and BSR U.S.A., Ltd.'s X-10 system of line-carrier wireless remote control available to the programmer.

Price of the unit is $395. Available options include sensors, cables, control modules and software diskettes at a variety of prices.

Remote Measurement Systems, P.O. Box 15544, Seattle, Wash. 98115.

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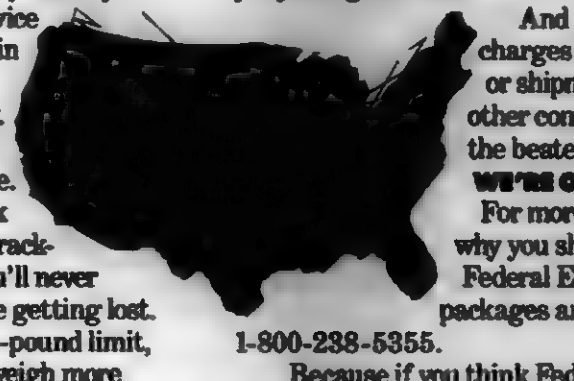

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HELP/38

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Flexibility required for automated factories

By John C. Rowe
Special to CW

The automated factory requires combining production, processing and material-handling equipment into a single computer-controlled system. The efforts toward this integration started with decentralized numerical-control automation of simple machine tools and metal-forming equipment. As this automation trend evolved, it employed the computer and computer-based communications to support integration.

This was accomplished horizontally to incorporate more functions and vertically to bring more and more devices into coordinated control of the work flow on the floor.

The integrated factory exhibits flexibility — the ability to establish new factorywide machine setups; the ability to implement engineering changes in a controlled, coherent manner; and the ability to react to changes occuring on the factory floor in a real-time mode.

Computers used at all levels

This flexibility and control exist because of the use of computers at all levels of the industrial organization. A variety of computers is used to control the production factory. They include mainframes, superminicomputers, minicomputers, microcomputers and programmable-logic controllers. As the fully integrated factory continues to develop and evolve, each of these types of computers will play its own role. There is not one single best solution to control the factory.

It is not practical to tie every sensor and device into a single host mainframe due to the time-critical nature of many control processes. Conversely, a completely distributed arrangement of all of the production devices with communications and coordination attempted among all of them in a peer-to-peer mode would be chaotic.

In order to understand the levels of control required in the factory, it is necessary to classify the factory into a hierarchy of manufacturing and then describe the role that computer control plays in each of the levels.

Factory segments

The U.S. Air Force Integrated Computer-Aided Manufacturing Program has constructed a model of the manufacturing process that segments the factory as follows:

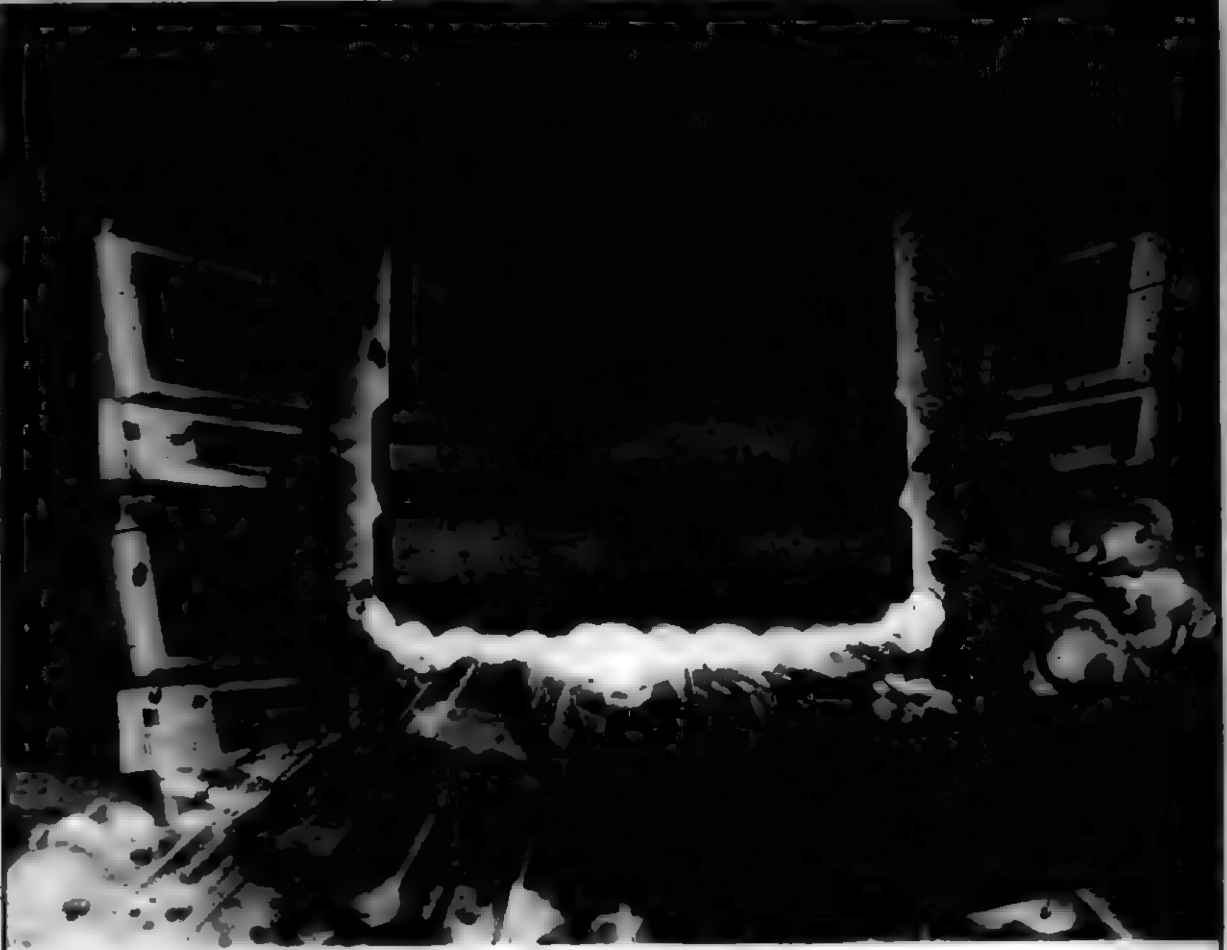
- **Process** — A single operation or set of operations carried out by a person or machine, not aided by an external hierarchy of program-driven circuitry or software. Processes are primarily controlled by a station controller or person.
- **Station** — The lowest level of automated control, it is composed of sets of processes under the control of software resident at or under the direction of the station. Stations control processes but do not control other stations.
- **Cell** — A basic concept in plant operation, controls stations and any process that is external to station control. Cell controllers control multiple stations or a single station if it is accompanied by at least one process not under station control.
- **Center** — The grouping and control of two or more cells. A center may control a single station that is external and not controlled by a particular cell.
- **Factory** — The grouping and control of one or more centers. Single cells not under the control of a center may be under the control of the factory controller. The factory is that level in the hierarchy that is controlled by management personnel and business policies.

Each of the various types of computers available on the market today has a place in factory automation. System cost vs. performance under the communications and control load of a moderately large number of distributed attachments is the major consideration.

When considering the power, response and flexibility of the computers available, minicomputers are ideal for the intermediate levels. In fact, their attributes make them a viable choice for filling the task at both the cell and the center levels, which are the key intermediate layers of factory control. They are much less expensive than large mainframes or superminicomputers. They also offer more operating system and communications flexibility than microcomputers. They offer relatively easy upgrades to increase processing power by substituting or adding circuit boards, as well as large potential additions to on-line file storage.

A major advantage that minicomputers have within the factory environment is their extensive communications capability, Distributed processing control as described also requires a hierarchy of communications along with the hierarchy of computer control.

Rowe is a principal of J.C. Rowe & Associates in Cleveland, a consulting firm specializing in factory automation and computer-aided manufacturing.



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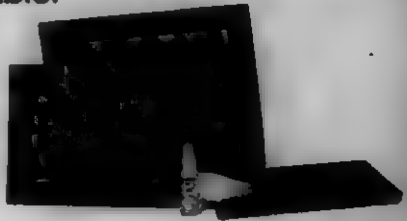

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*National Institute For Occupational Safety and Health Study, August 1981.

System fits shoemaker's market data needs

A satellite link helps Fisher Camuto track merchandise on a daily basis, allowing it to respond to shifts in buying trends in time to reorder popular styles from its manufacturing plants within the same season.

STAMFORD, Conn. — A shoe manufacturer here claims it has improved its ability to compete in the rapidly changing consumer goods marketplace by installing a superminicomputer with a satellite link to the firm's manufacturing facility in Brazil.

In just six years, Fisher Camuto Corp., a manufacturer and marketer of women's shoes, has become one of the largest privately owned shoe companies in the U.S.

Last year, the company produced more than 15 million pairs of shoes at its manufacturing facilities in Brazil. The company supplies more than 5,000 retailers, and the company is establishing a retail chain that it hopes will expand to more than 200 stores in the next two years.

Faced number of challenges

Until 1983, Fisher Camuto was strictly a wholesaler. When management elected to create an organization for direct sales to customers, it had to face a number of challenges.

First, the company had to find a way to get the maximum competitive advantage from its vertical integration. To do this, it needed to transfer information from its retail outlets to corporate headquarters and then to the manufacturing plants in Brazil. This process would allow management to respond on a daily basis to shifts in the marketplace, stepping up production of hot sellers and reacting to inventory needs relative to reorder and markdown, noted Ken Scharf, the company's vice-president and director of MIS.

A second concern was how to evaluate the wide range of variables involved in tracking and identifying inventory. This problem was particularly acute for Fisher Camuto because, Scharf said, the company offers a large number of colors.

A third concern was speed. Fisher Camuto wanted to move fast, but Scharf said that developing custom software to perform all the desired functions would take at least a year. That was longer than Fisher Camuto wanted to wait.

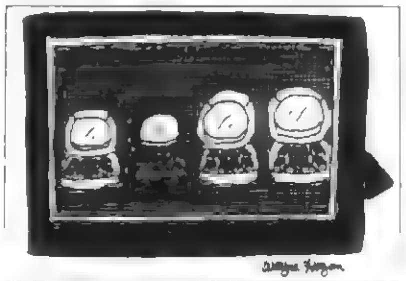
It was at that time that Fisher Camuto first learned of MDS Qantel Corp. The company elected to purchase a Qantel System 64 supermini with 512K bytes of main memory, MDS Qantel's Frame III software, a 600-line/min printer, and 12 terminals. The system also includes 26 IBM 3884 cash registers that record point-of-sale information at stores. An IBM 4381 mainframe located at company headquarters here polls these registers nightly, Scharf said.

Scharf said the company also uses the system for inventory, sales forecasting and marketing analysis. It has also added packages for accounts payable and general ledger to oversee the administrative aspects of its stores.

A satellite link between Fisher Camuto headquarters and its manufacturing facilities in Brazil allows plant managers in Brazil to know what types of shoes are selling each day in the U.S. and allows headquarters managers to verify inventory levels in Brazil, Scharf said.

Fisher Camuto is able to track merchandise on a daily basis, determining what is selling and what is not. This, Scharf said, allows the company to respond to shifts in buying trends in time to reorder popular styles from its manufacturing plants within the same season. If a certain color is hot, Scharf said, Camuto can respond by offering that color in a variety of styles. Conversely, Scharf said, the firm can pinpoint quickly and mark down slow movers to increase cash flow.

The Qantel system also gives Fisher Camuto the ability to test-market new products before putting them into full-scale production. Sales can be monitored from company headquarters, and full-scale production can be ordered if the product tests well.



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NCR adds 32-bit board-level processor

COLORADO SPRINGS, Colo. — NCR Corp.'s Microelectronics Division announced a very large-scale integrated (VLSI) 32-bit board-level processor said to be compatible with Intel Corp.'s Multibus architecture.

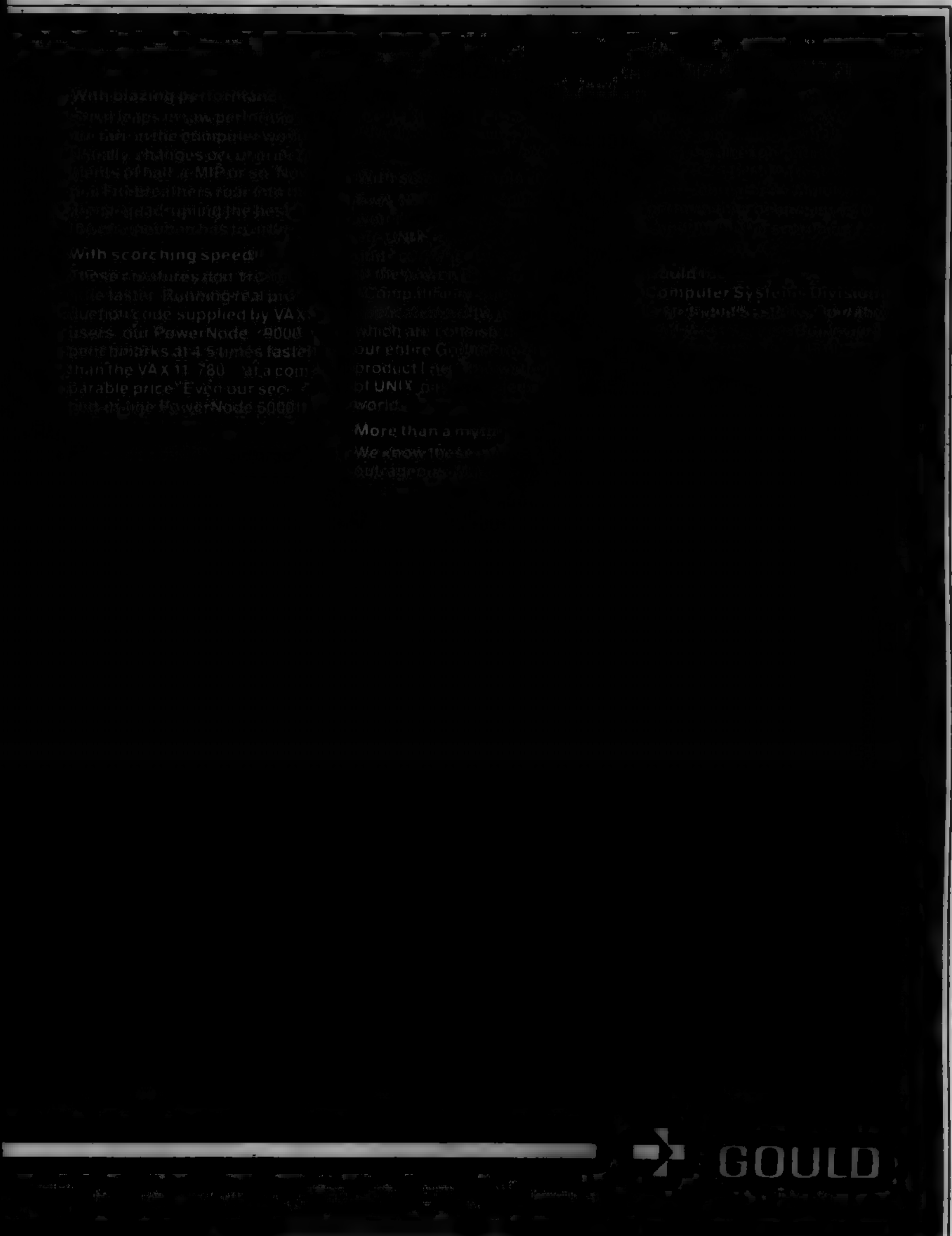
Called the NCR/32-795A, the unit features three members of the firm's NCR/32 chip set, including its microprogrammable Central Processor Chip, an Address Translation Chip and an Extended Arithmetic Chip. External microprogrammability is supported with 16K words of random-access memory microcode instruction storage. There is also a 128-word scratch pad memory for temporary data storage, the vendor said.

Operating with a 13.3-MHz clock, the board has instruction and bus access speeds of 150 nsec. The addressable memory capacity is 4G bytes of virtual storage and 16M bytes of real memory, the vendor said.

Applications for the board include dedicated algorithmic processing, graphics coprocessing, robotics control, high-level language acceleration and virtual machine emulation. The board was designed for users with compute-bound applications. The board can be added to 8- and 16-bit Multibus computer systems, the vendor said.

The board costs $4,995; a series of NCR-developed software tools that provide a debug monitor, initialization and trap/interrupt service routines costs $895. The board will be available this month, according to the vendor.

More information on the products is available from the vendor's VLSI Product Marketing Division, which is located at 1635 Aeroplaza Drive, Colorado Springs, Colo. 80916.



NCR from page 97

that it eliminates CPU contention and performance degradation problems that can occur with systems that rely on a single CPU to manage all applications software.

The Worksaver 3000 can operate with any product in the company's Worksaver line. These include the Worksaver 100, 200 and 300 series of workstations. Previously, only the Worksaver 300 could be used as a cluster controller. Davis added that the Worksaver 300 was only capable of supporting a cluster of three workstations.

Davis said the Worksaver 3000 can also be used as a communications gateway to larger systems. By using an NCR software product called the Workstation Host Access Method, users can access NCR mainframes running the firm's VRX operating system. The unit can also be used to provide asychronous, binary synchronous or IBM 3270 terminal emulation. The unit can also be used for remote job entry to an IBM host, or it can be used in an IBM Systems Network Architecture network environment.

The Worksaver 3000 can accommodate up to eight processor modules and can support up to six 300M-byte disk drives.

A standard configuration of the Worksaver 3000, capable of supporting up to 16 workstations, costs $48,300. That configuration includes system software, a 5M-byte removable cartridge disk drive, two 50M-byte disk drives, a file processor, a cluster processor, two memory expansion boards, one parallel port and three serial ports.

Volume shipments are scheduled to begin in the second quarter of 1985, the vendor said, from NCR World Headquarters, Dayton, Ohio 45470.

IDC from page 97

est market, with 15% of the stand-alone market and 18% of the clustered market.

IDC predicted that word processors will continue to increase market penetration in paper-intensive areas such as government, legal and insurance industries, for secretaries and clerical workers. But because of the influx of multifunction systems and because of the tendency toward personal computers with third-party word processing packages over multifunctional word processors, IDC is not predicting significant increases in sales in the professional or managerial marketplace.

IDC estimated that 80% of total word processor sales in 1983 were made directly, 9% through office product dealers, 4% through distributors and 3% each through dealers and OEMs.

In market share, IBM continued to dominate the stand-alone market with 29.8% of shipments and 39.5% of the installed base. Digital Equipment Corp.'s multifunctional Decmate systems showed a 108% increase in shipments and 141% increase in installed base.

The clustered market continued to be dominated by Wang Laboratories, Inc., with 49% of shipments and 50.8% of the installed base.

The report is available for $1,000 from IDC, Five Speen St., Framingham, Mass. 01701.

SECURITY

from page 97

terminal security. Most early terminals were designed with the assumption that security, if any, would be provided through either the physical security of the facility or through logical security designed into the host computer system.

Most early terminals were dumb and incapable of storing significant amounts of data. Consequently, there were higher security risks associated with paper tape or printouts than terminals. Also, older terminals were directly connected to the host computer, primarily through dedicated circuits, which also limited risks.

Today, however, technology has eclipsed the historic terminal environment. Intelligent terminals can have significant storage capabilities that make them removable data bases that must be protected.

It is often difficult to secure terminals because they are placed in warehouse, office or manufacturing locations that lack the physical security routinely provided by a computer center. The portability, high-dollar value per pound and widespread use of microcomputers have created a black market for terminals, microcomputers and components.

Misuse of a terminal can occur when an unauthorized person uses a terminal or when an authorized person uses a terminal in an unauthorized manner. Such misuse threatens both the integrity and the privacy of data stored at the terminal and can sometimes compromise the actual operation of the terminal.

> *Misuse of a terminal can occur when an unauthorized person uses a terminal or when an authorized person uses a terminal in an unauthorized manner. Such misuse threatens both the integrity and the privacy of data stored at the terminal and can sometimes compromise the actual operation of the terminal.*

It is also possible for someone to penetrate the logical security of the host computer through a terminal. Dependent upon a terminal's storage or processing capabilities, a perpetrator can use it to trap data sent to the host computer. Security breaches of this sort compromise the identification and authentication processes, such as a logon identification and password used on the host computer system.

Some terminals — those integrated with a telephone — store the telephone number and access codes for automatic logon to host systems. If this feature is misused, the number and codes can be altered, destroying the security of the associated host systems. These examples demonstrate that if terminals can be misused, host systems can be as well. Such misuse opens the door to fraud, malicious mischief and denial of service. The potential losses in productivity and asset conversion easily exceed the value of the terminal equipment.

Another serious information threat — disclosure — is a risk to valuable data and proprietary software. Actual access to the victimized terminal is not essential here. Most networks are vulnerable to disclosure regardless of whether they use coaxial cable, microwave terrestrial links, satellites, switched or dedicated circuits.

Although exploiting the electromagnetic interference (EMI) or electromagnetic conductance (EMC) transmission of data from terminals requires specialized equipment that remains relatively expensive, there are buyers for such hardware. Today, 98% of all terminals emanate characteristic EMI/EMC patterns from their keyboards, CRTs, printer elements, storage devices and other electronic and electromechanical components that can be recorded, analyzed and traced back to the original characters. Thus, messages entered or displayed at the terminal can be re-created for eavesdroppers.

To counter these security threats, managers must implement both technical and human procedural controls. Products like the Anchor Pad by Anchor Pad International, Inc. can prevent theft of terminals. The misuse of terminals can be reduced by requiring a means for identifying authorized users and by limiting the functions or data accessible to authorized users.

BATTLE

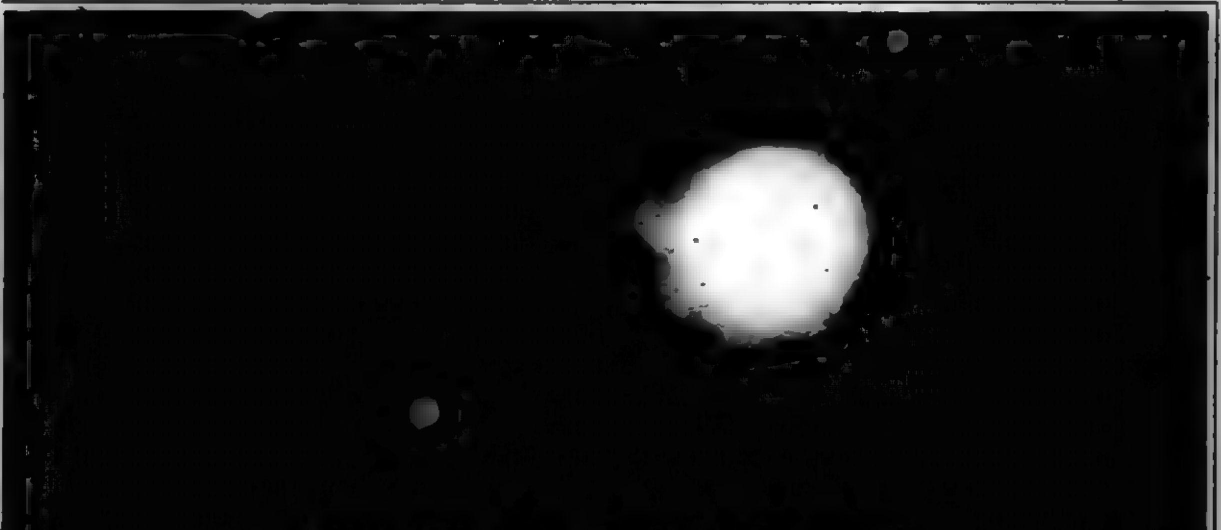
from page 97

ness tool.

The top two vendors of IBM-compatible mainframes, for example, both have announced plans to market Japanese-developed supercomputers as part of their regular processor lineup.

Industry watchers said they feel certain that IBM's rumored Sierra mainframe, while it may not offer supercomputer-class capabilities, will possess impressive number-crunching capabilities that far exceed those of currently available IBM mainframes.

Unlike supercomputers, mainframes with impressive number-crunching capabilities appear geared to perform traditional file-oriented functions and the sophisticated modeling and simulation tasks that many users are now demanding.



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BYTE Magazine Sieve Benchmark

In a comparison of Ryan-McFarland COBOL 1.6A, Micro Focus COBOL 2.0 and PHILON FAST/COBOL 1.0 using the BYTE Magazine sieve benchmark the results are conclusive: PHILON FAST/COBOL executes the benchmark 24 times faster than Micro Focus and 47 times faster than RM/COBOL. (System configuration: [illegible])

Unleash the true potential of your 68000/UNIX system, call Bob Glidenberg at (212) 807-0303 or write to Philon, Inc., 641 Avenue of the Americas, New York, NY 10011

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MICROCOMPUTERS

Visage ties micros, videodisk players

Development tools offered for visual information systems

BOSTON — Visage, Inc. has announced a line of visual information system products here that combine an IBM Personal Computer or compatible system with an interactive videodisk player for training, computer-based instruction, visual archiving and other applications.

In addition to what the firm hailed as "the industry's first IBM Personal Computer-compatible interactive video systems" and a host of software tools said to provide authors with a complete development environment, Visage introduced plug-in boards, interactive video upgrade kits and other options.

Visage's V:Station 2000 series includes five models, each featuring an IBM-compatible micro with videodisk player controller board, 13-in. red-green-blue (RGB) monitor and software development and run-time tools. Common system features reportedly include the ability to run most videodisk players, to overlay computer-generated graphics on the video image and to read digital data encoded on the video signal.

The V:Station series ranges from the VIS:2001 delivery system, with 256K bytes of random-access memory (RAM) and dual floppy disk drives, to the VIS:2005 development system, with 512K bytes of

See VISAGE page 126

Minis to act as hosts

Larger role predicted as departmental CPU

By Edward Warner
CW Staff

WALTHAM, Mass. — The minicomputer, not the mainframe, is destined to become the host processor of choice for departmental personal computer networks in Fortune 1,000 firms, according to analyst George Colony, president of Forrester Research.

Colony, who spoke on the future of corporate computing at the Boston regional meeting of the Microcomputer Manager's Association here last month, said he expects minicomputers, serving as what he called departmental resource processors, to become the standard in Fortune 1,000 firms. The processors, he explained, will control a local data base and a local network of what are likely to be mostly IBM Personal Computer ATs.

The departmental resource processor will reduce the need for micro-to-mainframe communications by housing the department's or division's data base. At present, he said, Fortune 1,000 firms, most with as many as 50 to 70 different divisional locations, experience large data communications costs when they try to link all their sites with a central mainframe.

"Intersite communications costs are going to force these [data processing] functions to be pushed out to the departmental level," he observed.

For both the corporate personal computer manager and the data processing manager, however, the resource processor will mean a loss of power, Colony said. The departmental resource processor is likely, he estimated, to be put in the hands of an on-site administrator who knows minicomputers and data communications, someone who once was "the minicomputer renegade of the 1970s."

Moves toward the departmental resource processor can already be seen in the rise of multiuser personal computers such as the Personal Computer AT and in the spread of such multifunction software as Data General Corp.'s CEO and Digital Equipment Corp.'s All-In-One, noted Colo-

See MINIS page 126

■ Control Data Corp. announces Process Flow Analysis software/108

■ Sysgen, Inc. launches a 45M-byte cartridge tape backup system for the IBM Personal Computer line/[illegible]

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Innovative developers aim at Apple Macintosh

SMALL TALK
Paul Korzeniowski

You are a software developer. You are young, energetic and bright, and you would like to become a millionaire.

You have written a data base management system (DBMS), spreadsheet or telecommunications package that someone else marketed. You were disappointed with the way the package was marketed and vowed to do it yourself the second time.

This morning, while pouring milk over a bowl of your favorite cereal, you had an idea for a new product — a product no one else is making, everyone needs and one that could make you a millionaire.

Decisions must be made, and one key choice is what machine should run your software.

One year ago, you probably would have chosen the IBM Personal Computer. Today, you're more likely to turn to Apple Computer, Inc.'s Macintosh.

"At [Comdex/Fall '84], there was a lot of software for the Macintosh," noted Robert Lefkowits, director of microcomputer system software research at Infocorp, a Cupertino, Calif., market research firm. "If the manufacturers can get the products to market [in good shape], there will be some real interesting Macintosh products in 1985."

If 1985 mirrors 1984, it will bring few interesting products for the IBM Personal Computer. This year, bells and whistles were added to Personal Computer spreadsheets, data bases, word processors and communications packages. But, while more cells in a spreadsheet, additional records in a data base or automatic dialing capabilities in a communications package may aid a user, they are not very enthralling.

See MAC page [illegible]

Perkin-Elmer's Unix-based micro to support five users

OCEANPORT, N.J. — Perkin-Elmer Corp. today is scheduled to announce an AT&T Unix-based, 32-bit supermicrocomputer.

The PE 7350A, built around an 8-MHz Motorola, Inc. 68000 microprocessor and supporting up to five users, is targeted to applications such as wholesale distribution systems, graphics and computer-aided design, disbursed site systems, Unix training and application development and small business accounting and control.

According to the company, the product is now available to OEMs, value-added resellers and large user companies. A spokesman said the product is not designed to replace the year-old PE 7350 supermicro, but that it is smaller and offers a better price/performance ratio.

The PE 7350A, with an entry-level system price of $8,250 in single quantity and $5,100 in quantities of 100, is said to be Ethernet-ready, with expansion space for a PE Ethernet Data Link Controller board, also announced today (See story page 87). That controller is said to give the 7350A access to a PE Ethernet local-area network and the resulting gateway to X.25 packet-switching and IBM Systems Network Architecture/Synchronous Data Link Control networks.

Supports Unix System III

The PE 7350A features the Unisoft Corp. Uniplus port of AT&T Unix System III. The system is said to support up to five users by connection of PE terminals to four RS-232C ports. An IEEE 488 bus is optional. The processor consists of the Motorola 68000, a 24-bit memory address bus and a 16-bit data bus and is said to have a 150 nsec random-access memory (RAM) access time and a 500 nsec RAM cycle time.

It features a minimum memory of 512K bytes and a maximum memory of 3M bytes and is available with a 320K-byte floppy disk and a 15M-byte or 28M-byte, 5¼-in. Winchester disk drive. The system is available with four monitors, including a 13-in. color graphics monitor with a palette of 27 colors.

In addition to Uniplus, the 7350A includes an interface for PE's OS/32 operating system and the PE Menu Maker user interface. The system reportedly supports Fortran 77, C, Unisoft's Basic-Plus, Ryan-McFarland Corp.'s RM-Cobol and Software Ireland Ltd.'s Sibol.

Third-party software now available is said to include Mark-of-the-Unicorn, Inc. Finalword, Visicorp Visi Word, Access Technology, Inc.'s Supercomp-Twenty spreadsheet and Unify Corp.'s Unify relational data base.

An entry-level system, including 512K bytes of memory, four ports, 15M bytes of hard disk storage and the operating system, costs $8,250.

A multiuser system with 1M byte of memory, four ports, 28M bytes of hard disk storage and the operating system costs $10,900, the vendor said.

More information is available from PE, which is located at 2 Crescent Place, Oceanport, N.J. 07757.

CDC software for IBM micro automates process-flow analysis

MINNEAPOLIS — Control Data Corp. has introduced Process Flow Analysis (PFA) Micro software. The software is said to allow businesses to automate process-flow analysis, a management technique that uses flow charts to examine repetitive operations.

PFA Micro, for the IBM Personal Computer, reportedly can cut documentation time by 50% over manual [redacted]

The software is also able to generate automatically nine different reports to identify areas where processes can be improved, according to the vendor.

PFA Micro is said to be supported by consulting services from Control Data Business Advisors, a CDC subsidiary, and by training modules. The training modules are said to be provided either on diskette or via workshops by using a facilitator's kit from CDC.

The PFA Micro software is priced at $950.

The training modules are priced at $450 for diskettes and $950 for the facilitator's kit, which is said to include slides, videotape and a facilitator's manual.

CDC is located at 3601 W. 77th St., Minneapolis, Minn. 55435.

Metasoft package integrates word processing, graphics

CHANDLER, Ariz. — Metasoft Corp. has introduced a software package that integrates word processing with presentation graphics for personal computers from IBM and other manufacturers.

The Benchmark Composer reportedly provides word processing that features word wrap, on-screen display of page breaks and automatic pagination. Its built-in graphics offer both business and presentation functions and can be windowed into a word processing document, according to the vendor.

The program's graphics capabilities are said to include the capacity to produce line, bar and pie charts as well as x/y plots. The graphics facility is able to interface with either a mouse or a graphics tablet and permit users to zoom or rotate images, [redacted]

The Benchmark Composer is priced at $575 and available for the IBM Personal Computer, 3270 Personal Computer and 3270/G Personal Computer. It is also available for the Texas Instruments, Inc. Professional and the Digital Equipment Corp. Rainbow 100 microcomputers.

Metasoft is located at Suite 12, 6509 W. Frye Road, Chandler, Ariz. 85224.

Package allows micros access to ITT's Telex

SECAUCUS, N.J. — ITT Communications Services, Inc., a division of ITT, said it has signed a joint marketing agreement with American International Communications Corp. of Boulder, Colo., for a software package said to allow personal computers to be used as Telex terminals.

The DCS-300 software program, developed by American International, provides access to ITT services through personal computers with communications capabilities. The package is said to support ITT's interactive Telex and directory services and includes a message editor to permit off-line message creation.

The package runs on the IBM Personal Computer and the ITT Xtra and compatibles, ITT said. It costs $250.

ITT is located at 100 Plaza Drive, Secaucus, N.J. 07096.

Sysgen offers micro backup

FREMONT, Calif. — A 45M-byte cartridge tape backup subsystem for the IBM Personal Computer, Personal Computer XT and Personal Computer AT was among several products recently announced by Sysgen, Inc.

The Qic-File is a half-height, modem-size subsystem that is said to back up from one disk and restore to another. The product sells for $1,395 for an internal version and $1,495 for an external model.

Sysgen also announced a Winchester disk/streaming-tape backup subsystem for the Personal Computer, Personal Computer XT and AT. The Sysgen XL reportedly gives users a 60M-byte half-height streaming-tape backup drive plus a 20M-byte formatted half-height hard disk. Cost of the Sysgen XL is $3,295.

A six-slot expansion box for the IBM Personal Computer and Personal Computer XT was also announced by Sysgen. It sells for $1,995.

Sysgen is located at 47853 Warm Springs Blvd., Fremont, Calif. 94539.

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Seequa Computer introduces Cobra micro, upgrades portables

ODENTON, Md. — Seequa Computer Corp. recently introduced a personal computer that runs Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M 80 operating systems. The company also announced enhancements to its Chameleon Plus and Color Chameleon portables.

According to the company, Cobra features an Intel Corp. 8086 microprocessor, hard disk, color graphics capabilities and six IBM Personal Computer-compatible expansion slots. Standard features include a Zilog, Inc. Z80A processor for 8-bit, CP/M 80 compatibility; an 83-key keyboard; one double-density, double-sided floppy disk drive; 256K bytes of random-access memory (RAM) expandable to 640K bytes; and 16K bytes of read-only memory (ROM).

Cobra sells for $4,995.

The Chameleon Plus portable computer is said to include three built-in IBM-compatible expansion slots, 8088 and Z80A dual processors, 128K bytes of RAM and 16K bytes of ROM. The product sells for $1,995.

Three IBM-compatible expansion slots also reportedly have been added to the company's Color Chameleon computer, priced at $3,195.

Seequa is located at 8305 Telegraph Road, Odenton, Md. 21113.

SOFTWARE

MANAGEMENT SCIENCE AMERICA, INC.

The Tool Kit

Management Science America, Inc. has announced a two-disk set of utilities that are said to enhance the productivity of Peachtree Software, Inc.'s Peachtext 5000 software.

The Tool Kit is said to include add-ons designed to enhance Peachtext 5000's components, including Peachtext word processor, Random House Electronic Thesaurus, Spelling Proofreader, List Manager and Peachcalc electronic spreadsheet.

The Tool Kit is said to include full support of color monitors, expanded printer support, document formatting templates for Peachtest that can be selected by the user from a menu and used to create original documents quickly and expanded dictionary coverage for Spelling Proofreader. Also included are a new List Manager utility and templates for List Manager and Peachcalc.

Peachtext 5000 runs on the Columbia Data Products, Inc. MPC, Compaq Computer Corp. Portable Computer, Corona Data Systems Personal Computer and Portable Personal Computer, IBM Personal Computer and Personal Computer XT, Eagle Computer, Inc. 1600 and Personal Computer, Texas Instruments, Inc. Professional Computer and the Zenith Data Systems Corp. Z100.

The Tool Kit, priced at $10, comes on two 320K-byte diskettes.

Management Science America, 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

PROJECT SOFTWARE & DEVELOPMENT, INC.

Qwiknet Version 2.0

Project Software & Development, Inc. (PSDI) has announced Version 2.0 of its Qwiknet project management software for Microsoft Corp.'s MS-DOS 2.0 operating system.

According to a spokesman, Qwiknet can manage up to 250 activities on a micro and enable a user to plan the time, money and resources necessary to complete a project. The enhanced version features added functions and documentation to improve the efficiency of planning, scheduling and analyzing cost and resource disbursements.

Version 2.0 is said to permit users to create resource histograms and generate reports from a selection of 20 standard formats. A logic diagram can be printed to show the entire project's activities and their interdependencies.

The software's tabular reporting output has been supplemented with resource and cost histograms, and users can perform project cash-flow analyses, the vendor said.

Version 2.0 of Qwiknet requires a minimum of 384K bytes of memory and two floppy disk drives or a floppy and hard disk drive combination. It is priced at $895, including a mouse interface.

PSDI, 14 Story St., Cambridge, Mass. 02138.

WARNER SOFTWARE, INC.

Desk Organizer for MS-DOS

Warner Software, Inc. has introduced a version of the Desk Organizer software package designed to run under Microsoft Corp.'s MS-DOS operating system.

The latest version of the Desk Organizer will run on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and PCjr as well as compatible systems, the vendor said.

The Desk Organizer is said to be an integrated program that features a number of efficiency tools. Capabilities include filing, phone dialing, calculation, data transfer and word processing, the vendor said.

When run concurrently with another software program in the MS-DOS version, the Desk Organizer's random-access memory demand is reduced to 95K bytes.

The program is priced at $195.

Warner Software, 666 Fifth Ave., New York, N.Y. 10103.

See TOOLS page 112

OR HAVE IT ALL.

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Pick the new COMPAQ DESKPRO™ over the IBM® PC or *XT* and your customers get a lot more computer for their investment.

One that runs thousands of programs already available—at speeds two to three times faster. One with a dual-mode monitor (amber or green) to display text *and* graphics. One with exclusives like internal tape backup and shock-mounted storage system.

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WE JUST TOPPED THE LONGEST RUNNING LINE OF PRINTERS.

The new 5300 family of printers from Teletype Corporation represents an exceptional value. The entire family combines our traditional reliability with a 200 cps speed that is ideal for business applications. You can choose a keyboard or auxiliary printer, both of which are available in 15-inch tabletop and 9½-inch compact sizes.

From the moment you take a 5300 out of the box and plug it into your system, you'll be amazed at how easy it is to operate. To begin with, you can down-line load or simply push a button on the printer's control panel to set options. And just push another button to select an alternate option set for a different system. A 4-character LCD on the control panel provides all of the status indicators you need.

The 5300 is available with a built-in 300/1200 baud modem that saves desk space and makes it possible for the 5300 to do all dialing and logon functions. So you can access a CPU or timesharing network by simply depressing a key on the detached keyboard.

For printing versatility, the 5300 is hard to beat. It features graphics capabilities as well as emphasized, expanded and compressed printing. And when used as an auxiliary printer, the 5300 is well-suited for use with most ANSI display-based terminals such as the Teletype* 5410 and 5420.

You'll also appreciate the forms handling of the 5300. It is available with adjustable push or pull tractors; a roll paper holder, a supply rack and an accumulator.

Other features that make the 5300 an even better value include an interchangeable platen, acoustic adapter and a carrying case for the 9½" model.

The 5300 also has a built-in self-diagnostic system that lets you know when and where problems exist. And if you can't solve the problem, you can count on our product service organization for help. With offices nationwide, we're able to offer fast response time.

So if you'd like a printer that tops what you have now, check out the latest in our long-running line. Write Teletype Corporation, 5555 Touhy Avenue, Dept. 3223-F, Skokie, IL 60077. Or call 1 800 323-1229, ext. 701.

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AT&T
Teletype Corporation

TOOLS

from page 109

CWAY SOFTWARE, INC.
Cway People, Cway Strategy

Two application packages designed to aid managers with employee appraisals and plan company growth have been introduced by Cway Software, Inc.

Cway People and Cway Strategy run under the IBM PC-DOS and Microsoft Corp. Xenix operating systems and feature menu-driven commands with on-screen instructions, the company said.

Cway People maintains applicant, employee and job files. The product includes an interviewing function that prompts questions about verbal communication, interpersonal skills, job history, education and career goals. Answers are coded and tallied numerically. Other functions focus on screening candidates, employee appraisals and report generation, Cway said.

Cway Strategy reportedly guides the user through building a business definition and solidifying long-term goals. Customer purchase and business environment considerations are used to develop short-term objectives and profit projections.

Each package costs $399 for the PC-DOS version and $499 for Xenix.

Cway Software, 121 W. DeKalb Pike, King of Prussia, Pa. 19406.

LATTICE, INC.
LMK

Lattice, Inc. has introduced LMK, an automated product generation utility for Microsoft, Corp.'s MS-DOS Versions 2 or 3 environments.

Once a user specifies relationships of various system pieces in a dependency file, a single LMK command initiates the automatic rebuilding of the system. LMK can perform any executable command, such as invoking a batch text editor to make replacements in a number of files, applying a file comparator to new and old files, updating a data base or running utilities, the vendor said.

Use of LMK requires 128K bytes of random-access memory and a minimum of 320K bytes of disk capacity.

The price of LMK is $195 per copy.

Lattice, P. O. Box 3072, Glen Ellyn, Ill. 60138.

TEXAS INSTRUMENTS, INC.
LAN:Datastore, LAN:Datacore

Texas Instruments, Inc. has announced data base management software for TI Professional Computers in 3Com Corp. Etherseries local-area networks.

LAN:Datastore and LAN:Datacore were developed by Software Connections, Inc. of Santa Clara, Calif.

LAN:Datastore is a relational data base manager designed for novice users and provides features such as forms design, report writing and query capabilities. Users reportedly can define the information that they want to store and the format in which to store it without learning complex command languages.

LAN:Datacore was designed for application developers and programmers and is said to handle information storage and retrieval, reducing development time in designing applications software. It reportedly offers the same features as LAN:Datastore, except the report writer, which in LAN:Datacore is programmed by the user. LAN:Datacore supports Basic, Fortran, Pascal and assembly, according to TI.

The products are scheduled for delivery this month and are priced at $945 each in a network version and $495 in a single-user version.

TI, P.O. Box 809063, Dallas, Texas 75380.

OPEN SYSTEMS, INC.
Materials Management

Open Systems, Inc. has introduced a materials management application software package for manufacturers using IBM PC-DOS- and Microsoft Corp. MS-DOS-based microcomputers.

According to the company, Materials Management can track a product from production scheduling to inventory of finished goods. The software is said to produce a master production schedule status report and to print parts requisitions and job schedules.

The software package reportedly interfaces with the vendor's inventory module, permitting generation of inventory status/alert reports, price list, inventory evaluation, detail list and sales analysis.

Cost of the package is $695.

Open Systems, 420 Oak Grove, Minneapolis, Minn. 55403.

KEY-1 COMPUTER SOFTWARE
Keytools2 Programming Aids

Key-1 Computer Software has announced a software package consisting of utilities and building blocks to improve application development for the postnovice Basic programmer using the IBM Personal Computer or IBM Personal Computer XT.

Keytools2 Programming Aids reportedly includes a screen-creation utility, a combination of a utility and Basic code that automatically produces multifield data-entry modules, a data-entry test utility and a collection of Basic code routines for searching, sorting and data validation. The price is $95.

Key-1 Computer Software, 178 Spring St., Newport, R.I. 02840.

STSC, INC.
APL*Plus/PC Release 4.0

STSC, Inc. has announced Release 4.0 of the APL*Plus/PC application development system.

The software runs on IBM's Personal Computer, Personal Computer

Continued on page 116

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Continued from page 112

XT, Personal Computer AT and compatibles with 192K bytes of random-access memory under IBM's PC-DOS or Microsoft Corp.'s MS-DOS operating systems.

The package contains documentation; keyboard stickers and placard; a character-generator read-only memory or program; and two diskettes containing the enhanced APL language processor, Help files and revised and expanded APL utilities.

Price is $595. Updates to registered users of Release 3.0 cost $90.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

SILTON-BOOKMAN SYSTEMS, INC.
Scheduler

Silton-Bookman Systems, Inc. has announced a program that is designed for scheduling training programs and that runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatible microcomputers.

The Scheduler reportedly handles schedule cutting and pasting, warns of conflicts and prevents double-booking of rooms and instructors. When schedule conflicts arise, the vendor said, the Scheduler provides strategies for resolving them.

The Scheduler is said to print class, room and instructor schedules in a variety of formats. It provides on-line access to all class, room and instructor schedules, the vendor said. The program can operate as a stand-alone tool or can be integrated with the Registrar, the vendor's training and logistics management program.

Requirements for use are an IBM Personal Computer or compatible system with IBM PC-DOS, 128K bytes of random-access memory, two floppy disk drives or one floppy and one hard disk drive and printer. The price is $349.

Silton-Bookman Systems, Suite 222, 4996 El Camino Real, Los Altos, Calif. 94022.

ALCYON CORP.
DFS system

Alcyon Corp. has introduced its DFS system, software which reportedly permits existing applications to run in a multihost network that is transparent to users.

The software reportedly runs on the IBM Personal Computer under Lantech Systems, Inc.'s Unetix or Microsoft Corp.'s MS-DOS and on Alcyon micros under Alcyon's Regulus operating system. The DFS system is said to offer distributed operating system capabilities and to feature a remote access methodology that does not require program modification.

DFS, developed jointly by Alcyon and Lantech, is priced at $450.

Alcyon, 8716 Production Ave., San Diego, Calif. 92121.

CHANCELLOR COMPUTER CORP.
Symgraph

Chancellor Computer Corp. has announced the Symgraph graphics editor for computer-aided engineering (CAE).

According to a company spokesman, Symgraph operates as part of the Chancellor 1000 and Chancellor 2000 IBM Personal Computer XT-based CAE workstations. It can provide design engineers with high-resolution color graphics and can perform schematic capture and physical layout.

Symgraph reportedly offers a resolution of 1,024 by 768 pixels on a 19-in. screen and 640 by 400 pixels on a 13-in. screen. The user can define the color for up to 50 layers of design, Chancellor said.

Symgraph's color coding facilitates the system's hierarchical design capabilities up to 10 levels of nesting. The editor's other graphics features include continuous pan and zoom, five different view and windowing commands and eight drawing and digitizing modes.

Symgraph is priced at $15,000 as part of the Chancellor 1000 system or at $21,000 as part of the Chancellor 2000 system.

Chancellor Computer, 1101 San Antonio Road, Mountain View, Calif. 94043.

LOGICWARE, INC.
Mprolog for IBM micros

Logicware, Inc. has introduced versions of the artificial intelligence language Mprolog for the IBM Personal Computer, Personal Computer AT and Personal Computer XT.

Versions of Mprolog were also introduced for systems running under Charles River Data Systems, Inc.'s Unos; Techtronix, Ltd.'s Uniflex; and Unisoft Corp.'s Unisoft.

Mprolog is said to be a micro version of Mprolog mainframe software.

The software reportedly permits AI applications to be created in modules and allows a full AI program to run in any environment, provided a version of Mprolog exists for it.

Mprolog for the Personal Computer, Personal Computer AT and Personal Computer XT is priced at $725. Mprolog for supermicros leases for $200/mo and is sold for $6,000.

Logicware, Suite 600, 1000 W. Finch Ave., Toronto, Ont. M3J 2V5.

FOX RESEARCH, INC.
10-Base Release 2.0

Fox Research, Inc. has introduced a new version of its 10-Base data base management system (DBMS) that reportedly features a procedural language processor and user-oriented power boosters to IBM's Sequel mainframe software.

10-Base Release 2.0 is a relational DBMS designed to be used in conjunction with local-area networks such as the vendor's 10-Net.

Improvements to Release 2.0 re-

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MICROCOMPUTERS

portedly include a date data-type feature, enhanced forms manager, data entry, SELECT command, error messages, multiuser support, batch processing, full screen editor, define/query editor and search function in data entry.

10-Base runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles, the vendor said. It reportedly supports IBM's PC-DOS 2.0 and higher and Microsoft Corp.'s MS-DOS 2.0 and higher, requiring 256K bytes of random-access memory, a cursor-addressable screen with 25-line by 80-char. resolution and two disk drives.

Price is $495 for a single-user version, $895 for a network version. Updates will be available for existing 10-Base Release 2.0 customers for a material-handling charge, the vendor said.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

MAINSTAY SOFTWARE CORP.
Mainstay

Mainstay Software Corp. has announced Mainstay, an application development software package designed to run on IBM's Personal Computer XT and Personal Computer AT.

Mainstay reportedly combines a mainframe-like analytical data base management system with a user interface that can be readily tailored. According to the vendor, the package is designed to allow value-added resellers to build custom software products.

The product reportedly combines virtual memory techniques and an unstructured data base analysis with a user interface for application developers. It is said to include built-in analysis and forecasting capabilities.

The package runs on an IBM Personal Computer XT or AT with 512K bytes of internal memory.

Single copies of Mainstay sell for $1,495.

Mainstay Software, Suite 201, 1745 Stout St., Denver, Colo. 80202.

SYSTEMS

TELEVIDEO SYSTEMS, INC.
Telecolor PC; Telecolor XT

Televideo Systems, Inc. has announced Telecolor PC and Telecolor XT, IBM Personal Computer-compatible microcomputers that provide color and graphics capabilities.

The micros feature an Intel Corp. 8088 microprocessor, 256K bytes of random-access memory, an adjustable 12-in. screen and Microsoft Corp.'s MS-DOS operating system. They reportedly support 16-color selection in text mode and four-color palette selection in graphics mode.

The Telecolor PC has dual 5¼-in. disk drives with 720K bytes of storage; the Telecolor XT features one 360K-byte disk drive and a 20M-byte hard disk drive.

Telecolor PC costs $2,995. Telecolor XT sells for $4,595.

Televideo Systems, 550 E. Brokaw St., San Jose, Calif. 95112

MAI/BASIC FOUR INFORMATION SYSTEMS, INC.
MAI 2000 Management System

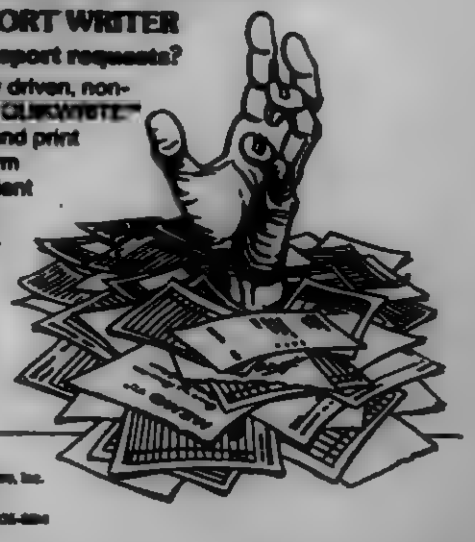
MAI/Basic Four Information Systems, Inc. has announced the MAI 2000 Management System, said to run business application software developed in Business Basic for MAI/Basic Four's minicomputers.

The MAI 2000 Management System features Boss/IX, an AT&T Unix-like operating system developed by MAI. Boss/IX is said to be capable of linking with more than 60 other MAI 2000s in a local-area network called Management Assistance General Network, also announced by the company.

Multiple systems are physically connected by two-wire twisted pairs up to 4,000 ft long, with each system connected by a drop cable to a local-area network tap box.

The MAI 2000 is based on the Motorola, Inc. 68010 microprocessor and comes with a main memory of 768K bytes. Each system can hold six

Continued on page 118



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MICROCOMPUTERS

Continued from page 117

memory boards of up to 256K bytes each and up to five controller boards. Two disk storage devices are also provided, with either two 5¼-in. Winchester hard disks or one hard and one floppy disk.

The MAI 2000 also comes with two serial ports, expandable to 14. Communications are compatible with IBM's 2780 and 3780 binary synchronous protocols.

The price for the MAI 2000 with 22M-byte Winchester disk drive, 120 char./sec printer, VDT and the Boss/IX operating system is $14,250. Deliveries are scheduled for February.

MAI/Basic Four Information Systems, 14101 Myford Road, Tustin, Calif. 92680.

BOEING COMPUTER SERVICES CO.

EIS Micro Workstations

Boeing Computer Services Co. has introduced four EIS Micro Workstations incorporating the IBM Personal Computer AT.

Two of the workstations are based on the 256K-byte Personal Computer AT Model 068 and two on the 512K-byte Model 099. The EIS workstations reportedly link the Personal Computers to Boeing's Mainstream remote computing services mainframe computers.

In connect mode, the workstations can automatically log on, access EIS data bases, upload and download and emulate an IBM 3270 terminal, Boeing said.

The EIS Micro Workstations based on the Personal Computer AT Model 068 are priced at $5,700, including a one-year Mainstream processing credit of up to $250/mo, and $7,600, including a one-year Mainstream processing credit of up to $350/mo.

The EIS Micro Workstations based on the Model 099 are priced at $7,500, including a one-year Mainstream processing credit of up to $355/mo, and $9,200, including a one-year Mainstream processing credit of up to $425/mo.

Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

DATAPOINT CORP.

Vista-PC monochrome version

Datapoint Corp. has introduced a monochrome version of its Vista-PC.

The monochrome Vista-PC reportedly can be used in a local-area network and can be linked to other workstations. It is said to be able to display either text or text and graphics and to be priced about $900 less than a version with a color monitor.

The price of the monochrome Vista-PC ranges from $2,870 for a text-only cluster workstation to $5,770 for a 10M-byte graphics workstation.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

SORD COMPUTER OF AMERICA, INC.

Sord IS-11C version

Sord Computer of America, Inc. has unveiled a briefcase-size version of its Sord IS-11 Consultant (IS-11C).

The IS-11C reportedly provides a 25-line by 80-char. LCD display with a flip-back screen that can be positioned for maximum readability. Resolution is said to be 640 by 200 pixels, allowing improved display of data for word processing and spreadsheet programs.

Word processing, communications and preprogrammed management utilities are included in read-only memory (ROM). According to the company, the word processing incorporates 14 advanced commands into Copy, Move, Search, Replace and Underline and is the equivalent of the desktop version.

The IS-11C reportedly includes 80K bytes of random-access memory (RAM) and 72K bytes of ROM. An optional cartridge provides an additional 64K bytes of RAM, while a built-in microcassette provides 128K bytes of storage per tape. Standard ports are said to be RS-232C, parallel, printer, bar code and numeric key pad.

An optional ROM pack houses Sord's DB-Pipe data base program, which includes spreadsheet, data base and business graphics. Other optional ROM packs include Sord's I-Basic; I-Trans data transfer program for input to Microsoft Corp.'s MS-DOS, IBM's PC-DOS and Digital Research, Inc. CP/M programs; and I-TSS, a time-sharing module providing links to data banks.

Scheduled for delivery in early 1985, the IS-11C costs $1,495.

Sord Computer of America, 645 Fifth Ave., New York, N.Y. [illegible]

CIE SYSTEMS, INC.

680/100; 680/200

CIE Systems, Inc. has extended its Cies 680 family of Unix-compatible, multiuser microcomputers with the introduction of the 680/100

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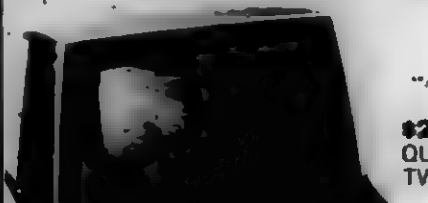

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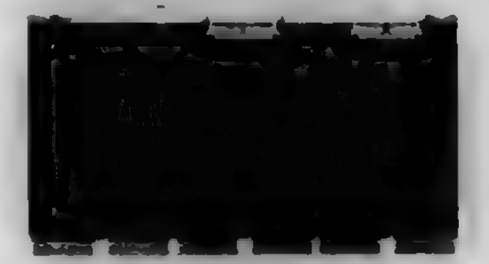

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and the 680/200 systems.

According to a company spokesman, the systems feature Intel Corp. Multibus architecture and include a central processor; high-speed bus; high-density, dual-ported random-access memory (RAM); and an intelligent I/O controller.

Both systems use a 10-MHz Motorola, Inc. 68000 CPU with on-board memory management designed for zero wait states.

The 680/100 supports between four and 12 users, CIE said. The system comes with 512K bytes of RAM (expandable to 1M byte), a 500K-byte floppy disk drive and up to 92M bytes of Winchester disk storage.

The 680/200 is said to support up to 40 users and to provide between 512K and 2M bytes of RAM and up to 336M bytes of hard disk storage.

The systems reportedly feature dual-bus architecture, using Multibus, to provide a common path for communications among all modules in the system, including memory and direct memory access peripheral device controllers. That feature is augmented by Intel's Local Bus Extension, which provides a 19M byte/sec data path between CPU and memory, a spokesman said.

The intelligent I/O controller is available as an option on the 680/100 and is standard on the 680/200. Each controller incorporates an Intel 8088-2 microprocessor with 64K bytes dynamic RAM and 32K bytes of erasable programmable read-only memory. I/O buffering, input character checking, parity checking and parity generation are provided for up to eight serial devices.

The 680/100 is priced between $14,995 and $30,000, and the 680/200 begins at $29,995, according to the vendor.

CIE Systems, P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

TOMCAT COMPUTER, INC.
Tomcat 3200-AT

Tomcat Computer, Inc. has introduced its Tomcat 3200-AT personal computer, said to be compatible with the IBM Personal Computer AT.

The Tomcat 3200-AT is available in two models. The low-end model consists of a 512K-byte CPU with a 1.2M-byte diskette drive only, Tomcat said.

A second, enhanced model includes 640K bytes of memory, a 1.2M-byte diskette drive, a 20M-byte hard disk storage unit, serial and parallel ports and a color board, according to the vendor.

The low-end model costs $2,996. The enhanced model is priced at $4,346.

Tomcat Computer, Suite 508, 548 S. Spring St., Los Angeles, Calif. 90013.

COMMUNICATIONS

SYSTEMS CENTER
Network Datamover-PC enhancements

Systems Center has enhanced Network Datamover PC (NDM-PC), which connects an IBM Personal Computer to a mainframe running IBM's MVS operating system.

The enhancements include a virtual cluster controller connection, the ability to submit distribution work to other computers and the capability to distribute information throughout an IBM Systems Network Architecture, Systems Center said.

Other features include the capability to schedule unattended data transmissions and distribute program information updates to any microcomputer on a network, the vendor said. The product is said to provide a standard interface to microcomputer applications.

NDM-PC costs $2,500 for a local-area network or $300 for single microcomputer connections.

Systems Center, 2988 Campus Drive, San Mateo, Calif. 94403.

NATURAL MICROSYSTEMS CORP.
Watson for the IBM Personal Computer AT

Natural Microsystems Corp. has announced a version of its Watson voice/data system for the IBM Personal Computer AT.

Watson can operate under the AT's primary operating system, PC-DOS 3.0, and consists of a single circuit board, system software and applications software, Natural Microsystems said. The system reportedly allows the computer, in conjunction with a Touch-Tone telephone, to conduct automatic dialing and time billing and to function as a dictating machine, allowing users to edit and rearrange a message before it is transcribed.

Also said to be included are 300 or 1,200 bit/sec modems and the capability to permit the computer to act as an electronic voice calendar.

Watson for the Personal Computer AT is priced between $849 and $998, depending on modem speed.

Natural Microsystems, 6 Mercer Road, Natick, Mass. 01760.

METRABYTE CORP.
MOD-MB

Metrabyte Corp. has introduced its MOD-MB modem for the IBM Personal Computer line.

The MOD-MB reportedly is an intelligent modem that plugs into an expansion slot on the computer's chassis. It is said to be AT&T 212A- and 103-compatible and to feature automatic dialing, automatic answering and 14 other serial commands. Its autodialer reportedly can be programmed to dial either voice or data calls.

The MOD-MB also features an auxiliary RS-232C port for connecting a printer, Metrabyte said.

The MOD-MB is priced at $345.

Metrabyte, 254 Tosca Drive, Stoughton, Mass. 02072.

NOVELL, INC.
Netware 4.6

Novell, Inc. has announced enhancements to its Netware operating system for the IBM Personal Computer AT and PC-DOS 3.0.

Netware 4.6 reportedly supports the computer as a local-area network file server and workstation and provides customized disk drivers for the data storage products of such third-party vendors as Tallgrass Technologies, Inc. and Davong Systems, Inc.

Its Netware/Remote feature reportedly allows remote personal computers to connect to a network as if they were locally attached.

Netware 4.6 is priced at $1,495.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

AT&T TELETYPE CORP.
SSI Irma

AT&T Teletype Corp. has introduced SSI Irma, a terminal emulation package that allows an AT&T Personal Computer 6300 to emulate an IBM 3278 Model 2 or 3279 Model 2A terminal.

By using either System Network Architecture/Synchronous Data Link Control or Bisynchrous 3270 protocols, the micro can access host software that supports IBM 5540 cluster controllers, AT&T said. Personal computers can tie into a 3270 series network by attaching to a 5544 or 5546 controller port. The product does not require modem or communications line support, AT&T said.

Continued on page 121

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SOFTWARE: APPLICATIONS	MAY 8	MARCH 29	COMDEX/SPRING
MANUFACTURING	JUNE 19	MAY 10	AMS '85
NETWORKS	AUGUST 28	JULY 19	TCA
SOFTWARE: SYSTEMS	SEPTEMBER 18	AUGUST 9	SOFTWARE/EXPO
OFFICE AUTOMATION	OCTOBER 16	SEPTEMBER 6	INFO '85
MICROCOMPUTERS: HARDWARE	NOVEMBER 20	OCTOBER 11	COMDEX/FALL

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MICROCOMPUTERS

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It includes a circuit card, a version of Digital Communication Associates, Inc.'s Irma emulator program and two file transfer utilities.

SSI Irma costs $1,195.

AT&T Teletype, 5555 W. Touhy, Skokie, Ill. 60077.

POINT 4 DATA CORP.
PC Connection

Point 4 Data Corp. has announced PC Connection, which allows an IBM Personal Computer to tie into Point 4's multiuser Iris operating system.

In Iris mode, the microcomputer works as an Iris workstation, and utilities allow any Personal Computer file to be copied to or from the Iris host, according to the vendor. With a single keystroke, the user reportedly can return to IBM PC-DOS operating system mode.

The product provides two file locking facilities that prevent two users from simultaneously updating the same file. One prevents the locked file from being read while the second allows the user to read but not write in the file, the vendor said.

PC Connection costs $550.

Point 4 Data, 2569 McCabe Way, Irvine, Calif. 92714.

PHILIPS INFORMATION SYSTEMS, INC.
Communications Cosystem

Philips Information Systems, Inc. has introduced its Philips Communications Cosystem, a voice/data terminal designed for use with the Philips P3100 Personal Computer and the IBM Personal Computer.

In a point-to-point network, the Cosystem reportedly allows electronic mail, transmission of data files and several intelligent telephone functions, including use of a 400-name data base. The Cosystem is said to be compatible with existing private branch exchange systems and to feature 92K bytes of internal memory, a 1,200 bit/sec modem and a speakerphone.

The Cosystem is priced at $2,295.

Philips Information Systems, Suite 300, 15301 Dallas Pkwy., Dallas, Texas 75248.

UIS CO.
Vistacom 4.0

UIS Co., a division of Control Data Corp., has released Version 4.0 of Vistacom, a micro-to-mainframe communications software package that reportedly allows an IBM Personal Computer, Personal Computer XT and Personal Computer AT or a Texas Instruments, Inc. Professional Computer to act as an interactive terminal and transfer files to and from a host system.

Vistacom 4.0 includes an increased data transmission rate, a secure file transfer protocol and the ability to interact with the IBM PC-DOS operating system without exiting a Vistacom session.

The Vistacom 4.0 reportedly uses a proprietary data transmission protocol based on the Open Systems Interconnect architecture of the International Standards Organization. The new Files capability is said to allow users to perform a variety of DOS directory and utility functions. Full directory access is available.

The product sells for $200.

UIS, 9300 Metcalf, Overland Park, Kan. 66212.

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
SNA Exchange for Concurrent PC-DOS

Intelligent Technologies International Corp. has announced Systems Network Architecture (SNA) Exchange for IBM Personal Computers, Personal Computer XTs and compatibles running Digital Research, Inc.'s Concurrent PC-DOS operating system. The product is said to allow communication with IBM mainframes via IBM's SNA protocol.

With the product, the Personal Computer user reportedly can communicate with a host while running Digital Research's CP/M 86 and PC-DOS applications. The windowing feature of Concurrent PC-DOS is said to permit the display of IBM 3270, CP/M 86 and PC-DOS applications on the same screen.

SNA Exchange is said to provide SNA/Synchronous Data Link Control communications and emulation of the IBM 3274 cluster controller. The price for SNA Exchange for Concurrent PC-DOS is $895.

Intelligent Technologies International, 151 University Ave., Palo Alto, Calif. 94301.

AGS MANAGEMENT SYSTEMS, INC.
PAC Micro Project Management System

AGS Management Systems, Inc. has announced PAC Micro Project Management System, said to convert PAC Micro data so it can be read by a mainframe.

PAC Micro runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles. The program is said to provide for planning, scheduling, tracking progress and costs and assigning resources.

By connecting PAC Micro to the AGS Management Systems' mainframe project management systems, such as PAC II or PAC III, the data is converted into a format required for mainframe use, the vendor said.

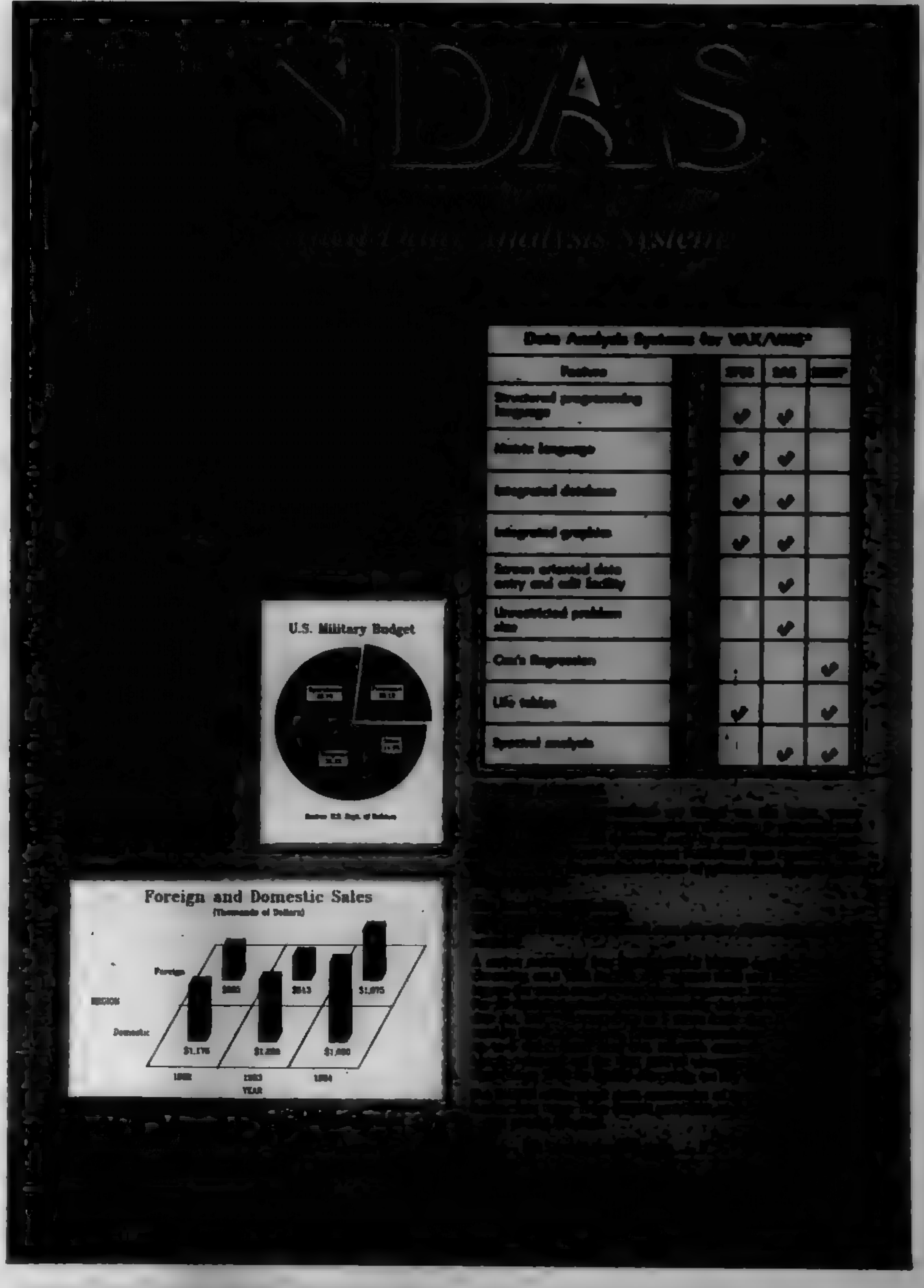
The price for PAC Micro is $990.

AGS Management Systems, 880 First Ave., King of Prussia, Pa. 19406.

THIRD FLOOR SYSTEMS, INC.
Mydesk

Third Floor Systems, Inc. has announced Mydesk, a computerphone and desk management package said

Continued on page 122



Continued from page 121

to allow IBM Personal Computers, Personal Computer XTs, Personal Computer ATs and compatibles to interface to standard private branch exchange (PBX) systems without requiring a modem.

Features reportedly include a personal telephone directory of up to 300 entries, advanced telephone and PBX dialing features, billing time and clock and a calculator. The package also offers one-keystroke access to telephone dialing features, menu selections and on-line, context-related Help, the company said.

The interface board takes up one I/O slot. The recommended configuration includes a micro with at least 128K bytes of random-access memory and IBM's DOS 2.0 or 2.1 operating systems.

Mydesk is priced at $199.

Third Floor Systems, Suite A114, 1630 Oakland Road, San Jose, Calif. 95131.

TELEVIDEO SYSTEMS, INC.
PM/SNA

Televideo Systems, Inc. has announced PM/SNA, which provides IBM Systems Network Architecture capabilities for Televideo's Personal Mini multiuser computer line.

The product reportedly consists of two parts: software that includes a host interface module and device emulation module and hardware that consists of a Synchronous Data Link Control interface card that fits an IBM Personal Computer-compatible bus.

PM/SNA allows up to 15 microcomputers to connect to an IBM mainframe and emulate an IBM 3274 control unit, 3278 display, 3287 printer and 3770 batch terminal, according to the company.

The 3770 batch terminal capability is said to provide file transfers between a Personal Mini terminal and an IBM mainframe.

PM/SNA costs $1,995.

Televideo Systems, 550 E. Brokaw Road, San Jose, Calif. 95112.

KEA SYSTEM LTD.
ZSTEMPC

Kea Systems Ltd. has announced ZSTEMPC, which is said to allow an IBM Personal Computer with IBM's PC-DOS operating system and 128K bytes of random-access memory to emulate a Digital Equipment Corp. VT100 terminal.

According to the vendor, the product allows a user to connect to a DEC system by either hardwire or modem. It reportedly features 132-col. mode, reverse screen, VT100 line graphics set and programmable answerback.

ZSTEMPC supports bidirectional file transfers, concurrent serial and parallel printers and macro programming capabilities, Kea Systems said.

ZSTEMPC costs $150.

Kea Systems, Suite 412, 2150 W. Broadway, Vancouver, B.C., Canada V6K 4L9.

CIE SYSTEMS, INC.
PCworks

CIE Systems, Inc. has released a software link that enables the IBM Personal Computer to communicate with CIE's 680 supermicrocomputer system.

Under PCworks, licensed by CIE from Touchstone Software Corp., the 680 supermicrocomputer running the Alcyon Corp. AT&T Unix-like Regulus operating system is said to act as a network manager.

The package provides file transfer between the 680 and the personal computer, automatically converting the data to the appropriate format, according to the vendor.

The personal computer user reportedly can store files on a local disk and print reports on a local printer or transfer them to the 680 for storage or printout.

Standard RS-232 ports are used to connect the personal computers to the 680, CIE said. Local personal computers may be cabled directly into the system, and remote personal computers may access it through a telephone modem, according to the vendor.

The price of PCworks is

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$565; $340 for the part of the package installed on the 680 and $225 for the portion on the personal computer, the vendor said.

CIE Systems, P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

FOX RESEARCH, INC.
SNA Gateway for Fox 10-NET

Fox Research, Inc. has released a 3270 Systems Network Architecture (SNA) Gateway for its Fox 10-NET local-area network that allows network users with IBM Personal Computers or compatible systems to communicate with IBM mainframes, including the 370, 4300 and 30 series.

Fox and Techland Systems, Inc. of New York jointly developed the hardware/software combination that allows the Gateway unit to act as an IBM 3274 cluster controller.

A User inserts a circuit board in the Gateway unit and software in other personal computers on the 10-NET network. Up to 64 logical units (personal computers or peripherals) can become part of the Fox 10-NET SNA Gateway net.

The Fox 10-NET SNA Gateway, including circuit board, software and documentation is priced at $1,990 for 8 logical units and $3,390 for 16 logical units.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

CYB SYSTEMS, INC.
Unite Series

CYB Systems, Inc. has introduced its Unite series of Unix-based network servers for personal computer networks.

The four models reportedly support from four to 32 users. Based on the Motorola, Inc. 68000 processor, the Unite series is said to feature Multibus architecture and AT&T's Unix System V operating system.

Personal Computer users in a Unite series network reportedly run applications written for their machines' native operating systems or log on to the Unite network server as a terminal and run Unix applications.

To join a Unite network, a personal computer reportedly needs a serial port and 192K bytes of memory. Personal computers with modems may gain remote dial-up access to the Unite series network, according to CYB Systems.

Unite series network servers are available in four-, eight-, 16- and 32-user versions. They are priced at $9,995, $16,995, $24,445 and $53,995, respectively.

CYB Systems, 6448 Highway 290 E., D-111, Austin, Texas 78723.

BUSINESS COMPUTER CORP.
Intellimodem XL, ST and XT

Business Computer Corp. (Bizcomp) has announced three plug-in modems for the IBM Personal Computer line.

The Intellimodem XL, Intellimodem ST and Intellimodem XT operate at 300 and 1,200 bit/sec and offer autoanswer/autodial features, according to Bizcomp. The modems reportedly feature the vendor's Intellisoft communications software, unlimited on-line telephone directories and Xmodem error-checking protocol file transfer. The modems operate in full- or half-duplex and are said to be compatible with Hayes Microcomputer Products, Inc. modems.

The Intellimodem ST reportedly implements the Hayes Smartmodem 1200 command set and can run all tested software written for the 1200. The Intellimodem XT is said to include all the features of the Intellimodem ST, plus a minicard design that will fit into all the short slots of IBM Personal Computers.

Prices are $499 for the Intellimodem ST and $549 for the Intellimodem XT and XL.

Bizcomp, 532 Mercury Drive, Sunnyvale, Calif. 94086.

See NETS page 124

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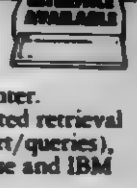

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NETS

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UNIVATION, INC.
Rainbow LAN Controller

Univation, Inc. has released a controller board that links Digital Equipment Corp. Rainbow microcomputers into a local-area network.

Users connect the Local-Area Network Controller (LAN Controller) to the Rainbow's transceiver device, then hook into Ethernet with a standard Ethernet cable, according to Univation.

Network Research Corp. in Santa Monica, Calif., provides Fusion, the Xerox Corp. Memory Systems (XMS) protocol software needed to implement the network, a spokesman said.

LAN Controller features reportedly include buffer management with three received packets and one transmit packet, four 8-bit data channels and loop-back for test diagnostics.

The cost of the Rainbow LAN Controller is $750. Fusion software carries an additional $750 price tag.

Univation, 1037 N. Fairoaks Ave., Sunnyvale, Calif. 94089.

STORAGE

AST RESEARCH, INC.
Colossus

AST Research, Inc. has introduced a disk subsystem for the IBM Personal Computer family that features a 67M-byte Winchester disk drive and a 60M-byte ¼-in. streaming tape cartridge backup.

Colossus, designed for use with the IBM Personal Computer, Personal Computer XT and Personal Computer AT, features 30-msec access time on the hard disk drive, according to the vendor.

The subsystem, enclosed in a single case, is said to use a modular design to ease service of components and system expansion.

A chassis slot is provided for future boards that will enable Colossus to interface directly with local-area networks, such as the AST-PCnetII, and with non-IBM personal computers.

Shipments are scheduled for January. The suggested list price is $7,499, according to the vendor.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

LANCORE TECHNOLOGIES, INC.
PC Core 45; PC Core 75

Lancore Technologies, Inc. has introduced a line of disk/tape mass storage systems for personal computers that allows for the sharing of files and resources on up to seven workstations without application software modifications.

The intelligent file servers, PC Core 45 and PC Core 75, provide up to 75M bytes of formatted capacity and selective and turnkey automatic off-line backup. The units have an Intel Corp. 80186 CPU with 128K bytes of random-access memory, five expansion sockets and a 16-bit data path.

The PC Core 45 unit costs $5,995. The PC Core 75 unit, with a larger Winchester disk and streaming tape drive, is priced at $6,995.

Lancore Technologies, 31324 Via Colinas, Westlake Village, Calif. 91362.

ALLOY COMPUTER PRODUCTS, INC.
Qicstor-Plus

Alloy Computer Products, Inc. has introduced Qicstor-Plus, a subsystem that provides five expansion slots, hard-disk storage and file-oriented streaming tape backup capabilities for the IBM Personal Computer.

The hard-disk capability supports from 20 to 128M bytes of storage, has an access time of 28 msec and is designed as a file-server in a multiuser system, Alloy said.

The streaming tape facility has a formatted capacity of 40M bytes on a cartridge tape and backs up a hard disk at the rate of 2M byte/min, the vendor said. The product requires 256K bytes of random-access memory.

A 20M-byte Qicstor-Plus sells for $5,595.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

RACET COMPUTES LTD.
PCMS-150

Racet Computes Ltd. has announced PCMS-150, a storage system designed for the IBM Personal Computer.

PCMS-150 reportedly consists of a 150M-byte hard disk drive, 150M-byte streaming tape backup and

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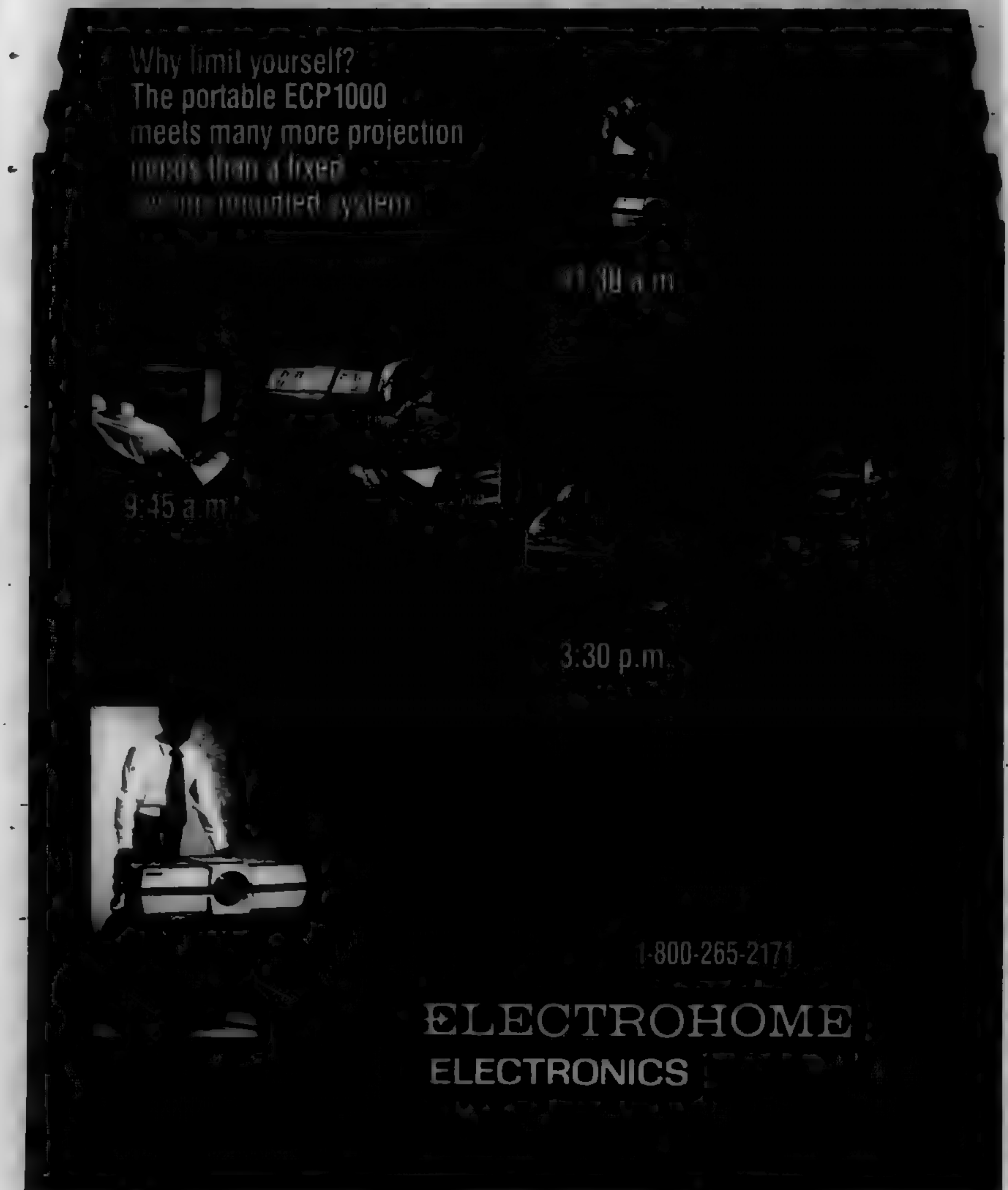

MICROCOMPUTERS

operating and diagnostic software. The system interfaces with IBM's PC-DOS operating system and provides large central files with password control, the vendor said.

The system's hard disk storage reportedly can be backed up in less than 30 minutes. The product is said to be compatible with Ethernet networks.

PCMS-150 costs $14,900, according to the vendor.

Racet Computes, 1855 W. Katella Ave., Orange, Calif. 92667.

IOMEGA CORP.
Bernoulli Box version

Iomega Corp. has announced a 5M-byte version of its Bernoulli Box, a removable cartridge disk drive, for Apple Computer, Inc.'s Macintosh microcomputer.

Applications for the Bernoulli Box with the Macintosh are said to include primary, backup and archival storage. The high capacity of each cartridge allows loading of multiple programs, thereby reducing the frequency of floppy disk changes, the vendor said.

The cartridges hold 5M bytes of formatted data and are completely interchangeable from drive to drive, a spokesman said. The unit is said to have an average access speed of 50 msec. Cartridges cost $59 each.

Iomega, 4646 S. 1500 West, Ogden, Utah 84403.

PRINTERS/ PLOTTERS/ PERIPHERALS

PERSONAL COMPUTER PRODUCTS, INC.
Daisylaser 1000

Personal Computer Products, Inc. has announced the Daisylaser 1000 letter-quality laser printer for use with systems having RS-232 serial or Centronics Data Computer Corp.-type parallel interfaces.

The Daisylaser is said to print at a rate of eight page/min and to be based on a Canon USA, Inc. LBP-CX laser printer engine, with a controller developed by Personal Computer Products.

Features include a forms generator that works from standard word processing software such as Micropro International Corp.'s Wordstar, and three read-only memory cartridge slots for font and form loading. Font selection is eight fonts per page standard, with 16 fonts per page as an option.

Daisylaser weighs 59 lb and measures 19.7 in. wide by 16.3 in. deep by 15 in. high. Prices for Daisywriter begin at $3,495.

Personal Computer Products, 11590 W. Bernardo Court, San Diego, Calif.

PANASONIC INDUSTRIAL CO.
TX-12H3P; TR-122MYP; TR-122M9P; BT-P4500D

Panasonic Industrial Co. has introduced four terminals: a 12-in. color terminal, two 12-in. monochrome displays and a 45-in. color terminal.

The 12-in. color display, TX-12H3P, produces 16 colors and features a tilt-and-swivel stand, Panasonic said. The 80-line by 25-char. display reportedly offers 740- by 580-pixel resolution.

The monochrome monitors are said to feature etched faceplates. The 80-char. by 25-line terminals have a bandwidth of 25 MHz and support either graphics or text, the vendor said. The TR-122MYP has yellow characters, while the TR-122M9P has green characters.

The 45-in. display's circuitry provides a 16-color display for the IBM Personal Computer and Apple Computer, Inc.'s Apple III. The BT-P4500D provides 640- by 240-pixel resolution.

TX-12H3P costs $699, TR-122MYP sells for $259, TR-122M9P is priced at $249 and BT-P4500D costs $4,995.

Panasonic Industrial, One Panasonic Way, Secaucus, N.J. 07094.

DIGITAL EQUIPMENT CORP.
Letterprinter 210

Digital Equipment Corp. has released the Letterprinter 210 dot matrix printer, said to be compatible with all of DEC's computers. It is also reportedly compatible with IBM's Personal Computer, Personal Computer XT, Personal Computer AT and compatibles.

The Letterprinter 210 can selectively emulate the IBM Graphics Printer and Epson America, Inc. MX80 printers, DEC said.

The printer reportedly

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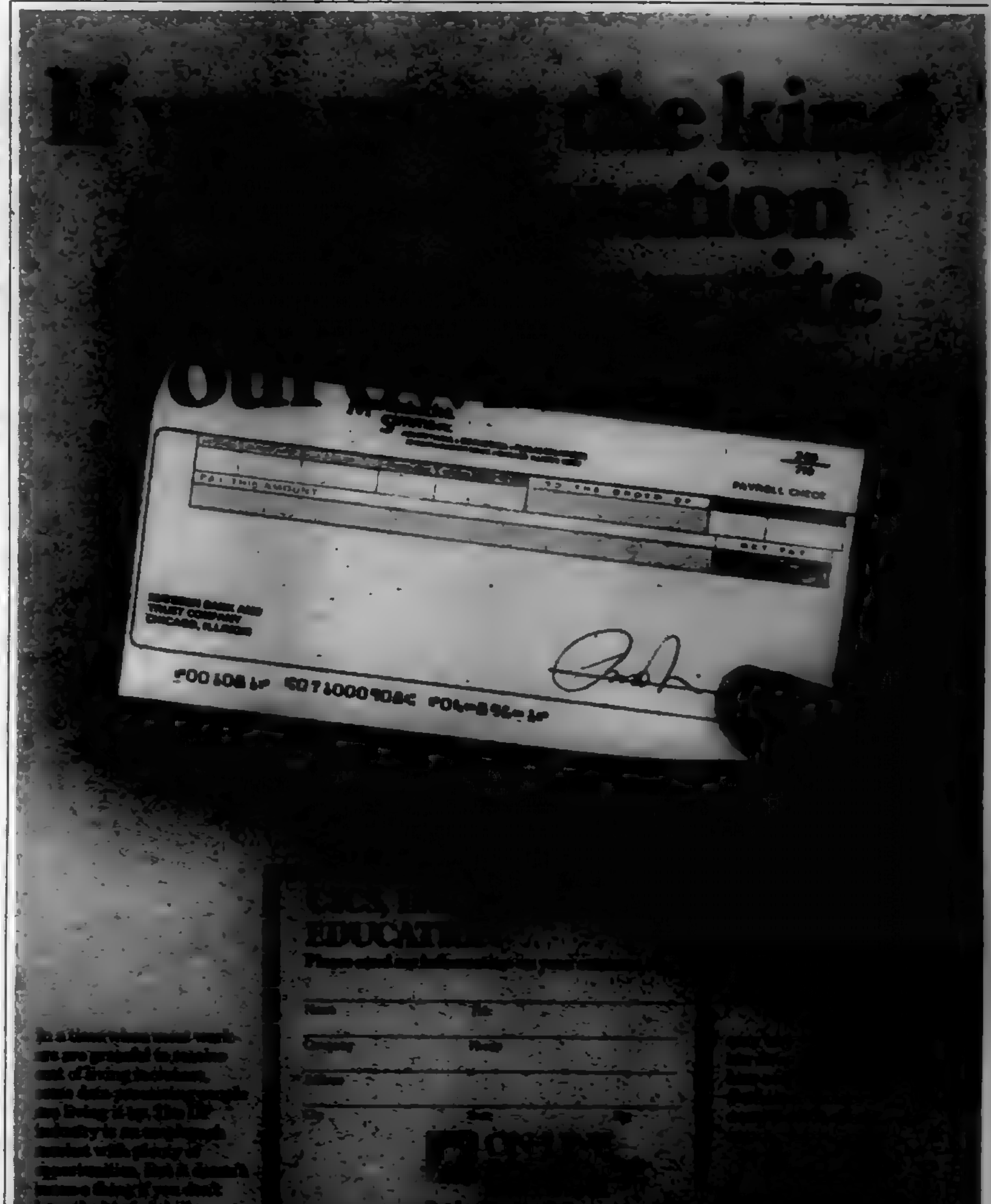

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handles text at 240 char./sec in draft-quality mode and 40 char./sec in near-letter-quality mode and delivers bit-mapped graphics in both DEC and IBM modes. Options include a bidirectional forms tractor, a single-sheet feeder and a user-installable IBM/Centronics Data Communication Corp. parallel interface for personal computer connection.

Price of the Letterprinter 210 is $1,595; two font cartridges and the parallel interface cost $125.

DEC, Maynard, Mass. 01754.

XEROX CORP.
Xerox/Diablo Systems, Inc.
Advantage D25

Xerox Corp. has announced a 25 char./sec letter-quality printer designed to operate with most microcomputers.

According to a company spokesman, the Xerox/Diablo Systems, Inc. Advantage D25 daisywheel printer was designed for heavy office use in word processing and other text- and graphics-related applications.

The product's All-Purpose Interface reportedly allows it to be connected via serial or parallel interfaces to most micros, including the IBM Personal Computer.

The D25 features automatic proportional spacing, automatic carriage returns and bidirectional printing, Xerox said. The printer reportedly offers variable line and column spacing and automatic paper loading. It also accommodates a bidirectional tractor and single-bin sheet feeder.

The printer is priced at $745.

Xerox, Xerox Square 006, Rochester, N.Y. 14644.

C. ITOH DIGITAL PRODUCTS, INC.
Prowriter 7500

C. Itoh Digital Products, Inc. has introduced its Prowriter 7500, a dot matrix printer with graphics capability and optional IBM Personal Computer compatibility.

The Prowriter 7500 reportedly features an 80- to 132-char. column width and prints at 105 char./sec. It is said to be available with either an RS-232C serial port, an IBM Personal Computer-type parallel port or a Centronics Data Computer Corp.-type parallel port. It is said to feature 9- by 9-wire dot matrix and 8- by 8-wire dot matrix.

It is priced at $260.

C. Itoh Digital Products, Suite 220, 19750 S. Vermont Ave., Torrance, Calif. 90502.

TEXAS INSTRUMENTS, INC.
Model 860 XL; Model 865

Texas Instruments, Inc. has introduced two wide-carriage versions of the company's Model 850 and Model 855 printers.

According to the company, the Model 860 XL microprinter prints draft copy at 150 char./sec in a nine-by-nine matrix and correspondence-quality copy at 35 char./sec in a 15-by-18 matrix.

The Model 865 is a letter-quality printer with a 35 char./sec capability in a 32-by-18 matrix, the company said.

The Model 860 XL, available in the first quarter of 1985, sells for $899. The Model 865 sells for $1,299.

Texas Instruments, Data Systems Group, P.O.Box 809063, Dallas, Texas 78350.

VISAGE

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RAM, one floppy disk drive, one 10M-byte hard disk drive, touch screen and mouse. Prices for the systems, all reportedly available by early 1985, range from $5,995 to $11,650.

Development software bundled with the system includes Visage's Microsoft Corp. MS-DOS-compatible V:DOS operating system; the company's V:Exec 2.0 videodisk virtual device interface; V:Basic, an interpretive Basic compatible with Microsoft's Basic; and V:Paint I and II graphics packages.

Visage also offers interfaces to IBM compiled Basic, IBM Pascal, IBM Macro Assembler, Lattice, Inc.'s Lattice C and Ashton-Tate's Dbase II, each available now for $295. In addition, Learncom, Inc. is offering its System for Authoring Microtraining menu-driven development program for the series.

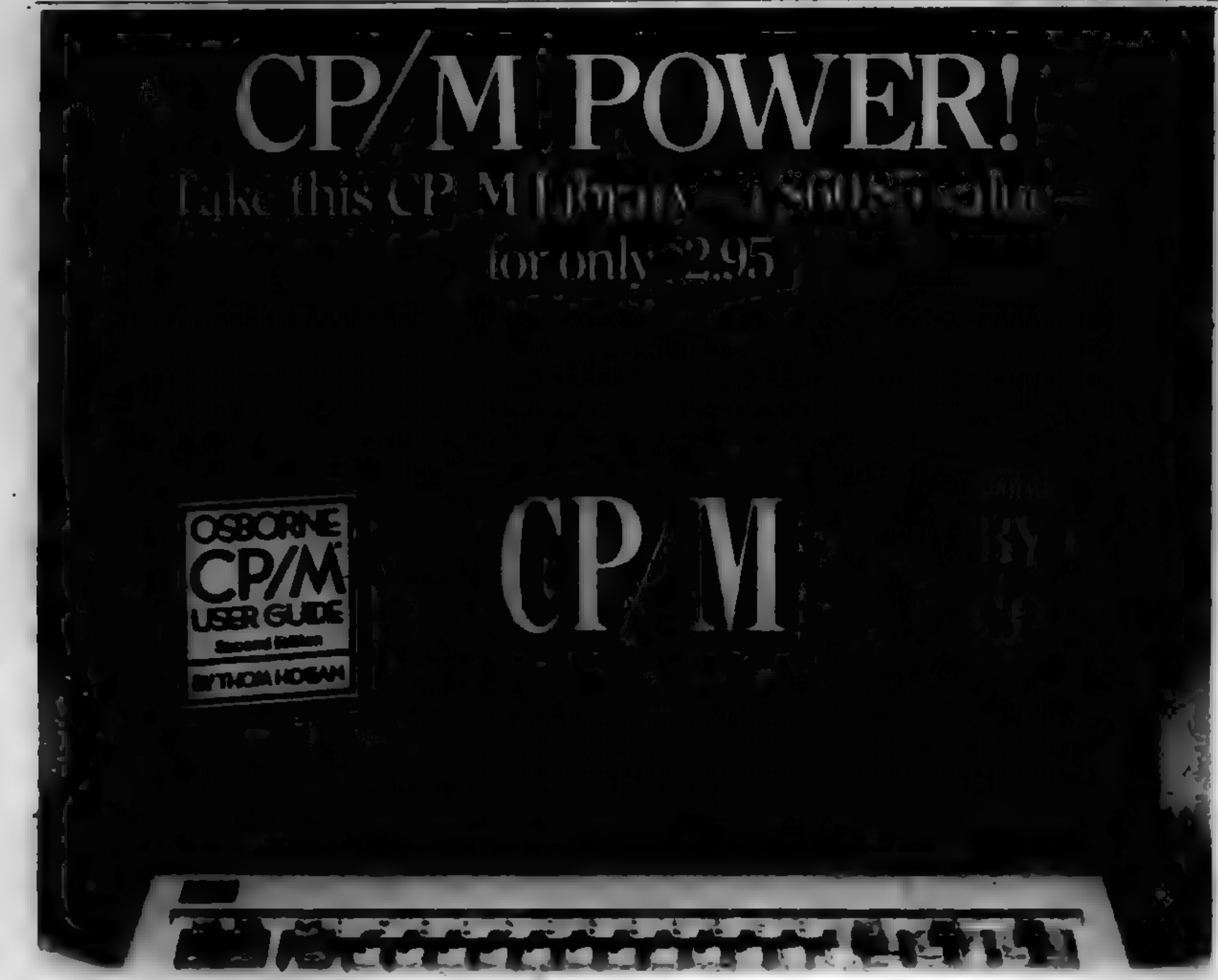
The V:Link 1500 and V:Link 1550 plug-in video controllers are designed for the IBM Personal Computer and compatible machines with at least 256K bytes of RAM. Both offer RGB output and on-board 256- by 192-pixel graphics with 16 colors. The V:Link 1500 accepts 320- by 200-pixel graphics with four colors from an IBM color graphics adapter, while such graphics are resident on the V:Link 1550. The two products cost $1,850 and $2,150, respectively.

Visage's VXP packaged upgrade kits feature a choice of monitors, V:Link boards, software and cables and are priced between $1,850 and $4,715. Among other options are the $975 Pioneer LD-V4000 videodisk player, an $850 bit pad package and a $125 mouse.

Industrial training represents the primary business application for interactive video today, noted Nathan Kalowski, Visage marketing vice-president. "There's a very high return on investment for companies with a large number of people to train or complex products," he claimed. "The more complex the message, the better this media is."

Kalowski predicted that several trends would boost business use of interactive video systems, including use of IBM Personal Computers and compatibles as development and delivery systems, less expensive and more capable videodisk players, lower costs and quicker turnaround in mastering videodisks and increased selection of video programs.

Visage is located at 12 Michigan Drive, Natick, Mass. 01760.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Publisher's Price: $15.95.

2) THE PROGRAMMER'S CP/M HANDBOOK. Andy Johnson-Laird.
Here is the single most comprehensive information source on CP/M you can purchase. Includes descriptions of CP/M's internal structure, the CP/M file system, Basic Disk Operating System, Basic Input/Output System, utility programs, and more. As a daily resource for the serious CP/M systems programmer, this handbook is an absolute must. Hardcover.
Publisher's Price: $27.95.

3) The BYTE Guide to CP/M-86.
Mark Dahmke.
Now you can get the full story on CP/M-86—the program specifically designed for today's most powerful and advanced microprocessors. From one of the leading computer publications, this guide clearly describes how CP/M-86 will operate with microcomputers using Intel 8086 or 8088, including the IBM Personal Computer. All commands and utility programs are discussed, along with application programs and support for high-level languages such as BASIC, Pascal, FORTRAN and COBOL. Softbound.
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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MAC

from page 107

In 1984, interest centered on integration, and packages such as Lotus Development Corp.'s Symphony, Ashton-Tate's Framework and Ovation Technologies, Inc.'s Ovation captured the headlines. These packages were disappointing. Symphony has not been as successful as Lotus' 1-2-3. Ashton-Tate has admitted that Framework sales have not reached expectations. Ovation died unborn — a slow, painful death.

Why has IBM Personal Computer innovation slowed? The microcomputer is three years old. When it was first announced, vendors began designing packages not for the Personal Computer of 1981, but for the Personal Computer of 1982 or 1983. They began working on a Personal Computer with 256K bytes of random-access memory (RAM) or a hard disk. When IBM announced these enhancements, vendors were able to roll out their products quickly. Unusual packages were steadily produced.

As one requirement for this trend to continue, IBM had to continue providing more RAM. IBM ran into a roadblock at 640K bytes of RAM because Microsoft Corp.'s MS-DOS operating system was not capable of directly addressing more memory.

This summer, IBM announced the Personal Computer AT, which would run Microsoft's Xenix and address 3M bytes of RAM. But Xenix shipments were not scheduled until the first quarter of 1985, and some developers doubted IBM's commitment to that operating system.

No blockbusters expected

Consequently, there have not been any blockbuster Personal Computer AT products. And there probably won't be any for the next six to 12 months.

As the IBM Personal Computer hit a roadblock, Apple announced the Macintosh. It, too, had a limited amount of RAM: at first 128K bytes, now 512K bytes. But it offered developers a new operating environment with a user-friendly interface and powerful graphics capabilities — features the IBM product lacked.

In addition, the Macintosh promised developers a large base of first-time users, hungry for software.

"Since the IBM market had already been developed, software vendors can have only limited success in it," Lefkowits claimed. "They [vendors] are threatened not only by IBM's recent software announcements, but also by the installed base of 1-2-3, Ashton-Tate Dbase and Micropro International Corp. Wordstar users."

So developers are turning to the Macintosh. "They would rather work with the Macintosh," Lefkowits said. "Even though it is more difficult to develop software for the Macintosh, [the micro] offers companies a better potential return on their investment."

And, for the moment, innovation has become synonymous with Macintosh.

One example is Filevision, by Telos Software Products, which combines DBMS facilities with the Macintosh's graphics capabilities and creates a data base that stores images as well as text. This may be the first of a series of products that truly integrate graphics with traditional applications.

The leading vendors also are making their moves. Lotus has unveiled Jazz, a Symphony-like package for the Macintosh, to positive initial reviews. "The Macintosh gave Lotus an excuse to correct the biggest problem with Symphony," said Morton Rosenthal, chairman of Corporate Software, Inc. of Waltham, Mass. "The user interface in Jazz is much improved; no longer does everything have to go through the spreadsheet."

MINIS

from page 107

ny, whose Cambridge, Mass., firm specializes in research in corporate computing.

Regarding local-area networks, Colony predicted that IBM will find its Personal Computer network directly competing with — and defeating — the IBM Cabling System by 1986. The Cabling System is much more costly, and the Personal Computer Network, which he recommended for those needing a local network, will receive a great deal of third-party vendor support, he said.

As for the departmental resource processor, Colony said it currently faces several barriers, including the need for better data base security on the mini, incompatibility between personal computer and minicomputer software packages and the fact that there currently is "no such thing as a distributed data base."

An additional barrier is the need for software site licensing, so that software may reside on the mini and be downloaded to end users when they need it. "The software industry is going to have to respond to this, because it's coming," he claimed.

A departmental resource processor networked with a group of personal computers will also need to be able to reach up to the corporate mainframe for data not stored locally, requiring a high level of compatibility between all of the computers in the system, he said. "That's why IBM will look so strong in the future," Colony argued.

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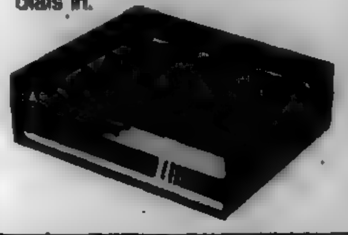

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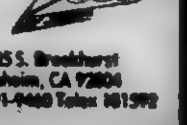


COMPUTER INDUSTRY

STC files financing plan

Seeks to borrow $80 million from subsidiary

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and its financing subsidiary last week filed a financing plan with a federal bankruptcy court that would allow the company to borrow $80 million from the subsidiary.

The proposed agreement would permit STC to borrow the cash assets of its Storage Technology Finance Corp. Those assets include about $80 million in notes and accounts receivable and about $60 million in accounts receivable that the parent firm collected but did not transfer to its subsidiary.

The agreement provides that the subsidiary's creditors would receive a "superpriority" claim on $44 million of the parent firm's assets. The subsidiary would also have priority claim on another $96 million of the parent's assets, subject to proof that the parent has borrowed additional funds from its unit.

Filed Chapter 11 petitions

Both the parent firm and subsidiary have filed Chapter 11 petitions under the U.S. Bankruptcy Act. Under Chapter 11, a company is protected from creditors' claims while it works out a court-approved reorganization plan with its creditors.

In a separate matter, an industry source confirmed recent published reports that STC has received a $10 million order from IBM for tape drives and controllers. IBM, STC's principal rival in the data storage business, has reportedly been unable to meet demand for its 3803 Model 2 tape controllers because of a shortage in a circuitry part used in the controllers.

"Computer and Communications Buyer," a New York newsletter covering the used-equipment market, reported that IBM will use the tape devices to meet its own internal operations, thus freeing up IBM's tape systems for its own customers.

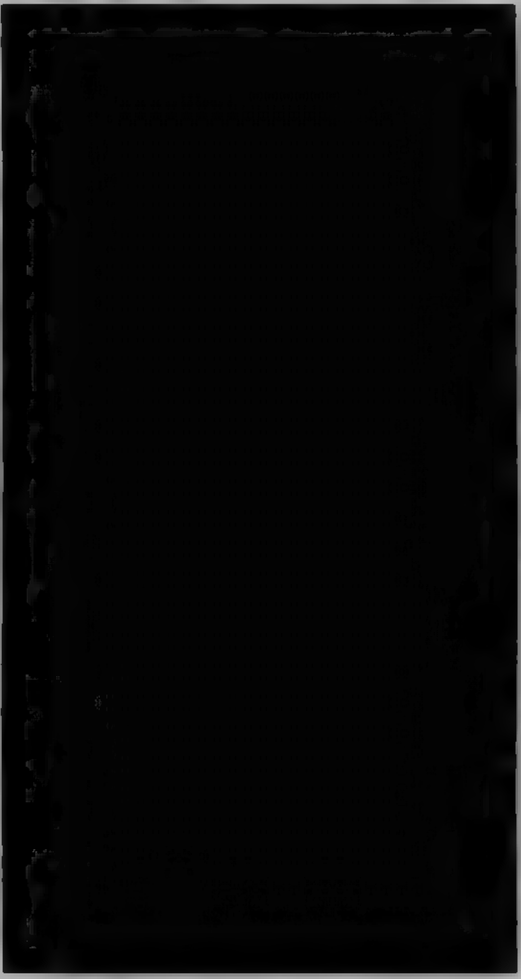
Neither IBM nor STC would comment on the sale of the equipment.

Hearing scheduled

A hearing on the joint financing plan is scheduled today in the federal bankruptcy court in Denver.

The plan already has been approved by separate creditors' committees representing the parent firm and its subsidiary.

Last month, Chemical Bank of New York decided not to go ahead with a previously announced loan commitment of $150 million to STC. STC later announced it would lay off 1,200 workers at its facilities in Colorado and Florida [CW, Nov. 26].



- Honeywell, Inc. plans to sell its Synertek, Inc. semiconductor subsidiary and lay off 1,000 U.S. employees/122
- A Future Computing, Inc. executive predicts that IBM's Personal Computer AT won't make a black sheep of one of its family members, the Personal Computer XT/123
- Boeing Co. expands its efforts in artificial intelligence technology by acquiring a $1.6 million equity interest in a Pittsburgh company specializing in such research/136

Durango shifts focus to compete with IBM AT

By Kathleen Burton
CW West Coast Bureau

SAN JOSE, Calif. — When Durango Systems, Inc. conceived the Poppy II microcomputer last year, IBM's Personal Computer AT was nothing but a gleam in Big Blue's eye. But in an industry where change is a byword, yesterday's good ideas can become tomorrow's headaches.

Durango faces just such a headache today, now that IBM's multiuser Personal Computer AT, scheduled for April release, will compete directly with Durango's Unix-based Poppy II product, a Personal Computer AT look-alike.

"Durango shot an arrow into the wall, and IBM, with the AT announcement, drew a target around it," said Len Baker, a Durango director and partner in Sutter Hill Ventures, a Palo Alto, Calif., venture capital firm that backed the company.

However, IBM's August announcement made the Poppy an immediate industry standard, Baker claimed, largely because of the Personal Computer AT's limited availability. The Poppy's sales have since doubled.

The Intel Corp. 80186/80286-based Poppy II, which can handle as many as 14 users, was initially designed as a general-purpose unit to compete with Altos Computer Systems, Inc. and Fortune Systems Corp. offerings, not IBM's, claimed Durango President Jim Simpson. Although the Personal Computer AT announcement legitimized the Poppy concept, he said, the company cannot survive by going head-to-head with Big Blue.

According to Simpson, Durango must rapidly change direction, searching out market niches and shifting its focus to major OEMs and value-added retailers and dealers. Durango recently signed a major OEM agreement with Molecular Computer, Inc., based here, and is discussing a similar agreement with major IBM Bunch competitors in the $150,000+ computer markets, Simpson said.

Durango also will target smaller, vertical market companies, Simpson said, be-

See POPPY page 144

Treasury's tax overhaul proposal gets mixed reaction

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The computer industry greeted the U.S. Department of the Treasury's recent proposal for a major overhaul of corporate taxation with a mixed reaction, reflecting the fact that different segments of the industry favor different provisions of the existing tax code.

The Treasury plan generally repeals the business community's most coveted tax credits and deductions in return for reducing the corporate income tax rate from 46% to 33%. The plan is aimed at simplifying the tax code, ridding it of loopholes and eliminating its bias toward certain types of investments, officials said.

Of particular interest to the computer industry, the Treasury plan repeals the 10% investment tax credit but revives the R&D tax credit; replaces the accelerated depreciation schedule enacted in 1981 with a less generous depreciation system; and repeals the preferential treatment for long-term capital gains.

The Computer and Business Equipment Manufacturers Association (Cbema) here strongly supported the Treasury tax reform proposal, particularly retention of the R&D credit and lowering effective corporate tax rates. "For too long, major high-tech companies have suffered under high taxes," said Vico E. Henriques, Cbema president. "We've been paying more than our share, while at the same time, our products were contributing to productivity in every economic sector."

Henriques said Cbema is not concerned about losing the 1981 accelerated depreciation system. "That doesn't bother us because it didn't help us in the first place," he said, noting that the depreciation schedule favors investments in industrial plants and equipment.

In contrast with Cbema's general support of the Treasury plan, small and mid-size electronics firms and venture capitalists were outraged with the plan, saying it would end the preferential tax treatment given to long-term capital gains. (Under current law, the maximum tax rate on long-term capital gains is 20%, rather than the 50% maximum rate applied to ordinary income. The Treasury plan would tax the profits of investors in start-up enterprises the same as other income, although gains through inflation would be discounted.)

The American Electronics Association (AEA) in Palo Alto, Calif., strongly opposed the capital gains proposal, arguing it could cut off the investment capital that has fueled the growth of high-risk electronics firms.

Dean O. Morton, AEA chairman and the chief

See TAXES page 143

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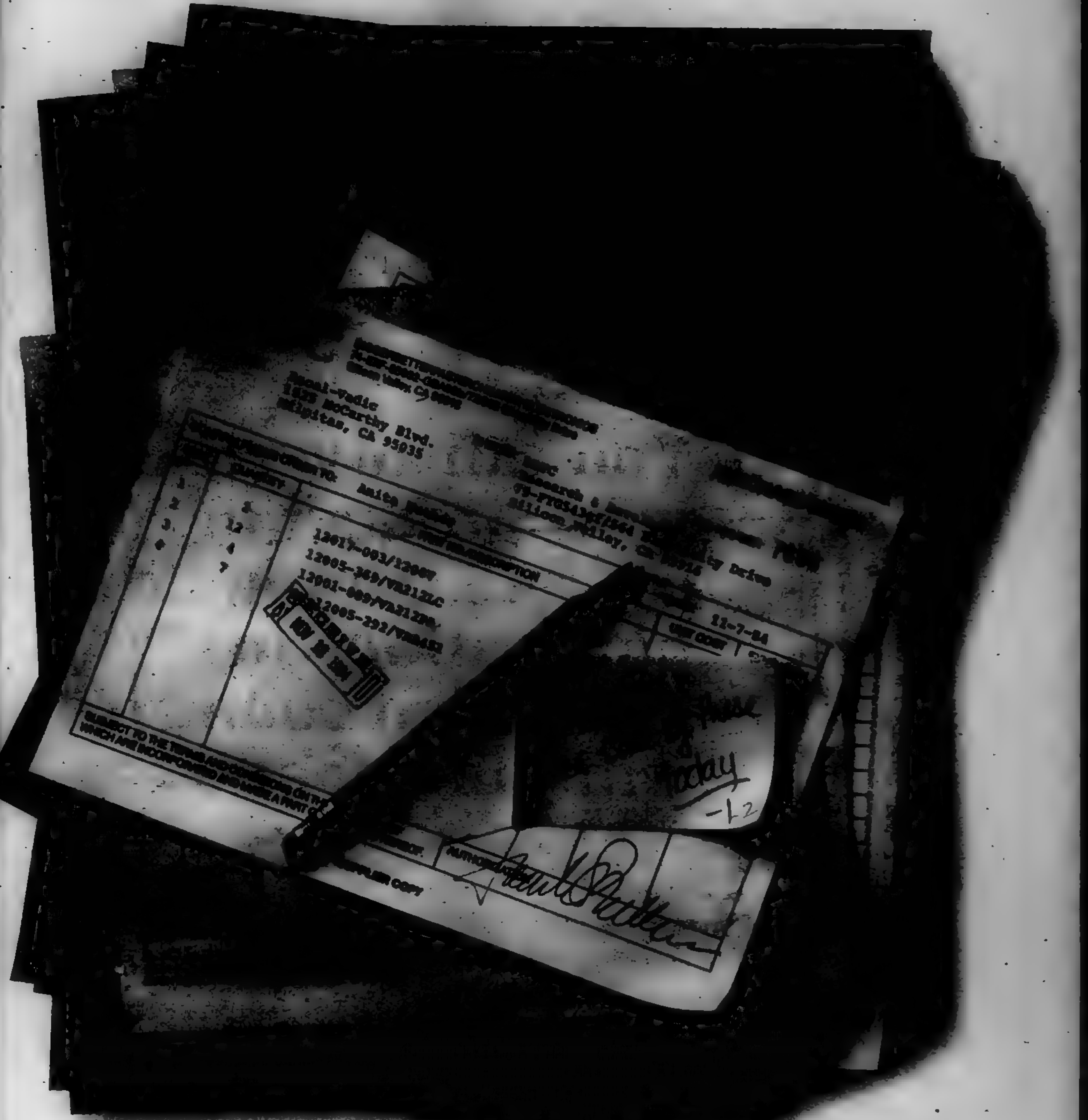

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Honeywell plans layoff of 1,000 workers at Synertek

By David Olmos
CW Staff

MINNEAPOLIS — Honeywell, Inc. last week announced plans to lay off 1,000 employees at its semiconductor subsidiary, Synertek, Inc., and said it is making plans to sell the unit.

The layoff will affect most of Synertek's 1,200 U.S. employees at facilities in Santa Clara, Calif., and Santa Cruz, Calif. A substantial number of the 500 employees working at a Synertek facility in Singapore also will be laid off, Honeywell said.

The company said there will be no layoffs at its Synertek plant in Bangkok, Thailand, which will remain open to handle packaging and subcontract work while the business is offered for sale.

The unit experienced delays in new product development, which the company attributed in part to high turnover of engineering personnel in Silicon Valley.

The subsidiary's design center in Munich, West Germany, will also not be affected by the layoff, according to Honeywell.

Kathy Toonheim, a Honeywell spokeswoman, said that discussions are being held with interested parties about purchasing Synertek, but she would not elaborate on the purchase.

In a statement, H. D. Elverum, Honeywell executive vice-president, said the company "examined several alternatives for Synertek, but all of them included continued losses and unacceptable investment levels."

The unit's primary products are low-density read-only memory (ROM) chips that are used in video games, personal computers and other consumer electronics products.

As the video game business has declined sharply in recent years, so have Synertek's sales.

"The major ROM business is doing very poorly," said a spokeswoman for the Semiconductor Industry Association, a trade association in San Jose, Calif.

"Obviously, anyone who is heavily directed in that market is not doing well now," she added.

Synertek sustained large operating losses in 1983 and 1984, Honeywell said.

A company spokeswoman said the unit was unsuccessful in its efforts to diversify by manufacturing semicustom chips for industrial markets.

The unit experienced delays in new product development, which the company attributed in part to high turnover of engineering personnel in Silicon Valley, she said.

Honeywell said it expects to take a substantial write-off of the assets and reserves for costs related to the layoffs in the fourth quarter. However, according to Toonheim, it was too early to determine the amount of the write-off.

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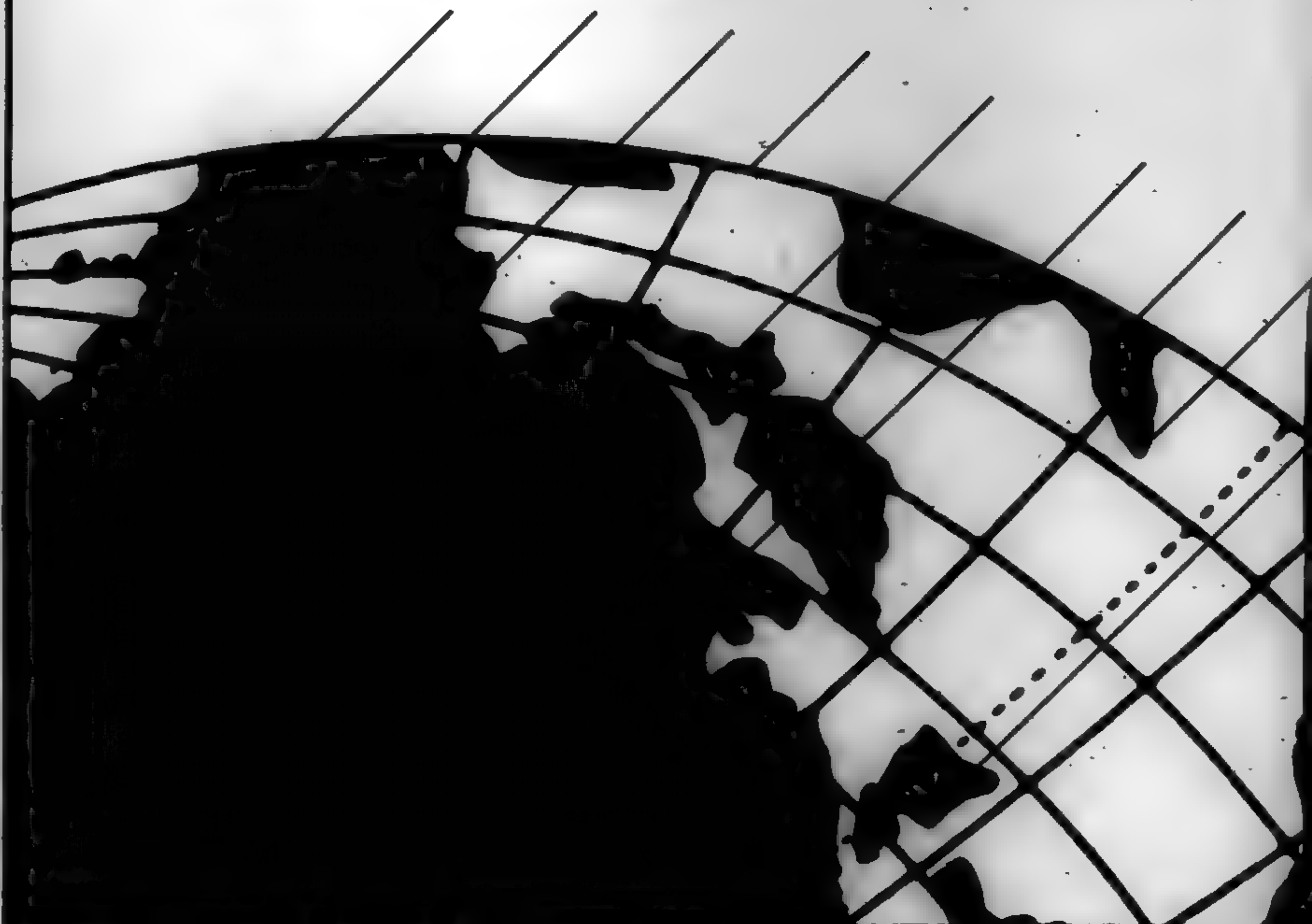

Exec predicts XT survival despite doomsayers' forecast

By Kathleen Sullivan
CW West Coast Bureau

SAN FRANCISCO — When IBM introduced the Personal Computer AT last August, many observers said the announcement of the Intel Corp. 80286-based computer signaled the beginning of the end for one of its other Personal Computer family members — namely, the Personal Computer XT.

But Ron Ward, executive vice-president of Future Computing, Inc., a Richardson, Texas-based market research group, said he believes the Personal Computer XT will retain a solid footing in the company's microcomputer lineup.

Speaking at a recent seminar, Ward said the system will endure because the Personal Computer XT, along with the Personal Computer, brings in the bulk of the firm's microcomputer revenue.

'Workhorse units'

"The [Personal Computer] and XT combinations are the workhorse units; they are the cash cows of the company's Personal Computer line," Ward said.

But more important, Ward said, IBM will continue to offer a "Personal Computer-speed" machine because it has recognized the importance of offering a full range of micro products, from home computers to stand-alone business machines to multiuser systems, and will continue to follow that strategy.

IBM's product family will continue to evolve, however, in order to stave off competitors and meet changing market conditions. Looking ahead to 1988, Ward predicted the possible additions and adaptations to IBM's product line:

- The Personal Computer II, to be introduced in 1985, will represent a "cost-reduced Personal Computer" and will be based on Intel's 8088 microprocessor.
- IBM will introduce a briefcase-size, battery-powered portable computer that uses 3½-in. floppy disks in mid-1985 or early 1986.
- In 1985, IBM will extend the power of its PCjr by adding 256K-byte chips and a hard disk drive. In addition, a portable Personal Computer AT will be introduced.
- By 1987, the Personal Computer AT will be upgraded with 256K-byte chips and the addition of optical disk storage. That same year, IBM will introduce a 80386-based successor to the AT that will use 1M-bit chips and will feature an optical disk.
- In 1988, IBM will unveil a 80286-based ATjr. By then, the firm will be "questioning the viability of its 8088-based product line," Ward said.

He indicated that 1985 heralds "revival time" for the microcomputer industry. With IBM's recent product introductions, the market is poised for new growth.

New market opportunities

In some ways, the market opportunities in 1985 will parallel those of 1982, when hundreds of companies joined the industry following the introduction of the Personal Computer, according to Ward. Existing companies will discover new market opportunities in 1985, and new products will be introduced.

However, added Egil Juliussen, Future Computing's chairman, differences exist between the two situations that should also be noted, especially in the supply-and-demand picture. Shortages of the Personal Computer gave rise to the Personal Computer-compatible industry in 1982, he noted. While Juliussen predicted that the demand for the AT will exceed the supply in 1985, he said the shortage will not be as great as in 1982 and 1983.

He said IBM's Entry Systems Division, which produces the Personal Computer line, is better prepared to handle the demand, having increased its manufacturing capacity by a factor of 10. Also, the market itself has changed; in 1985 the industry will experience slower growth rates and a slower expansion of its dealer base.

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IBM's albatross: A history lesson for micro makers

By David C. Dykstra
Special to CW

Second of two parts

IBM was one of the first personal computer makers with its line of 5100 series computers, which it introduced in 1975. The first models had a small screen and a cumbersome operating system and computer language for small computers. They did not include word processing or other individual productivity tools, such as electronic spreadsheet, data base or file management packages. They also did not use the Basic programming language. These computers were, therefore, misdirected toward accounting and business management, not toward good, single-user applications.

IBM sold many of the 5100 series machines on the strength of the IBM name, and many independent developers wrote software packages to run on these computers. In the following years, more computers were sold based on the number of packages that were available. Several thousand packages were available for the 5120, which was the last of this series. Unfortunately, many customers who bought 5100 models based on the quantity of software found the quality of the packages and software vendor support not very good.

In the meantime, some of the other major companies in the computer industry were making and marketing personal computers for appropriate, single-user applications. For example, Wang Laboratories, Inc. was marketing personal computers for word processing and engineering uses and Hewlett-Packard Co.'s line was directed toward engineering. Lanier Business Products, Inc. and Lexitron/Raytheon Data Systems Co. were specializing in word processing.

The retail personal computer industry received its initial impetus from Radio Shack, with its chain of retail outlets and large potential computer- and technology-oriented customer base. Apple Computer, Inc. and Commodore Business Machines, Inc. began marketing through third-party outlets. All three included Basic or other relatively easy programming languages, and low-cost word processing packages were available.

The introduction of Software Arts, Inc.'s Visicalc, available for most personal computers, (except the IBM 5120 because of its inappropriate operating system) gave the personal computer industry a tremendous shot in the arm. Visicalc and other similar and enhanced packages have made the single-user computer a valuable tool for increasing productivity.

In 1979 and 1980, sales of IBM's 5120 computer had leveled off at an estimated $1 billion per year. This represented, by far, the largest share of the personal computer market of any company. Customer complaints, however, were growing, and the product's deficiencies were becoming more evident. Many of the 5120 software developers had abandoned ship and were supporting programs for more state-of-the-art products.

In 1981, IBM introduced the Personal Computer with one of the most effective advertising campaigns and public relations blitzes that the computer industry has experienced. The discontinuation of the 5120 was not announced until long after the fact. By the time the media realized that IBM had discontinued the 5120, few wanted to report it because it was not news. IBM had not only successfully launched a new product, but it had quietly buried an albatross.

> ***Most business failures will be those of opportunists who fail to heed sound management practices. There will be a larger share of failures by those who try to go head-to-head with Big Blue.***

IBM will continue to grow and prosper. There will continue to be many business failures in the computer industry. Most will be the failures of opportunists who fail to heed sound management practices. There will be a disproportionately larger share of failures by those who try to be IBM-compatible and go head-to-head with Big Blue.

The total number of companies in the computer industry will continue to grow as entrepreneurs invent new products and identify new needs. Many emerging niche markets will become future major markets. The companies that continue to be innovative and serve their customers' needs will continue to grow.

Dykstra is president and owner of Dykstra Consultants, a Newport Beach, Calif.-based independent consulting firm. He teaches at the Irvine campus of National University and is the author of Computers for Profit, *recently published by Reston Publishing Co.*

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It's nice to know that when you pick NOMAD2 as the 4-GL/DBMS for your company, EVERYBODY will know first-hand that you've made the right choice.

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In fact, there are no issues. DunsPlus does what you want, the way you want it--now.

Designing systems that reflect the way you do business is business as usual for us. NOMAD2, the premier 4th-Generation-Language/DBMS from D&B Computing Services, has made us a leader in the field of information management services. And as your needs evolve, so do we. DunsPlus is just the latest step in translating technological advances into usable business tools --tools that reflect the way you do business.

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GSA's Section C micro purchases expected to rise in '85

By Andrew Mohr
Special to CW

The General Services Administration (GSA) has issued its schedule contract solicitation for the purchase of microcomputer hardware, software and maintenance. The solicitation encompasses a wide range of end-user computers, including standalone personal computers, portables and multiuser, multitasking equipment servicing numerous users.

Known as the Section C schedule, it is one of the government's primary contractual vehicles for purchasing microcomputers and related products. During fiscal year 1984, the government spent approximately $50 million on microcomputers purchased from Section C vendors. The amount spent on microcomputers under Section C this year is expected to rise substantially.

GSA schedule contracts are indefinite quantity contracts awarded to numerous vendors.

To ensure that the government receives a fair deal, GSA negotiates discounts from a vendor's commercial price list before awarding a schedule contract to a vendor. After award, the government is not obligated to buy any goods or services from the contractor.

According to the solicitation, GSA will award a single Section C schedule contract for each make, model or line of hardware offered. Vendors offering equipment under the schedule must also offer maintenance and repair services.

However, GSA may award separate schedule contracts for third-party maintenance service.

Software may be sold either together with hardware or as a separate item under software-only schedules. In a change from the current schedule practice, agencies may procure only one of the same model software package for each micro acquired. If an agency desires to purchase two or more of the same software package, then it must acquire the software from the software-only schedule vendor, whose price for the package will generally be lower than that of schedule vendors offering both hardware and software.

Manufacturers and dealers may bid on the Section C schedule solicitation. Dealers bidding on the Section C schedule solicitation must obtain a product support letter from the manufacturer of the equipment proposed to ensure a source of supply for the duration of the contract.

It should be noted that agencies are not required to use Section C and may procure micros, software and maintenance from nonschedule vendors. But to do so, agencies must comply with the more rigorous rules governing the acquisition of nonschedule products.

Mohr practices at the law firm of Cohen & White in Washington, D.C., specializing in federal procurement and computer law.

Suit settled against Telink for $3 million

NASHVILLE, Tenn. — Northern Telecom, Inc. said last month that it had settled a legal claim against one of its former contractors, Telink, Inc., which has agreed to pay a $3 million settlement.

The claim alleged that Telink, a Santa Ana, Calif., subsidiary of Burnup & Sims, Inc., had violated the federal Racketeer Influenced and Corrupt Organizations Act in connection with a $24 million microwave, private-branch exchange and telephone contract in San Diego county.

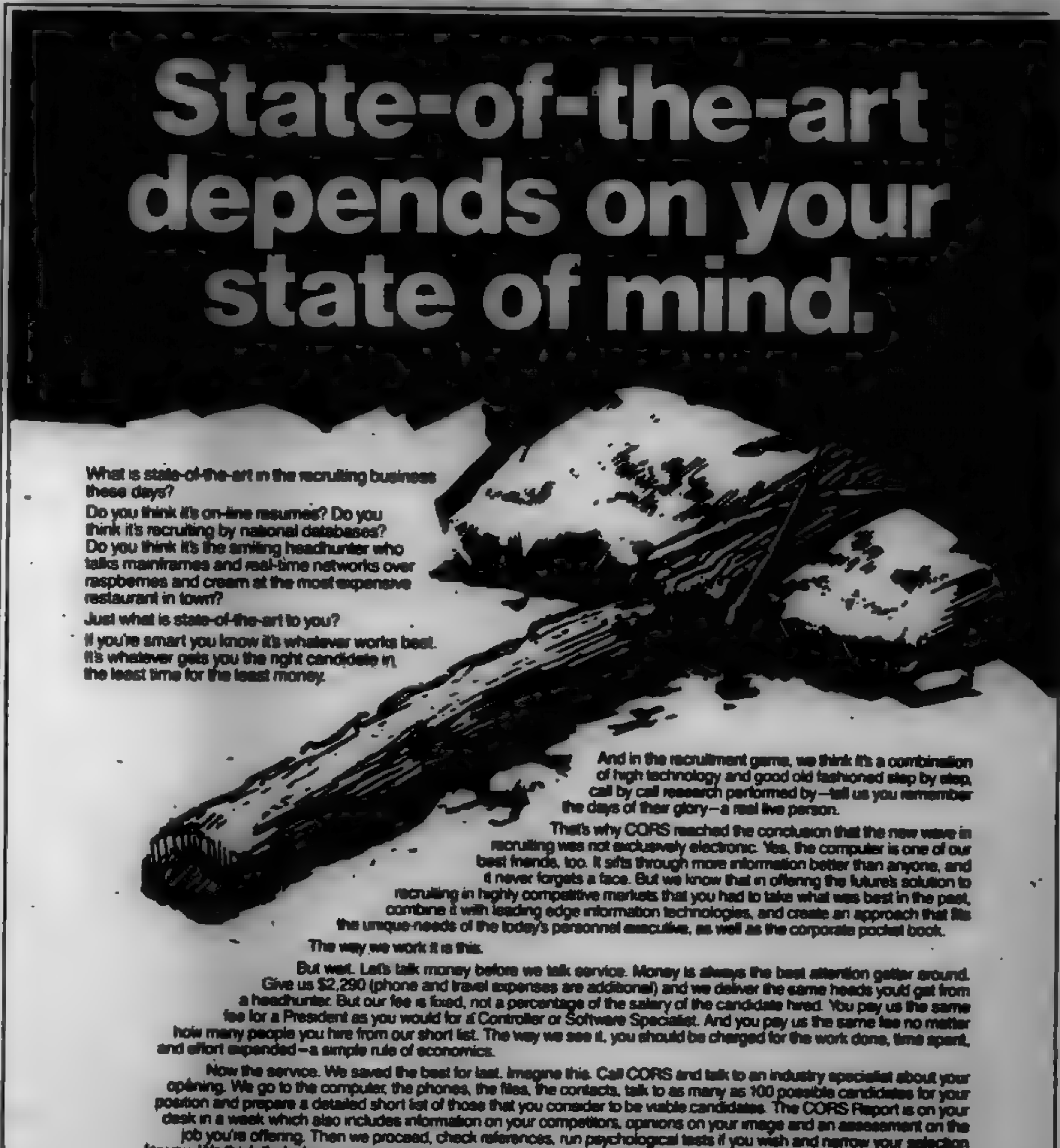
Under terms of the settlement, Telink has agreed to pay all trade debts owed Northern Telecom, as well as damages and legal expenses associated with the two-year legal dispute. Northern Telecom said that the total settlement is $3 million, with payment of damages guaranteed by Burnup & Sims of Plantation, Fla., and by an independent bonding company.

Telink also agreed to dismiss with prejudice a lawsuit it had filed against Northern Telecom charging wrongful termination of Telink's factory-authorized contractor agreement. Northern Telecom said it will pay no damages for suit dismissal.

Last month, Telink, two of its executives, Burnup & Sims and 11 other individuals — including some former county officials — were indicted by a federal grand jury on charges of racketeering, mail fraud and wire fraud in connection with the San Diego County contract and other telecommunications contracts.

Northern Telecom said the settlement with Telink came before the indictment was issued.

In June 1982, the San Diego County Board of Supervisors voted to award the telecommunications contract to Telink. Northern Telecom, which manufactured the system called for in the award, bid $5.6 million less for the contract. The award resulted in a lawsuit and a grand jury inquiry.



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Boeing acquires AI interest

PITTSBURGH — In an effort to expand its development of artificial intelligence technology, Boeing Co. recently said it has acquired a $1.6 million equity interest in the Carnegie Group, Inc., an AI company here.

Boeing also said it has agreed to contracts with the Carnegie Group valued at $4 million or more over four years for the development of knowledge-based software systems.

Four scientists from Carnegie-Mellon University founded the Carnegie Group in February 1983. The company specializes in designing and developing knowledge-based systems for the manufacturing process, such as sensor-based machine control and diagnosis, and knowledge-based management decision-support systems.

Last year, Boeing established an AI center in Bellevue, Wash., operated under the aegis of Boeing Computer Services Co., a division of the Seattle-based aerospace giant.

Robert L. Dryden, president of Boeing Computer Services, said the agreement would allow the company to expand its AI programs by gaining access to technologies from the Carnegie Group.

George Roberts, general manager of the Boeing unit's Advanced Technology Applications Division, said Boeing "will perform a portion of [its] contract work on advanced technology products at the Carnegie Group facility in Pittsburgh."

AT&T offers program to ensure Unix-based software portability

NEW YORK — AT&T recently announced a software program said to be designed to ensure the portability of application software running under its Unix System V, future releases and various System V derivatives offered by AT&T licensees.

The principal element of the AT&T program is the System V Interface Definition, a document that reportedly defines the relationship between an application program and System V.

The document defines a minimum set of system calls and library routines that should be common to all operating systems based on System V. The remaining commands and utilities have been grouped into a logical series of optional extensions to the basic definition, AT&T said.

AT&T said that the goal of the program is to have applications written under the System V definition execute unchanged on any system that conforms to that definition.

AT&T is located at 195 Broadway, New York, N.Y. 10007.

Fujitsu units to run Pick

SANTA CLARA, Calif. — Fujitsu Microelectronics, Inc., a subsidiary of Japan's Fujitsu Ltd., has announced that it has entered into a licensing agreement.

The licensing agreement is to offer the Pick and Associates, Inc. Pick operating system on Fujitsu business computers.

According to a Fujitsu spokesman, the company has not decided which of its processors will be equipped with the Pick operating system and what those systems will cost.

He said Fujitsu products with Pick, a multiuser operating system, probably will be released during 1986.

ISI, ADR reach DBMS agreement

WALNUT CREEK, Calif. — Integral Systems, Inc. (ISI) and Applied Data Research, Inc. (ADR) have announced a marketing agreement.

The agreement is said to enable ISI's on-line, interactive human service system to operate with the ADR/Ideal fourth-generation software development system and the ADR/Datacom/DB relational data base management system (DBMS).

ADR will assist ISI in developing versions of its payroll and personnel system for ADR's relational DBMS.

AEA fills three board positions

PALO ALTO, Calif. — The American Electronics Association (AEA) recently elected three corporate executives to its national board of directors.

The new directors will serve on the AEA's 52-member national board. They are Horace G. McDonell Jr., president and chief executive officer of Perkin-Elmer Corp.; William T. Ylvisaker, chairman and chief executive officer of Gould, Inc.; and Charles E. McKittrick Jr., vice-president of governmental programs at IBM.

The AEA is located at 2600 El Camino Real, Palo Alto, Calif. 94306.

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COMPUTER INDUSTRY

SUPERSHORTS

Computer Sciences Corp. has received a $14.1 million subcontract from IBM for services in the design competition phase of the Federal Aviation Administration's (FAA) advanced automation system program.

During the 36-month design phase of the program, IBM and a team led by Hughes Aircraft Co. will develop competitive designs for the advanced automation system. The FAA will then select one contractor to produce and install the system. This will provide new computer software, new processors and new controller work stations, known as sector suites.

■

Magnetic Peripherals, Inc. announced that it plans to reduce the work force at its Oklahoma City plants. Approximately 20% of the current full-time work force will be terminated or reassigned as production ceases by year-end 1984.

The decision to discontinue production at the plant stems from the poor market for floppy drives caused by severe price erosion.

■

Hyundai Group, Korea's largest company, has announced its new $40 million microelectronics facility in Santa Clara, Calif..

The new 100,000-sq-ft facility would house headquarters, marketing, engineering and manufacturing operations for Hyundia's wholly owned U.S. subsidiary, Hyundai Electronics America.

■

Beehive International Ltd. has announced that its wholly owned subsidiary, **Beehive Ireland Ltd.**, is entering into an orderly and voluntary wind-down of its manufacturing facility located in Fermoy, Ireland.

Beehive International is in the process of signing agreements with the customers of Beehive Ireland to continue the supply of Beehive products to those customers directly from Beehive's Salt Lake City plant.

Beehive Ireland intends to pay all sums presently owing to suppliers and to work out acceptable arrangements with its bank and with the Irish development authority with respect to certain loans and grants it has received.

■

Onyx+IMI, Inc. announced that it has consummated an agreement with **Computer Memories, Inc.** to sell the technology, manufacturing rights, inventory and assets for a new family of half-height, 5¼-in. Winchester disk drive products for which development by Onyx+IMI has been substantially completed.

The agreement provides for the sublease of certain facilities and grants Computer Memories a worldwide license to use Onyx+IMI's patents, trade secrets and other proprietary information for the development, manufacture and sale of these half-height products.

Onyx+IMI previously announced its plans to divest itself of its disk drive division. The company had estimated that it would be necessary to establish a $10 million aftertax reserve associated with the divestiture.

■

Gould, Inc. has opened a corporate office in China.

The new office in Beijing will coordinate all of the sales and marketing activities for Gould's four electronics business segments with Chinese government industrial ministries.

In July, the company also signed a 10-year licensing agreement with the China National Machinery and Equipment Import and Export Corp. in Beijing for the manufacture and assembly of industrial computers called programmable controllers.

■

The Foxboro Co. and **Hewlett-Packard Co.** have announced the formation of a strategic partnership designed to provide integrated information networks for use in the process industries.

The agreement focuses on an OEM arrangement that makes available information-based systems using Foxboro process control technology in combination with HP distributed data processing and real-time systems.

■

Xidex International, a division of Xidex Corp., announced that it has signed a three-year equipment, raw materials and technology agreement with the **Shanxi Provincial Electronics Industry Corp.** of China. A dollar amount was not disclosed.

The agreement calls for Xidex to provide hardware, raw materials and technical support for a complete floppy disk assembly facility to be in operation in Shanxi province by early 1985.

■

General Electric Information Services Co. has announced its new disaster recovery services business. Located in Schenectady, N.Y., the disaster recovery services facility contains mainframe equipment from Honeywell, Inc.; IBM and Hewlett-Packard Co., as well as related peripheral devices, telecommunications links, office and work space.

Disaster recovery services provide a "hot" site facility for use by subscribers whose own computer facilities have been destroyed or disabled. This service is designed to fit the needs of Fortune 500 companies operating their own data centers.

■

D.W. McArthur, group vice-president, information systems group, at 3M Corp., has been elected chairman of the board of the **Computer and Business Equipment Manufacturers Association (Cbema). Richard Dunglas**, group vice-president, U.S. marketing and service, Honeywell Information Systems, Inc., was elected board vice-chairman.

Ronald Gallier, vice-president of

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government affairs for the Multigraphics division of AM International, Inc., has been elected chairman of Cbema's joint plans and policies committee. **A. Raymond Daniels**, director of industry standards and relations at NCR Corp., was named vice-chairman of plans and policies.

■

Applied Computer Techniques Ltd. (ACT), a UK firm, has announced the formation of a Santa Clara, Calif.-based company that will be responsible for overseeing U.S. marketing efforts of ACT's Apricot microcomputer line.

The new company, **Apricot, Inc.**, will receive approximately 20% of its initial capital of $20 million from ACT. The balance of the funds required for working capital and for financing the initial promotional expenditure is expected to come from ACT's own shareholders and other institutional investors.

■

Ing. C. Olivetti & Co., S.P.A. and **Filenet Corp.** have announced an agreement in which Olivetti will distribute overseas the recently introduced Filenet document-image processor system. The equipment will be sold directly by Olivetti, which will also provide field service support.

■

South Korea's **Daewoo Telecom Co., Ltd.** has signed a long-term contract with U.S. vendor **Leading Edge Products, Inc.** to provide the American firm with personal computers designed and manufactured by Daewoo Telecom.

The products will be marketed by Leading Edge in North, South and Central America and in Europe and Australia. The companies will market the products jointly in Asia and Africa.

■

The Napa Division of Ramtek Corp. has selected **Artel Communications Corp.** to provide fiber-optic systems for communications in its advanced, high-resolution computer graphics systems.

The Napa Division will market Artel's fiber-optic interfaces as an optional feature in its computer graphics systems.

■

Deltak, Inc., a Prentice-Hall, Inc. subsidiary, and **Software AG of North America, Inc.** have announced an agreement to codevelop and comarket multimedia and computer-based training for Software AG software products.

■

Network Research Corp., Santa Monica, Calif., and **Spartacus Computers, Inc.**, Bedford, Mass., have entered into a joint marketing agreement making available a high-performance connection between IBM mainframes, IBM and compatible personal computers and non-IBM workstations.

■

Sytek, Inc. announced last month that it has filed a registration statement with the U.S. Securities and Exchange Commission regarding its proposed initial public offering of two million shares of common stock.

The estimated offering price is between $10 and $12 per share. The proposed new offering consists entirely of newly issued shares to be sold by the company, which intends to use the proceeds to repay bank debts, purchase capital equipment and add to working capital.

MERGERS AND ACQUISITIONS

Xidex Corp., Mountain View, Calif., and **Evotek Corp.**, Fremont, Calif., jointly announced that an agreement has been reached under which **Oktel**, a wholly owned subsidiary of Xidex Corp., will acquire 100% of the common stock of Evotek.

Oktel will move from its Campbell, Calif., facility to the Evotek facility.

■

Linear Corp., Carlsbad, Calif., has purchased controlling interest in **Security Science Corp. of America, Inc.**, Scottsdale, Ariz. Terms of the acquisition were not available.

■

An agreement in principle has been reached on the purchase of the **Monroe Systems for Business** division of **Litton Industries, Inc.** by a group of private investors headed by Jeffry M. Picower and H. V. Williams and including Robert F. Kane, Monroe's president.

The leveraged buyout is subject to the completion of definitive agreements, approval by Litton's board of directors, financing and certain governmental approvals. Terms of the proposed transaction were not disclosed.

■

Computer Task Group, Inc., Buffalo, New York, announced it has acquired **Amtec Systems Corp.** of Los Angeles. Terms of the acquisition were not available.

■

Aquix Advanced Systems Corp., Farmingdale, N.Y., has agreed in principle to acquire **Players Computer, Inc.**, also of Farmingdale, and, concurrently, establish an additional DP service support facility at the World Trade Center in New York.

The acquisition is subject to several conditions, including the approval of the transaction by the shareholders of Player's Group Companies, Inc.

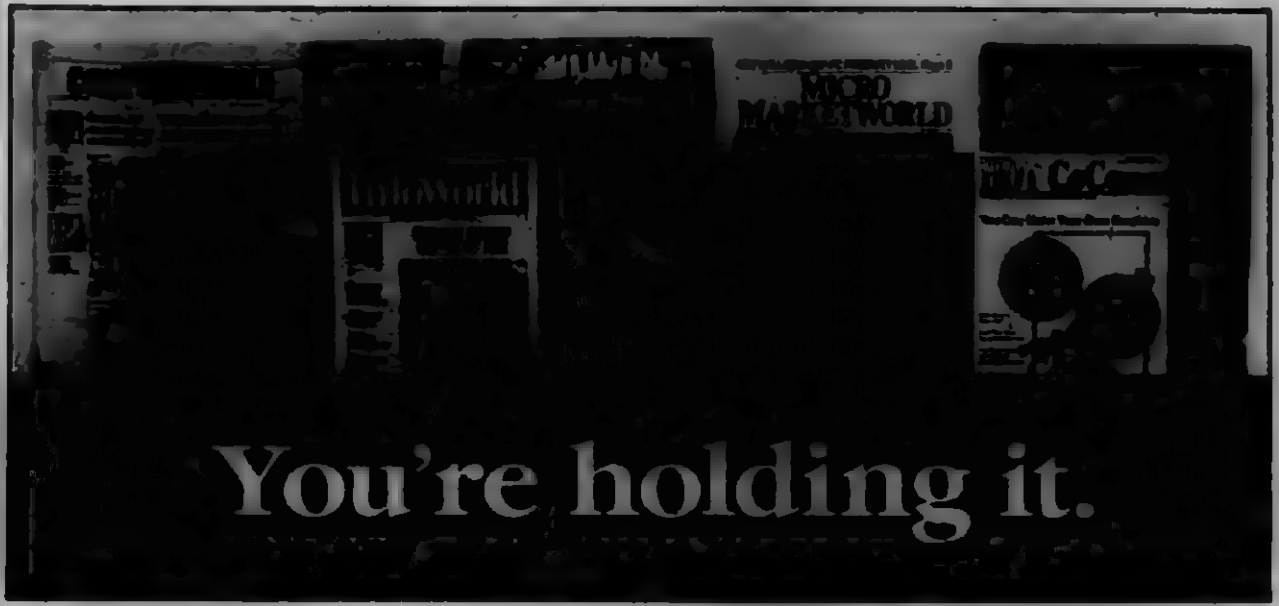
■

Control Data Corp., Sunnyvale, Calif., announced the acquisition of **Computer Marketing Association** (CMA). CMA is a vendor of maintenance services for computers manufactured by Digital Equipment Corp. Terms of the agreement were not disclosed.

■

American Computer Hardware Corp. (ACHC), Santa Ana, Calif., and

See MERGERS page 142



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MERGERS

from page 141

Systech Corp., San Diego, announced the completion of the purchase of Systech's Burroughs Corp. interface division by ACHC. ACHC is currently expanding its product lines and becoming a more visible company to both the general computer industry and to the computer-buying public. With this acquisition, ACHC acquires an existing working interface for use with the Burroughs line of minicomputers.

Terms of the agreement between the firms were not available.

■

Motorola, Inc., Schaumburg, Ill., announced the acquisition of **CTX International**, Sunnyvale, Calif., for an undisclosed amount of cash. The privately held company will become part of Motorola's newly formed enterprises organization.

■

Printronix, Inc., Irvine, Calif., announced it has completed the acquisition of **Anadex, Inc.**, a privately held California-based company that is engaged in the design, manufacture and sale of serial matrix computer printers. The acquisition was completed through a merger of Anadex into a newly formed, wholly owned subsidiary of Printronix in exchange for 380,948 shares of Printronix common stock.

The new subsidiary will continue to conduct business with its former management under the name Anadex.

■

Money Management Systems, Inc., Waltham, Mass., has been acquired by **Strategic Information, Inc.**, Burlington, Mass. Terms of the acquisition were not disclosed.

■

Seagate Technology, Inc. and **Grenex Corp.**, Scotts Valley, Calif., jointly announced that they have reached an agreement in principle for Seagate's acquisition of Grenex in exchange for not more than 3.5 million shares of Seagate common stock.

The transaction is subject to completion of a definitive agreement, approval from the board of directors of both companies and the Grenex shareholders and customary regulatory approvals.

■

MTI Systems, Port Washington, N.Y., a division of Ducommun, Inc., announced that an agreement in principle has been reached to acquire **Cgdatacom, Inc.**, Pittsburgh. Details of the purchase agreement were not disclosed.

■

Computer Identics Corp. announced it has reached an agreement in principle with **N.V. Bekaert S.A.**, a Belgian corporation, whereby Bekaert would purchase 500,000 shares of Computer Identics common stock.
stock

The two companies recently announced an intent to form a joint-venture Belgian company to sell, service and manufacture bar code systems and equipment in Western Europe.

■

Communications Corp. of America (CCA), Dallas, announced the completion of an agreement with **Telic Alcatel** and **Thomson-CSF Telephone.**

Telic and Thomson, both French companies affiliated with Compagnie Generale D'Electricite, a $7 billion international company headquartered in Paris, purchased one million shares of CCA's common stock at $10 per share.

Under the terms of the agreement, Telic and Thomson have a two-year option to purchase from CCA up to 2.5 million additional shares of common stock at $10 per share.

CCA further announced the signing of a distributorship agreement with Thomson CSF Communications wherein CCA will be a nationwide distributor of the Opus key system products manufactured by Thomson CSF Communications.

■

American Bancservice Corp. has acquired **Vertimax Corp.**, Lakeland, Fla., a microcomputer software company, in exchange of stock. Terms of the agreement were not available.

■

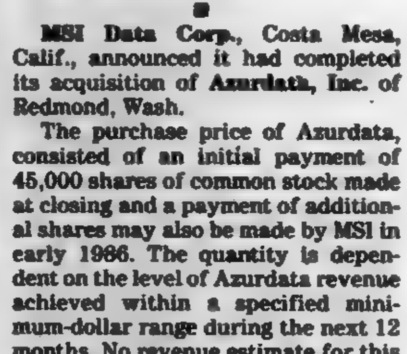
McGraw-Hill, Inc., New York, acquired, for cash, the capital stock of **Occidental Consulting Group, Inc. (Oxicon)** of Lafayette, Calif.

Oxicon produces a series of test instruments, or profiles, that are used by businesses to screen and select the best candidates for specific jobs. The system was designed to help businesses improve their selection of employees, and thus increase productivity and reduce turnover.

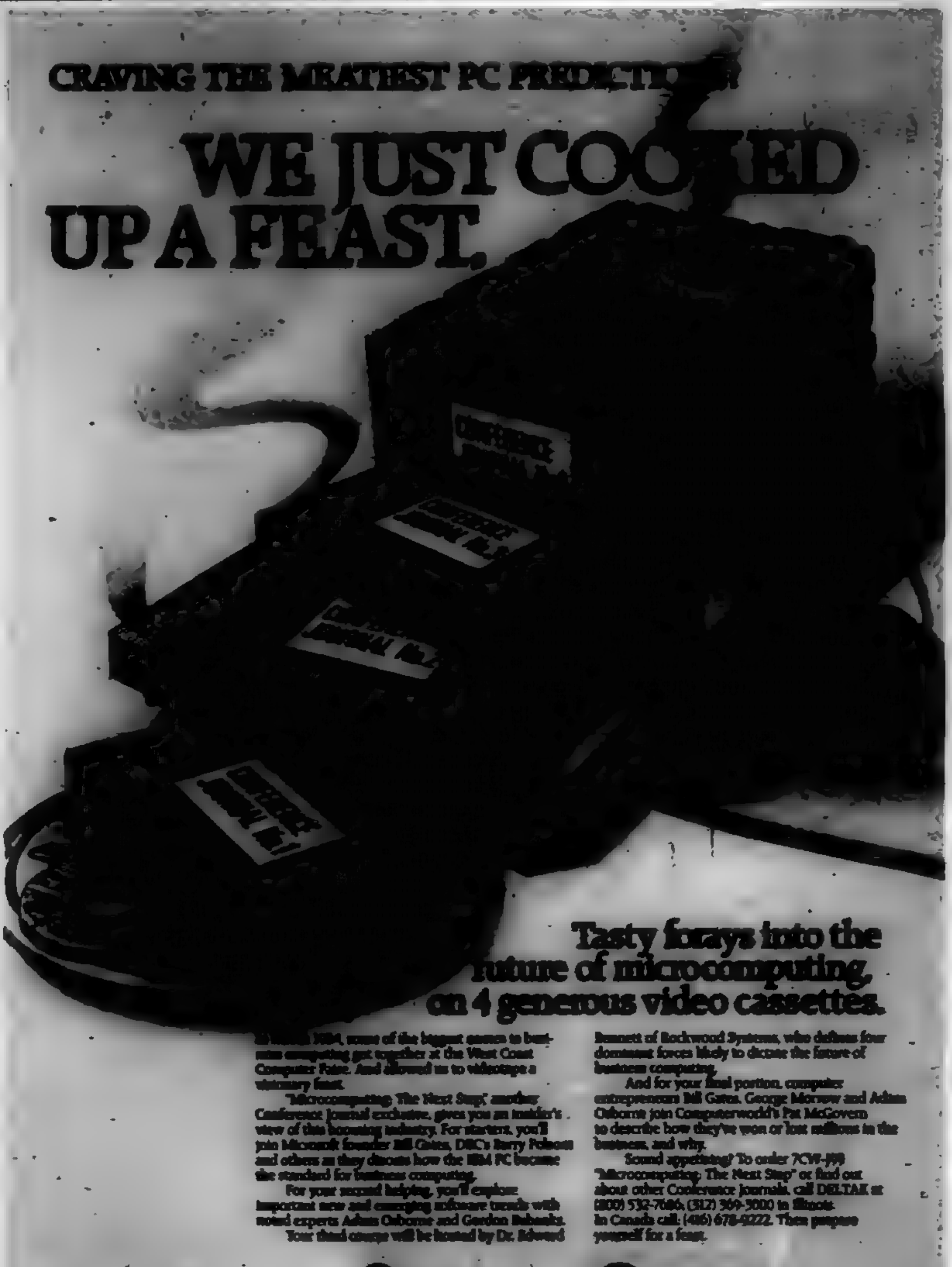
■

MSI Data Corp., Costa Mesa, Calif., announced it had completed its acquisition of **Azurdata, Inc.** of Redmond, Wash.

The purchase price of Azurdata, consisted of an initial payment of 45,000 shares of common stock made at closing and a payment of additional shares may also be made by MSI in early 1986. The quantity is dependent on the level of Azurdata revenue achieved within a specified minimum-dollar range during the next 12 months. No revenue estimate for this period was given, but MSI did say that the 1984 level is expected to be between $5 million and $6 million.



'A real increase in this computer crime lately.'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DELTAK

BTU, Ulvac form company to market chip processing equipment in Japan

NORTH BILLERICA, Mass. — BTU Engineering Corp. said it has formed a joint venture with Ulvac Corp., a Japanese company, to market semiconductor processing equipment in Japan.

The new company, Ulvac-BTU, will initially market diffusion, oxidation and chemical vapor deposition systems made by BTU. The joint venture company plans to build its own system eventually, using technology and components provided by BTU.

Ulvac is a manufacturer of high-vacuum semiconductor production equipment.

According to BTU, the joint venture company will begin operations at a plant in Chigisaki City, Japan, but will eventually move to a new manufacturing facility in Tsukuba Science City, a large research center near Tokyo.

BTU said Ulvac-BTU plans to produce 30 to 40 processing systems during its first year of operation.

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NEC, Corvus to develop controller

LAS VEGAS — Corvus Systems, Inc and NEC Corp. recently announced an agreement here to develop a single-chip controller for Corvus' Omninet local-area network.

Presently, the controller function for Omninet is implemented with a three-chip set developed by Corvus, a company based in San Jose, Calif.

According to the firms, the Cmos single-chip controller will be manufactured and distributed by Tokyo-based NEC to Corvus and Omninet licensees.

Corvus claimed the one-chip version will allow simpler and lower cost implementation of the transporter than the three-chip set. It will also provide higher performance and expanded functionality, according to the company.

TAXES

from page 129

operating officer of Hewlett-Packard Co., stated, "The capital gains differential is the very lifeblood of America's high-risk, high-technology companies."

Morton said the 1978 reduction in capital gains rates sharply increased the volume of venture capital investment.

"During the eight years prior to the reduction in capital gains rates, investments made available to venture capital funds averaged only $50 million per year. In 1983, $4.1 billion in new risk capital was made available for investment in new ventures and growth companies," Morton said.

Charlotte LeGates, a spokeswoman for Cbema, said the association is not concerned about the capital gains proposal. "That's really a small-company issue and not significant to our members," she said.

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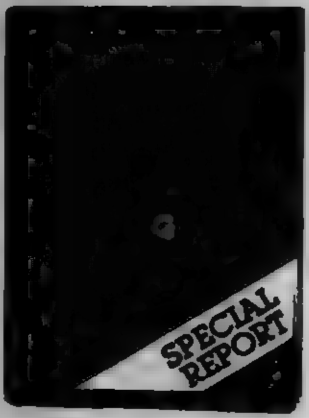

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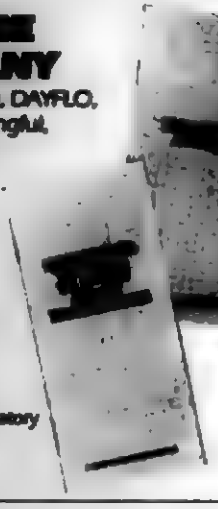

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COMPUTER INDUSTRY

Ashton-Tate appoints chief

CULVER CITY, Calif. — Ashton-Tate announced last week that Edward M. Esber Jr. has been named chief executive officer. Esber succeeds David C. Cole, who abruptly resigned the position of chairman and chief executive officer in late October.

The microcomputer software company also announced that Carmelo J. Santoro, who had served as active chairman since Cole's resignation, has resigned the interim position. Santoro, who is chairman of the board and chief executive officer of Silicon Systems, Inc. in Tustin, Calif., will continue to serve on Ashton-Tate's board.

Esber joined Ashton-Tate in May as executive vice-president in charge of marketing and sales. He has since been appointed chief operating officer and was elected to the board of directors.

Executive committee planned

Ashton-Tate also announced the formation of an executive committee that will perform the functions of chairman and concentrate on long-term planning, according to the company.

Ashton-Tate said it has no immediate plans to fill the vacant chairman's position.

Last month Cole was appointed president and chief operating officer of Ziff Corp., a company that has holdings in informatioh services companies and computer publications.

POPPY

from page 129

cause they are risk-takers and are driven more by price and performance considerations than are Fortune 1,000 companies. "The Fortune 1,000 [firms] are in a freeze, waiting [for] the clash of the titans [between IBM and AT&T] to eventually resolve itself," he said. "Who knows how long that will take?"

Robert Lefkowitz, director of microcomputer systems software research for the market research firm Infocorp of Cupertino, Calif., and a former Durango employee, said "the company has been in serious trouble for the last three years" and has not been profitable for more than two years. One strength, however, has been aggressive overseas sales, which account for half of Durango's sales, and a strong, though relatively untested, manufacturing capability.

With product life cycles now averaging three years, Lefkowitz said, "the clock is already ticking on the AT." And because the Poppy is months ahead of IBM's product, OEMs making hardware "build-or-buy" decisions may opt for Durango's product, he said.

On the downside, however, the personal computer shakeout has made both vendors and venture capitalists nervous. This may impact Durango, which is now in "a cash-poor, production ramp-up mode," Lefkowitz said. Vendors may insist on stricter cash payment terms in the short run, and future financing may be hard to obtain. Lefkowitz said the total venture capital investment in Durango after more than seven rounds of financing since 1977 is approximately $17 million.

Infocorp predicted the Unix market to reach $2 billion this year.

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If you qualify for one of the categories listed below, you meet the minimum qualifications:

1) High School & 2 yrs. COBOL Programming Experience
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3) A.S. or A.A. degree and 1 yr. of COBOL programming experience

Preferred experience for ALL positions mentioned above:

IBM JCL, IBM System Operating, ICCF & VSAM Files

Contact:

**PERSONNEL OFFICE
Polk County Board
of County Commissioners
P.O. Box 330
Bartow, Florida 33830**

EOE M/F/H

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DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits program, including bonuses and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3391 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call BECKY FINLEY or JIM BARRETT at 404-455-7260, or toll free:

1-800-241-6862

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Office of the President Information Systems and Services

Administrative headquarters of the University of California 9 campus system seeks a manager with extensive experience in planning and project management in a large, complex organization. Responsible for planning, development and management of communications facilities and networks; developing Universitywide network standards, Computing and Communications Planning, and policies on computer usage and equipment acquisition; advise on technical advances in computing and telecommunications. Requires demonstrated interpersonal and communications skills. Knowledge of higher education administration and functional experience in telecommunications and computing useful. Salary $50-65K commensurate with experience. Excellent benefits. Send resume by 1/15/85 to:

Personnel Services - 12
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University of California
Berkeley, CA 94720

EOE/AA

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Degree preferred. Must have 3+ yrs exp in COBOL on Sys 34. Appls are Manuf, Distr. Wholesale & Retail. Will supervise 5 people; 1 prgmr, 2 oper & 2 data entry. Shop is growing and Co will expect P/C's, on-line ability within 1 yr. Good potential and growth. $26-32,000

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Degree required. 2+ yrs actual Audit exp preferably in large IBM mainframe. Need to possess structured skills & audit (fin'l) trail skills. Company is [illegible] and position has excellent potential for promotion; limited only by your own ability. [illegible]

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Degree preferred. Must have 6+ yrs in operations with at least 2+ yrs Supv or Mgr exp. Startup situation with heavy training/hiring/documentation. [illegible] OS/MVS migrating to XA. Need to be current. Excellent visibility to top mgmt. $30-35,000

All positions above and many more are in Texas where "Long Necks," "Armadillos" and the "Cotton Eyed Joe" call home.

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1-800-531-[illegible]
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Rapidly growing software devel co seeks sys pro w/min 2+ yrs HP3000 on-line & data base exp. IMAGE & VIEW knowl pref. Challenging position for high achievers. $27,000

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If you have that rare blend of tech & apps skills consider this key position. IBM 30XX MVS IMS-DBDC COBOL environ. Oppty to join Fortune 500 firm in hi-vis spot developing DBMS systems. $36,000

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The most state-of-the-art org in the Boston area seeks a tech astute PL-1 P/A for on-line proj. Environ is multi-CPU IBM 30XX MVS IMS-DBDC. Oppty to work on firm's highest priority new project. $33,000

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Personnel Consultants**

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Fabulous ground-floor opportunity beckons your expertise in IDMS. St. Louis [illegible] organization has a new MVS/IDMS configuration and immediately [illegible] IDMS [illegible]. Requirements include IDMS Data Base Design experience, CULPRIT, and Interactive Data Dictionary. [illegible] 5.7 and/or IDMS sysgen experience. Exceptional [illegible] relocation.
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(314) 727-1535**

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Excellent oppty for a UNIVAC 1100 professional with 4-6 yrs exp to enter into the design & development area. Mfg apps, TIP, DMS or MAPPER exp are pluses.
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(612) 339-6001**

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Electronic components mfg has a need for software engineers with 3 yrs C, PASCAL or assembly programming on 8085 or similarly based system, or PL/M in an RMX operating systems environment. This is an employee-oriented firm.
Salary to the $40's

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5 plus yrs exp large scale IBM [illegible] 1 strong yr CICS (command level) and DL/1. This is a senior position with a software design team. Company offers many different projects and upward mobility, as well as rewards for individual performance.
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(512) 836-0883**

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Two Northpark East
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Dallas, TX 75231
(214) 363-3300**

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Very professional shop seeks COBOL programmer/analyst with 3+ years exp. financial applications. Start $28,000

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RCA Service Company (a subsidiary of RCA Corp.) is under contract to design, develop, and maintain state-of-the-art data acquisition, real-time tracking, interactive graphic displays and data processing systems composed of GOULD 32/8780 Control Processors and Intel 8086 embedded micro computers.

Due to increased commitments of a long-term contract, we are currently augmenting the Systems Development Group with the following unique and challenging positions located at the Development Site in NEWPORT, RHODE ISLAND and the Operations Site in the BAHAMAS:

Digital Systems Engineers

Engineering assignments include block level systems design, problem clarification, equipment evaluation and procurement, interfacing, integration, and logic design. These positions require a BSEE and applicable experience on similar projects. Familiarity with embedded microprocessor control applications a real plus. (NEWPORT)

Sr. Systems Analysts

Sr. Staff position engaged in systems planning, requirements specification, feasibility and justification studies. Participate in algorithm development, system output analysis and performance evaluation. Scientific BS required (MS preferred) and related experience. (NEWPORT)

Systems Diagnostic Programmer

Experienced with GOULD Concept 32 systems, MPX 2.1 or 3.2 internals, troubleshooting systems level problems, assembly, and diagnostics. Degree preferred, FORTRAN a plus. (BAHAMAS)

Applications Programmers

Design, develop, implement, and document real-time, FORTRAN applications software. Specific assignments include: Applications executive, alphanumeric display processing graphics, error analysis and plotting. Requires BSCS and experience. (NEWPORT)

Microprocessor Software

Design, develop, implement, and document real-time microprocessor software systems for embedded controller applications using 8086 assembly language. Software developed and tested using Intel MDS in-circuit emulation (ICE). Requires BSCS, familiarity with assembly language programming (knowledge of 8086 + ICE a plus). (NEWPORT)

Qualified applicants are encouraged to mail resume, including salary requirements to:

RCA Service Company
Department 263232
Aquidneck Industrial Park
Middletown, RI 02840

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HEC

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The Department of Quantitative Methods at H.E.C. Montreal, invites applications for faculty positions in the field of Information Systems.

Applicants should have a commitment to teaching at the graduate and undergraduate levels and interests in both research and curriculum development to broaden and strengthen our emerging program.

An applicant should hold a Ph.D. in Information Systems or related fields or be a candidate for such a degree. (Fluency in french is an asset).

Student group: The total enrollment at H.E.C. is more than 8000, including 974 graduate students.

Area: Montreal is the second-largest french-speaking city in the world, with european flavour and renowned cuisine.

Applicants should send a résumé, not later than March 1st, 1985 to:

Directeur du service du personnel
École des Hautes Études Commerciales
5255, avenue Decelles
Montréal (Québec) Canada H3T 1V6

IMMEDIATE OPPORTUNITIES

IMMEDIATE OPPORTUNITIES CURRENTLY exist for skilled DP professionals with the following skills:

SYSTEM 38 - Requires RPG III experience. Salaries $18-41K.

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DATABASE SPECIALISTS - IDMS, IMS, ADABAS, MODEL 204, and DMS 1100 designers, programmers and DBA's needed. Salaries $[illegible]K.

UNIX/C - Software engineers and systems programmers. Salaries $27-48K.

IBM PROGRAMMER ANALYSTS - COBOL and/or ALC opportunities for programmers and project leaders. Salaries $22-37K.

Positions are available in Northeast, Sunbelt and West locations.

For more information call Tom Arnold collect at (301) [illegible] or send resume to

J. Randall Associates
P.O. Box 1521
Rockville, MD 20850
Attn: Tom Arnold

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Director of Computer Center and Administrative System Coordinator.

Full-time, 12 month Administrative position in a pleasant campus atmosphere. Five years directly related experience required, plus college degree. Responsibilities include managing computer center, coordination and support of administrative system users in the development and use of applications. Wang word processing, and other Wang utilities. Familiarity with both minicomputers, especially the PDP 11/70 and Wang VS 85 and microcomputers is preferred. Please send letter of application, resume and salary requirements by January 11, 1985 to the Personnel Office, Merrimack College, North Andover, MA 01845.

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Duties: Installs, configures, maintains dumb CRTs to PCs and datacomm equipment; network planning/maintenance. Qualifications: BS in Engineering/Computer Science (equivalent field experience considered). Two years Digital Equipment maintenance/support. Training in electronic/datacomm maintenance desirable. Salary: $19-25K. Deadline: January 4, 1985. Letter/resume to: Faculty/Staff Relations, SUNY Brockport, Brockport, NY 14420.

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Professional Employment Manager
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Consolidated

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HDR Systems
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Omaha, NE 68114

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HDR

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City of Billings, Montana

Responsible for the direction of staff, operations, allocation of resources, data base management and directing the selection and development of new applications. Qualified applicants will possess a Bachelors degree in Business or Computer Science with 3-5 years supervisory experience. The successful candidate will have knowledge of data base management, systems analysis, programming; have the ability to evaluate 3rd party programs, microcomputer experience and government experience helpful. Salary range: $29,800-$40,900, plus a full benefit package. Application deadline is 12/18/84. Send resume to:

Personnel Director
CITY OF BILLINGS
P.O. Box 1178
Billings, MT 59103

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The Seebeck Computer Center at the University of Alabama operates a Univac 1100/80, Univac 1100/71, IBM 3081D, and HP 3000 computers for academic and administrative processing. Computing and support services are provided by the Center to University faculty, students, and staff. Applications for the following positions are being accepted through January 5, 1985.

Production Control Programmer/Analyst: Computer Science or related BS degree required. Twelve months experience in COBOL maintenance programming required. $19,885-29,827.

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Remote Site Supervisor/Consultant: Computer Science or related BS degree required. At least three years programming or related faculty position is highly desirable. $20,375-30,563.

Computer Systems Specialist: Degree in a technical field or ninety semester hours plus three years experience in an equivalent position is required. Must have knowledge of internal operating systems concepts. $21,889-32,528.

To apply, or for more information, please contact:

Employment Office
University of Alabama
P.O. Box 6163
University, AL 35486
205-348-7732

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P.O. Box 3928
Modesto, CA 95352

E.O.E.

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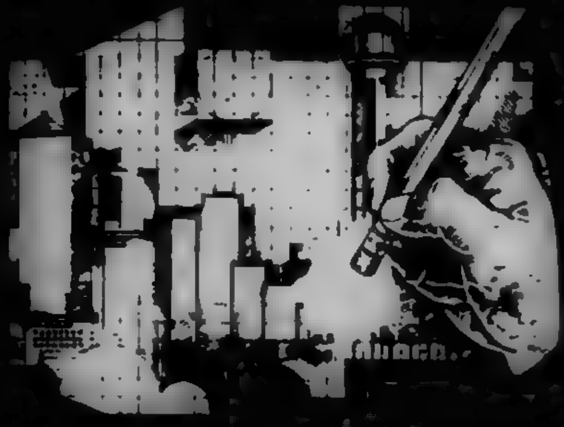

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DATA BASE ADMINISTRATORS: Responsible for building and managing large database systems for VAX and/or IBM hardware systems. Requires a degree plus five years experience structuring, algorithm development and fail safe techniques.

SOFTWARE ENGINEERS: Responsible for designing software to operate digital image/signal processing controllers. Requires BS (MS) EE/CS plus fluency in structured FORTRAN, PASCAL, ADA, and/or Assembly languages. BW, C', O/S, I/O interfaces and/or communications background a plus.

Contact **Ann Olson** for these positions.

PROJECT LEADERS: Responsible for assisting software development managers with definition and implementation of tasks in software project planning, procedures, Unit Development Folders, proposal writing and cost estimation of government-type programs. BSCS, EE or Math with six plus years experience. Experience with VAX, PASCAL and MIL-Spec standards required. These individuals will eventually assume roles in software management.

SENIOR SOFTWARE ENGINEERS: Responsible for implementing the tasks defined below on software development projects. These engineers will report to project leaders. BSCS, EE or Math with six plus years experience in definition, design, development and delivery of software systems, utilizing VAX or Motorola 68000 computers. Required fluency in PASCAL, structured FORTRAN, MACRO-11 or Assembly languages. Experience with Mil-Spec standards required.

SENIOR VMS SPECIALIST: Responsible for definition, development and enhancement of software development environment on VAX systems. BSEE (MS) or CS with seven plus years related experience with VAX systems in PASCAL fluency required. Must be VMS internalist within I/O driver systems. Defense environment background a plus.

Contact **Gary Hunt** for these positions.

SOFTWARE ENGINEER: Responsible for design, coding, and testing of system level software. Position requires minimum of BSCS/or BSEE degree with at least two or more years experience with the VAX 11/750 or 780 and VMS operating systems. Experience in one or more of the following areas is desirable: MIL-Standard documentation, UYK series computers, and real-time signal processing architecture.

BUSINESS PROGRAMMER ANALYST: Responsible for development and maintenance of on-line systems in an IBM OS/MVS IDMS CICS environment. Must have a college degree in Business, MIS or related field, and three to five years experience developing/maintaining on-line systems, supporting Accounting, Manufacturing or Purchasing/Inventory control.

DATA BASE ADMINISTRATOR: Responsible for the installation of IDMS in an IBM OS/MVS environment, for the design and maintenance of the data base and related data dictionary, and for the development and enforcement of standards and procedures for its usage. Requires a college degree and three to five years data base Design/Administration experience.

Contact **Bob Webber** for these positions.

If you are looking for new career challenges, then E-Systems Garland Division could be what you are looking for. We will offer you the opportunity to develop new ideas in a *warm, friendly* atmosphere where people *really* care about you. Qualified candidates are invited to contact the specified Staffing Specialists for those positions they represent, at: **E-Systems, Inc., Garland Division, P.O. Box 660023, Dept. 41LK, Dallas, Texas [illegible]**

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Now, we are assembling a team of talented, dedicated individuals like you to help us meet our newest challenge the development of a **Requirements Data Bank (RDB)** for the Air Force Logistics Command in Dayton, Ohio. The RDB will provide an efficient, effective, and economical logistics and repair requirements forecasting system. Helping to maximize support by the Air Logistics Centers to USAF operational and war readiness objectives. The RDB will be a fully-automated system using large-scale IBM mainframes (3081), MVS, CICS, ADR DBMS & Utilities, Basic IBM Utilities and COBOL.

If you have experience utilizing the above systems (particularly IDEAL & ADR's DATCOM DB), Boeing welcomes the chance to talk with you concerning the many challenging opportunities that will be created for:

- **System Integration & Test Engineers**
- **Logistics Analysts**
- **Software Systems Analysts**
- **Hardware Systems Analysts**
- **Programmer/Analysts**
- **Training Analysts**

We offer a comprehensive compensation program. A Security clearance will be required for these challenging positions. For more information, send resume and salary history, in strictest confidence (principals only) to: Susan Feliciano, Dept RDB-1 7980 Gallows Court, Vienna, VA 22180. An equal opportunity employer.

BOEING COMPUTER SERVICES
A Division of The Boeing Company

DATA RESOURCE MANAGEMENT

Information systems consulting firm with excellent reputation and 'creme de la creme' client base is seeking senior people in Dallas/Ft. Worth and New York/New Jersey. We believe we offer the opportunity of a lifetime for outstanding professionals who combine solid technical depth, business judgment and polish. We need individuals who can grow to partnership within 2 to 4 years and are experienced in:

Designing data architecture models
Developing corporate data policy with senior management
Managing the data administration function
Designing and implementing physical data bases and data dictionaries

Please mail your resume with cover letter and salary history (do not call) in confidence to:

Mr. Arnold Aprahamian, CPA
V.P. - Administration
COLLARD & COMPANY
48 Hastings Road
Berkley Heights, NJ 07922

SR. STAFF ANALYST
• SOFTWARE PLANNING •

EXPERIENCE REQUIREMENTS

- Evaluation & selection of vendor supplied software products.
- Identification, evaluation & recommendation of software tools.
- Primary liaison with major vendors.

From micros to minis to mainframes, we're dedicated to state-of-the-art EXCELLENCE. We offer a competitive salary, 24+ benefits, and PAID RELOCATION. Nashville is a growing Sunbelt capital with no state income tax. Respond in confidence with salary history/requirements.

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SERVICE MERCHANDISE CO.
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Nashville, TN 37202
EOE M/F/H/V

COMPUTER

CAD-D ANALYST

Consulting engineering firm has a Senior key position available in its computer division. Qualified candidates should have minimum 5 years experience in computer applications related to civil engineering and 2 years experience in CAD. BS degree required in Civil/Structural Engineering or Computer Science. Comprehensive benefits. Growth potential. Office located in pleasant surroundings with on-site parking. Salary commensurate with experience.

Send resume and salary history
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Personnel Administrator
EDWARDS and KELCEY, INC.
70 South Orange Ave.,
Livingston, NJ 07039
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Associate Manager of International Software Support needed to coordinate software support functions between co's int'l div & sales systems support grps. provide support to mktg & systems planning in interpreting reqs, specs, & standards regarding software orders, assist in the design of custom products per customer req, ensure prompt determination/resolution of customer complaints & problems, participate in preparation of proposals & tech presentations. Reqs BA Degree in Computer Science/Engineering related & 6 yrs exp in job offered or 5 yrs info/communications systems support exp, or will consider 4 yrs of info/communication systems support managerial exp in lieu of education. Must have int'l managerial exp in a computer environment & software support exp including problem determination/resolution, new product releases, customizing of software & hardware, training of mktg & technical staff. 40 hour work week. $27,600.00 per yr. Apply at Texas Employment Commission, Dallas TX or send resume to Texas Employment Commission, TEC Bldg, Austin TX. Job Order #3863038. Ad paid by an Equal Employment Opportunity Employer.

Programmer/Analyst. Assigned to corporate and government customers to customize, implement and test proprietary business software for implementation on user hardware (IBM 360/370 and 4341). Must spec new system; implement new system (design and implement conversion programs, identify user report requirements and design, develop, code, test and implement new systems reports); and perform module, integration and systems tests, and, using conversions programs, parallel test old and new systems. Forty hours per week. Over time as necessary. $26,000 per year. Must have M.S. in Computer Science and travel to customers sites anywhere in U.S. 90% of time. All programs and systems are custom designed using COBOL executed by IBM - JCL, IDD and IDMS database systems. Send resume to Illinois Job Service, 910 South Michigan Avenue, Room 333, Chicago, IL 60605, Attn: Jaskowiak. Reference # 3860-J. An employer paid ad.

Sales manager computer industry. To manage all branch personnel; assist in direct sales situations, maintain ARTEMIS knowledge; engage in contract negotiations, project and maintain accurate revenue forecasts, make and follow-up customer contacts, coordinate operations support with regional operations staff, monitor and control field expenses, actively participate in management meetings; train new employees, work up new accounts; conduct sales meetings. Requires thorough knowledge of ARTEMIS, at least nine years sales management experience in computer industry and good recent references. Salary $55,000 per year. 40 hours weekly. Contact Texas Employment Commission, Houston, Texas, or send resume to Texas Employment Commission, TEC Building, Austin, Texas, 78778, J.O. No. 3850637. Ad paid for by an Equal Opportunity Employer.

SENIOR ANALYST/ PROJECT LEADER

Holmes Transportation Inc. seeks a Senior Analyst/Project Leader with at least 2 years experience. System 38 and RPG III a plus. New position. Excellent salary and benefits including dental, vision, prescription, and profit sharing. For interview appointment call (617) 872-8592 ext. 115.

Holmes Transportation Inc.
560 Cochituate Road
Framingham, MA 01701
EOE

ASG
Automated Sciences Group, Inc.

SYSTEMS ANALYST... VAX/VMS

ASG is a technically innovative company providing a wide variety of managerial and professional services to the Federal Government and commercial clients, as well as to state and local governments.

Our planned growth has created an opportunity for a talented SYSTEMS ANALYST in our Silver Spring, Maryland home office. The selected person will support a data center and an engineering staff dedicated to research on automotive crash test data. This position also involves the supervision of application development programmers as well as planning, coordination and change control.

Applications under development on VAX 11/780 include graphics, DBMS and engineering analysis software.

Requirements include:

- Experience with scientific applications development
- FORTRAN 77, strong analysis, design and programming skills
- Background in relational DBMS data base design
- Knowledge of graphics software
- Engineering math helpful
- MSCS preferred

This challenging position offers an attractive salary, excellent fringe benefits and a professional work environment in which your expertise will be noticed and rewarded. For complete information about ASG, send your resume with salary history to:

AUTOMATED SCIENCES GROUP, INC.
[illegible] Staffing & Recruiting [illegible]
700 Roeder Road MS 5700
Silver Spring, Maryland 20910
An Equal Opportunity Employer M/F [illegible]

Data Processing Lead Systems Analyst

Norfolk-Virginia Beach Based

Act as Project Leader for Mortgage Loan Group in our Norfolk, Virginia Data Processing Center. Will work on a system serving a portfolio of 150,000 loans. At least five years experience in large mortgage loan systems as a Systems Analyst and/or Project Leader, with knowledge of COBOL, JCL required.

We offer a competitive salary and comprehensive benefits package and the opportunity to grow professionally. Interested and qualified candidates, send resumes and salary requirements, in confidence, to Jo Ann F. Cross, Assistant Vice President, SOVRAN BANK, N.A., Two Commercial Place, First Floor, Royster Building, Norfolk, Virginia 23510. An equal opportunity employer, m/f/hc.

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Need to fill immediate positions in the following areas:

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Need senior hardware/software person with Allied Communications Publication 127 format experience. Must be familiar with store-and-forward message switch for the military. Will evaluate customer specifications for a military switch and do evaluations to vendor responses. Light travel to Europe possible. 3-4 month assignments. Must have active secret clearance.

AN/UYK Systems Software

Need several real time systems software development engineers with experience on AN/UYK-7, -20, or -44. Work in assembly language on real time embedded computer for anti-submarine warfare. Active DOD secret clearance required. 3-6 month assignment.

Please call or send resume today for the above positions.

Computerware Services
A Division of Computerware, Inc.
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Dept. 10
Dallas, TX 75234
(214) [illegible]

BOISE, IDAHO

Boise City, in a premier outdoor recreation area, seeks a

SYSTEM SOFTWARE SPECIALIST

with minicomputer experience and desire to work with a Digital VAX-based system. Starting salary $30,228 to $31,728 plus excellent benefits. Involves technical management of system resources, support to applications development staff, participation in software and hardware selection, and overall supervision of computer operations. For application and position description contact Boise City Personnel, (208) 384-4083. For more information concerning position call Jim Bell, MIS Manager, (208) 384-4322. Application deadline 12/31/84. EOE. M/F/H.

SYSTEM CONSULTANTS

- SAN FRANCISCO BAY AREA -

These positions can bring Large Rewards, High Satisfaction, Major Challenges & Tremendous Growth.

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We're Hiring Data Processing Professionals

Central and South West is a two plus billion dollar electric utility holding company offering competitive salaries, excellent benefits and stable working conditions. Our Information Services Department, as host center, provides services in a multi-company environment.

Our primary system software is MVS/SPI with JES2. Additionally we use TSO/SPF, COBOL ROSCOE, and Command Level CICS. Our data base is IDMS. We were recently chosen to be one of Cullinet's beta sites for their new development software! We use Cullinet's 4th generation languages—ADS/O, OLM, CULPRIT, etc.

Each of our current openings needs people with proven analytical skills and user interface experience in addition to technical knowledge and abilities.

If we're the type of company you are seeking, and your experience is from a similar environment, please send your resume *and* salary requirements to the Employee Relations Department. Principals only.

Programmer/Analyst
(Business Applications)
Typical project assignments include construction project management, land management system, corporate shareholder system, etc.
Will provide technical expertise in system design, problem determination and system maintenance efforts. Should have JCL skills and online experience (CICS, VSAM) plus exposure to data base concepts.

Sr. Programmer/Analyst
(Engineering Applications)
Multi-project assignments offering multi-company exposure will include CAD/CAM, VM/CMS, transmission design, etc.
Will provide scientific/engineering expertise in system design and implementation efforts. Should have prior scientific/engineering application experience plus IDMS experience.

Programmer/Analyst
(Engineering Applications)
Initial assignment to the mining information management project will result in the development of a total, stand-alone system using state-of-the-art technology.
Will provide online and data base technical expertise in system design and problem determination efforts. Should have related technical skills developed from manufacturing related assignments. IDMS, ADS/O experience important.

Central and South West Corporation
P.O. Box 220164 • Dallas, Texas 75222

Central and South West Corporation is one of the nation's leading electric utility systems, having annual revenues of more than $2 billion. With corporate headquarters in Dallas, CSW serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

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COMPUTER GRAPHICS DEVELOPMENT

WYETH LABORATORIES, a leading pharmaceutical firm, is seeking an experienced individual with a background in computer graphics software development to work in support of clinical research applications. This new high-level position is now available with our Biomedical Data Systems group in Radnor, a highly attractive Main Line Suburb of Philadelphia.

Responsibilities of this position will emphasize systems analysis and computer programming in support of new and existing software systems. Using state-of-the-art hardware, the individual will coordinate all aspects of graphics support with medical researchers (physicians, medical writers, etc.) including development of new display techniques, assessment of new technology, and administration of personnel training. Supervision of one junior staff member will also be required.

Applications will be developed using the TELL-A-GRAF and DISSPLA graphics software packages in conjunction with PL/1. Knowledge of these software packages is required as is experience in developing applications systems on large-scale IBM computers. The successful candidate must be results-oriented and possess effective communications skills. Educational requirements include a Bachelor's degree in mathematics, computer science, or the sciences. An advanced degree (Master's level) is highly desirable.

This position offers an excellent starting salary and includes an attractive package of fringe benefits. Qualified individuals are invited to apply by forwarding a resume to: Personnel Department.

Wyeth Laboratories, Inc.
P.O. Box 8299
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IDMS 30k - 50k

A young and growing consulting company needs your 2+ years of IDMS expertise to support several development projects starting early 85 in western states with these skills:

SYS. PROG. with solid MVS background to install, maintain & fine tune IDMS.

DBA for logical & physical database design, maintain IDD & code schemas. Must be a good communicator. 3+ yrs IDMS.

ADS/O ANALYST to design & spec maps & dialogs for application systems. 3+ yrs ADS.

APPLIC. PROG. experienced in structured coding & debugging of COBOL, PL/I & ADS/O applications for DB/DC environments.

Work for us as a consultant or we can place you in a permanent position with one of our clients, your choice. We specialize in IDMS projects and offer competitive salaries, health & life insurance, sick leave & vacation, education plan, profit sharing and liberal expense benefits for our employees. We also contract with indiv who have a good track record. 3+ yrs IDMS and 5+ yrs in DP.

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Meral, Inc.
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Issaquah, WA 98027-0196.
206-746-0401

(no agencies please)

SYSTEMS TECHNICIAN

The Modesto Bee, a 70,000 circulation, central California newspaper is in need of an individual to begin in-house maintenance of new Tandem computers and peripherals.

This position requires 4+ years technical experience and the proven ability to independently diagnose and repair computers and all peripherals. The Modesto Bee offers competitive salary and benefits along with an excellent location for a variety of recreational activities.

Submit application no later than January 14, 1985.

THE MODESTO BEE
Personnel Office
1325 H Street
P.O. Box 3928
Modesto, CA 95352

E.O.E.

Women and Minorities encouraged to apply.

COMPUTER NETWORKING

The Los Alamos National Laboratory has several challenging career opportunities for Computer Scientists/Engineers in the areas of computer networking.

Scope of Work

Design and develop network control and data communication software. Specific areas include network gateways, local area networks, high speed packet switching, terminal concentrators, secure communications.

Requirements

Demonstrated professional experience in computer networking or operating systems. These positions are for individuals who are able to work and communicate effectively in a team effort, require a minimum of supervision, and are highly motivated. B.S. degree in computer science or equivalent education and experience will meet minimum educational requirements.

Position Offers:

Competitive salaries and fringe benefits, including 24 days annual vacation; sick leave; paid holidays; medical, dental and retirement programs.

The Los Alamos National Laboratory is located in the mountains of northern New Mexico, at an elevation of 7400 feet. The living is uncrowded, casual, and pollution free. The sunny climate is superb; cool summers and mild winters. Los Alamos has an excellent school system and ample recreational opportunities.

To apply, send resume, in confidence, to:

Tim Merrigan, DIV 85—AM
C-5, MS B255
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

U.S. Citizenship Required.

University of California

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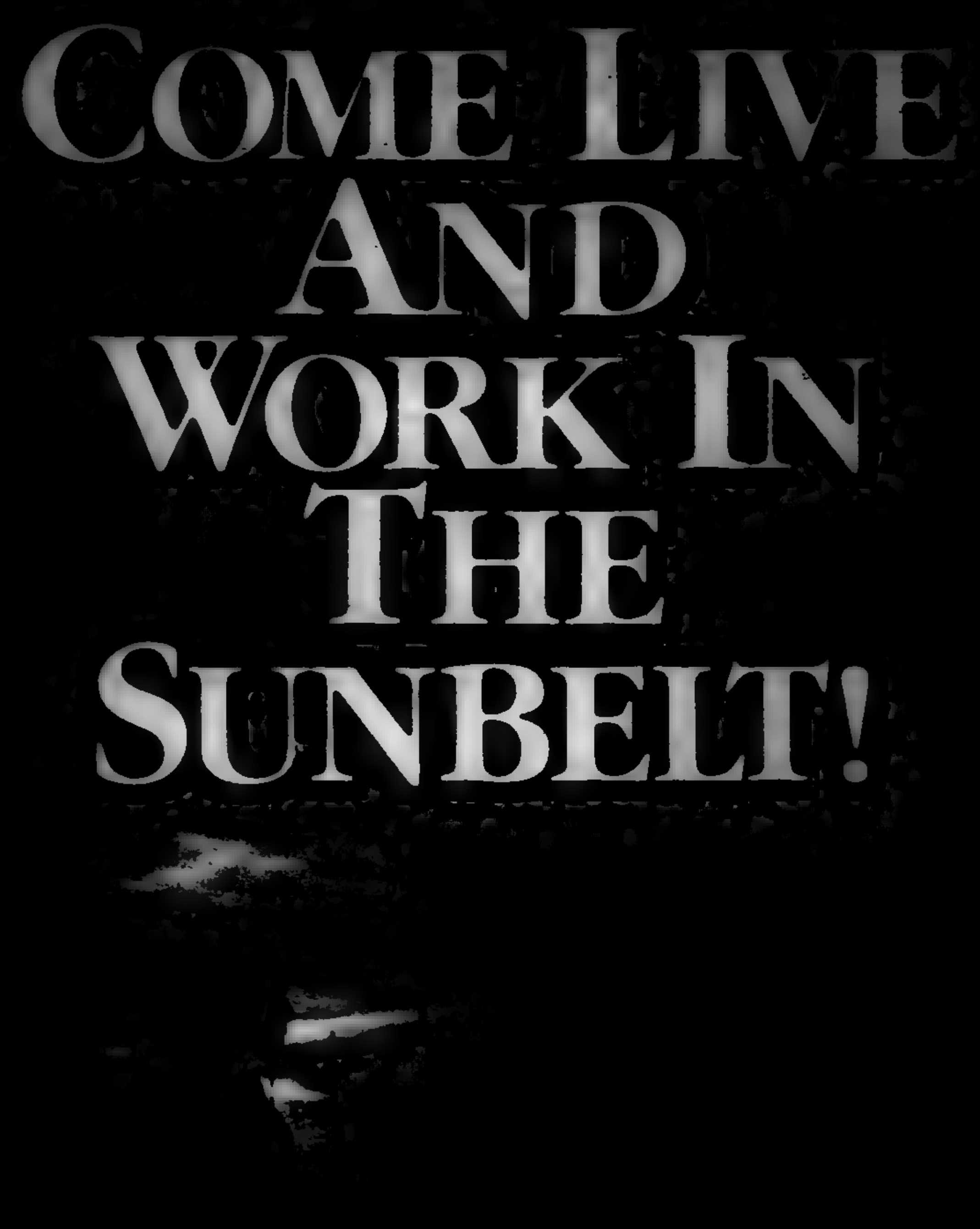
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Besides a warm and inviting climate year-round, you'll discover that our Sunbelt clients have almost any kind of position available in virtually every kind of leading edge computer environment. In addition, you'll find that the Sunbelt also offers:

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As the world's largest recruiting firm devoted exclusively to the computer profession, we can help you make your best move yet. Call today. If you're unable to call, write:

Dave Smith
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Department C6
P.O. Box 7100
Mountain View, Ca 94039

SOUTHEAST

(Florida, Georgia, Atlanta, Louisiana South Carolina)

Consultants—Big 8. Prestigious Big 8 CPA firm seeks experienced computer professionals for its Southern Florida Management Advisory Services Group. Broad business experience a plus. Excellent growth opportunity. To $34,000.

Programmer Analysts—Learn IMS. Major national firm based in great Florida vacation town seeks professionals to work in its state-of-the-art IBM 30XX (MVS) environment. Two years COBOL programming experience required. IMS training provided. To $30,000.

IMS Data Base Analyst—Coral Gables, Florida. Major international bank seeks IMS Data Base Analyst experienced in COBOL and structured analysis. Excellent internal training program provided. To $40,000.

IMS Systems Programmer—Major national corporation seeks a senior IMS internals Systems Programmer. Experience in performance tuning and VSAM sought. Ft. Lauderdale. To $39,000.

Programmer Analysts—Many openings. Large international Florida-based company seeks Programmer Analysts to develop financial applications in a VAX 11/780 environment. A minimum of two years experience is required using COBOL. To $28,000.

Programmer Analysts—Learn OS/MVS. Miami based corporation will be converting from DOS/VSE to OS/MVS. Currently seeking DOS COBOL Programmers looking to learn OS/MVS. To $26,000.

Systems Programmer—Management Potential. South Florida based corporation with large IBM mainframe seeks an OS/MVS Systems Programmer. Position will lead to management. To $46,000.

Senior Programmer Analysts—Northern Florida. Large Florida utilities company seeks data processing professional to lead in the development of financial applications. IBM/OS, COBOL and CICS experience sought. To $35,000.

Series 1—RPS Analyst. Atlanta-based company seeks an experienced Series 1 RPS professional to develop a new point of sale network. Company has purchased 1000 Series 1 units to implement this dynamic project. Position requires two years programming experience in an RPS environment. To $37,500.

Data Base Sales Representative—Move up to Branch Manager. Rapidly growing manufacturer of intelligent data base machines seeks a proven sales professional to start and manage an Atlanta branch. Excellent growth opportunity. Estimated first-year earnings $90,000 with a $40,000 base salary.

Software Sales Representatives. International manufacturer of CPA industry software with 2000 installations in all 50 states is expanding its Atlanta sales force. Position requires two years of quota measured sales experience with small business computers and a general knowledge of fundamental business financial applications. First year compensation to $65,000.

IMS Applications Analysts—We'll Relocate. Prestigious Atlanta software development organization needs IMS DB/DC Analysts for a major national project. Join a very professional peer group and enjoy a complete relocation package to metro-Atlanta. Two years of specific DB/DC expertise sought. To $38,500.

Data Base Analyst—Lead DBA Group. Join an international shipping company based in New Orleans. Two years experience with DBGENS, BACKUP, RECOVERY, and MAINTENANCE sought. TOTAL database a plus. Excellent benefits. To $38,000.

OS/MVS Systems Programmer—Great Relocation Package. Fortune 500 Energy company with corporate headquarters located in New Orleans seeks a Systems Programmer. Three years experience in OS systems programming preferred. A comprehensive benefits package and relocation policy including third-party home purchase program is available. To $46,000.

Banking Programmers and Analysts. One of Atlanta's largest financial institutions seeks professionals to design and implement a major ATM project in an OS/MVS, TSO environment. Team members will work directly with top management to define, plan, schedule, and implement this dynamic system. One year of banking data processing experience needed. To $36,500.

Communications Specialist—Super Benefits. Atlanta division of a world renowned manufacturer of aircraft is increasing its technical support staff in communications. Three years of installation and maintenance of ACF/VTAM, ACF/NCP and BSYNC SDLC helpful. Network planning and debugging is preferred. Benefits include a complete relocation package and comprehensive fringe benefits. To $40,000.

Consultant—Partner Potential in National CPA Firm. Firm with heavy concentration in medium-sized client firms seeks Consultant to expand its Atlanta practice. Bachelor's degree, excellent communications skills, and a broad industry reference base support. Will gain a broad exposure to a variety of computer hardware applications. Career path to partner. To $37,500.

CICS Analysts—Move Into Development. Well-known Atlanta-based service organization is increasing its Analyst staff to implement a major on-line development. Career growth opportunity provides "blue chip" benefits, top salaries, internal education and a recession-proof industry. Two years CICS applications work in a medium to large scale IBM environment sought. To $32,500.

IMS Applications—Train for DBA. Major southeastern service firm is offering the right professional a career path to Data Base Administrator. Will join two current DBAs in a major relational data base endeavor. Two years of heavy IMS applications experience and good communications skills sought. Beautiful surroundings in South Carolina and a complete relocation package are included. To $32,400.

Manufacturing Systems Analyst. South Carolina manufacturer of heavy equipment seeks an Analyst who understands and relates to manufacturing users. Three years of manufacturing background in an IBM OS environment needed. IMS DB/DC knowledge, MRP and Process Control are definite pluses. Nice rural location close to a major suburban vicinity. To $34,000.

Banking Programmer Analyst—Great Location. Join the processing shop of one of the leading banks in New Orleans. Excellent suburban data center location for a P/A with SHAW Commercial Lending Package experience. Large scale multiple IBM 308X systems under OS/MVS utilizing CICS and COBOL. To $28,500.

Programmer Analyst. Leading 2 billion dollar bank seeks an IBM OS/MVS COBOL Programmer with commercial lending systems background. SHAW Package experience desired. State-of-the-art shop, major expansion. New Orleans. To $29,000.

Senior Analyst Programmer—New Development. Major IMS development project offers excellent opportunity for a Programmer with a minimum of three years COBOL DB/DC experience. Suburban New Orleans location, excellent relocation and benefits. To $35,500.

Programmer Analyst—Major Development. Fortune 500 company in Atlanta seeks individual with RPG III, System 38 experience to participate in major new development projects. To $32,000.

Programmer Analyst—Banking. Leading Florida financial institution has multiple openings to develop banking applications in state-of-the-art IBM environment. CICS knowledge preferred. To $30,000.

Merchandising Systems Analyst—High Visibility. Major retailer seeks Analyst with three or more years experience in merchandising systems in a major retail environment. Large development projects, data base environment. Full relocation to Baton Rouge. To $32,000.

Project Leader—Communications Systems. Opportunity to supervise a staff of five, supporting IMS/DC, CICS, NCP/VTAM in multiprocessor MVS/XA environment. Requires good managerial and interpersonal skills. To $42,700.

RPG Programmer Analyst—Increase Salary Every Six Months. Largest privately owned drug store in the U.S.A. with corporate headquarters in New Orleans seeks RPG P/A with accounting experience. Working knowledge of DOS/VSE and CICS is desired. Excellent benefits package, and six month reviews. To $30,000.

SOUTHWEST

(Arizona, Texas, Oklahoma, Nevada, Utah)

IMS Programmer Analysts—Rapid Growth. An expanding Houston financial institution is adding to staff due to increased market activity. They seek several individuals with banking application development experience with IMS DB/DC exposure. Hogan a plus. To $38,000.

Financial Business Analyst—Scottsdale Arizona. Major division of Fortune 500 company seeks Systems Analysts for new financial applications development. B.S. in Accounting with MBA preferred. Strong financial systems experience and training in IMS DB/DC and Structured Methodology provided. To $43,000.

Senior Database Analyst—High Visibility. Progressive Houston-based firm seeks senior with IDMS skills. Opportunity for great management visibility. Will be groomed to direct the activities of the DBA team. Heavy IDMS DB/DC skills required. To $48,000.

Communications Software Specialist—Satellite Communications Development. Develop software for a new service offering to the energy exploration industry. Will lead the team in developing state-of-the-art data communications technology. Requires Data Communication software experience on 16 Bit Micros. Some international travel! To $65,000.

Programmers/Systems Analysts—One of the Best. Major growth is being experienced by this exceptionally well-run Houston organization. Opportunity exists for degreed professionals with less than three years of total experience. Requires OS/COBOL experience. Will learn SAS, FOCUS, TELL-A-GRAF and more. Multiple locations. To $40,000.

Programmer Analyst—Energy. Large petroleum corporation with headquarters in Tulsa seeks a professional with two years of OS COBOL and accounting applications experience. CICS and IDMS experience preferred. To $30,000.

Systems Programmer—Learn MVS. Oklahoma corporation seeks qualified Systems Programmer with a minimum of three years experience as Systems Programmer. State-of-the-art environment. To $46,000.

Programmer Analysts—Data Center Expansion. Manufacturing corporation with headquarters located in Tulsa suburb seeks Programmers for its small but growing data processing center environment. Three years experience with CICS background desired. To $32,000.

EDP Auditor—New Position. Rapidly expanding Oklahoma corporation seeks a professional with a minimum of one year EDP auditing experience. To $30,000.

Marketing Representative—Management Potential. Major national corporation located in Tulsa seeks an experienced data processing Marketing Representative to cover a large, lucrative territory. Career path leads to sales/management. Estimated first-year earnings $45,000.

Data Base Analyst—New IBM System. Oklahoma-based corporation seeks a professional for its state-of-the-art IBM data center. A minimum of three years IDMS design experience preferred. To $45,000.

Programmer Analyst—New Development. Industry leader located in rural Oklahoma seeks a professional for its DOS/VS and CICS environment. One year of DOS COBOL experience desired. To $24,000.

Programmer Analyst—Unique Benefits. Major transportation corporation seeks professionals with PL/1 coding experience and IMS applications exposure. Tulsa location. To $35,000.

IMS Programmer Analysts—Rapid Growth. An expanding Houston financial institution is adding to staff due to increased market activity. They seek several individuals with banking application development experience with IMS DB/DC exposure. Hogan a plus. To $38,000.

Lead Development Analyst—Relocation Package. Outstanding opportunities are available to participate in a major software development effort with this Houston-based firm. Three-plus years of COBOL or FORTRAN experience using PRIMOS sought. Will provide relocation assistance. Rural location. To $40,000.

Senior Database Analyst—High Visibility. Progressive Houston-based firm seeks senior person with IDMS skills. Opportunity for great management visibility. Will be groomed to direct the activities of the DBA team. IDMS DB/DC skills required. To $48,000.

Lead Development Analyst—Relocation Package. Outstanding opportunities are available to participate in a major software development effort with this Houston-based firm. Three-plus years of COBOL or FORTRAN experience using PRIMOS sought. Will provide relocation assistance. Rural location. To $40,000.

Microcomputer Development—Unique Projects. Dallas-based company seeks several Microcomputer Systems Software Programmers to participate in leading edge systems. Assembly or 'C' required. To $38,000.

Programmer Analyst—New DB/DC Projects. Corporate staff of a rapidly expanding Dallas Fortune 500 organization seeks experienced professionals with strong OS/COBOL background. All applications projects are new and involve IMS DB/DC. To $35,000.

Senior Systems Analyst—Move Into Management. Large financial institution in Dallas seeks banking systems design professional with four or more years experience to be groomed for promotion. To $40,000.

Programmer Analyst. Big 8 firm looking for person with OS/COBOL/CICS/VSAM and solid developmental skills for a high-visibility product. Dallas location. To $37,000.

Senior Analyst—Exposure to Senior Corporate Management. Large financial services organization in Dallas seeks Internal Systems Consultant. Banking systems background preferred. To $46,000.

ALC Programmer—Dallas Location. Leading software development firm in Dallas seeks a professional to develop data base software on IBM system. CICS is preferred. To $40,000.

Systems Programmers. Two IBM OS firms in Austin are seeking Systems Programmers with MVS internals experience. VM or CICS experience a plus. To $45,000.

Programmer Analyst. Person with two or more years insurance systems experience sought. IBM environment in a fast-growing, Austin-based company. To $35,000.

Systems Programmers. San Antonio-based firm seeks person to develop new operating systems and utilities. State-of-the-art technology, for both civilian and military applications. Language experience sought is Assembler and/or "C." To $40,000.

Manager of Systems Software. Nationwide firm seeks a seasoned software developer with heavy UNIX internals to manage their micro software development. Forth Worth location. To $60,000.

Senior Online Programmer Analyst—New Expansion. National computer service company needs strong OS COBOL or ALC Programmers with on-line experience and leadership skills. Rapidly growing firm. To $43,000.

IMS Database Analyst—Growth Opportunity. Prestigious Phoenix-based company seeks experienced IMS DBA. Extensive logical and physical design of multiple databases, DBD, PSB gens, standards, security and back-up/recovery experience sought. Excellent career growth potential. To $43,000.

Communications Systems Engineer—World-wide Travel. Phoenix-based company requires individual to design world-wide data/voice communications network. Requires extensive exposure to IBM, SNA/SDLC, X.25, and network design. Exceptional ground-floor opportunity. To $50,000.

Assembler Programmer Analysts. Phoenix-based data center is expanding to handle the transaction services for travel industry. Needs three qualified Programmer Analysts to develop new systems and on-line system requirements and procedures. Excellent benefit package and travel discounts through corporate plan. Will consider training Senior Assembler Programmer Analysts in ACP systems. Cross training in IMS applications available. To $45,500.

Microprocessor/UNIX/C Systems Developer. Phoenix-based manufacturer of integrated hardware and software systems based on 8086 and M68000 products seeks Senior Software Engineers with five years experience in development of real-time system executives for micro systems. Strong Assembler and one high level language (PASCAL or C) preferred. B.S.E.E. or extensive experience with hardware design required. M.S.E.E. a plus. This company is a separate division of a Fortune 500 company based in Phoenix. Continued business growth of over 30% per year. To $41,000.

Senior Programmer Analysts—Multiple Openings. Major financial institution based in Las Vegas is planning new development expansion in 1985. Need experienced Programmer Analysts familiar with the banking industry who can perform analysis and specification of new systems. Will also be involved in the development cycle through implementation. Excellent professional growth opportunity with the ability to live in the suburbs and enjoy Lake Mead and surrounding outdoor sports activities. To $39,000.

Programmer Analyst. Expanding Fortune 500 firm plans OS/MVS financial systems development using COBOL. They seek a Programmer Analyst with three or more years experience. CICS training provided. Excellent career prospect in Albuquerque with low cost of living and no commuting problems. To $28,000.

New Development Group—Many Positions. Fortune 500 vendor in Phoenix is expanding on-line applications systems development group. Will develop new software products. Positions available for all levels. COBOL and Systems Programmers and Communications Specialists sought. Extensive training. To $42,000.

Data Base Analyst—IMS or IDMS Design. Leading firm seeks person to provide technical support both internally and to clients. Currently developing entirely new version of existing software in new area. Beautiful Texas hill country location. To $45,000.

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Responsibilities will include estimating and designing enhancements, programs or functions from user requirements, as well as researching and resolving programming problems and investigating, designing and implementing problem solutions.

Candidates for all of the above positions must have a minimum of 2-5 years programming experience in a COBOL, CICS, IDMS, OS/MVS environment. Computer Science degree preferred. Strong analytical and interpersonal/communication skills are essential.

United offers salaries commensurate with experience, dual career paths, and frequent salary reviews, as well as pass/reduced fare air travel privileges. For confidential consideration, send a resume, including salary history, to: **Professional Employment/EXOPX-HC, United Airlines, P.O. Box 66100, Chicago, IL 60666.** *Equal Opportunity Employer.*

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Southern California

A major California manufacturing/engineering firm is seeking a highly qualified TOPS-20 Systems Programmer who will be responsible for generation, maintenance and troubleshooting of TOPS-20 operating system and associated systems programs. Position will provide CAD technical support, interface and multi-vendor network communications support. Must have DEC 20 assembly skills. Multi DEC CPU environment to include DEC 20's, VAX 11/790's and a VAX 730. Cross training available. 1986 migration to next generation CPU architecture planned. This is a highly technical engineering environment. Candidates must have a high degree of technical motivation and state-of-the-art curiosity. 3-5 years TOPS-20 systems programming required. BS degree in technical sciences highly desirable. Relocation package available. Salary up to 45K. Interested candidates forward resume to Box CW-B4104, Computerworld, Box 880, Framingham, MA 01701.

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We are currently seeking a results-oriented professional interested in joining one of the most technologically advanced IBM shops in Columbus.

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This position will oversee and direct the activities of the CICS and IMS DB/DC Systems Programmers. This group manages the on-line systems, provides technical support of the on-line systems software and related products. They also become involved with Information Systems teams by evaluating on-line application systems during development, and handling profiles of on-line applications systems prior to production.

The incumbent will possess 4-5 years of on-line experience and will have "up through the ranks" experience with IMS DB/DC systems generations, performance tuning and internals. Prior exposure to CICS would be helpful.

To learn more about the Gold Circle challenge, our progressive compensation program that includes an excellent relocation package and the exciting, affordable life-style in a new era of growth for Columbus, our state's largest city, CALL Julie Smith COLLECT at (614) 459-3589 or send your resume and salary history to: GOLD CIRCLE STORES, Executive Placement, Dept. L, P.O. Box 63, Worthington, Ohio 43085.

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We have been retained by a prestigious client to recruit, evaluate and submit candidates for the following openings:

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* PROGRAMMERS *

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You'll also find a salary/benefits package that's fully commensurate with your experience...and opportunity for continued career growth. Qualified individuals are invited to forward resume, with salary history and requirements, in professional confidence to: Mr. C.E. Willard, Allied Corporation, Chesterfield Plant, P.O. Box 831, Hopewell, Virginia 23860.

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[illegible]
968 Albany-Shaker Road
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Software Design Engineers with experience in microprocessor operating systems, C compilers and UNIX operating systems internals.

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Four-Phase offers competitive salaries and a comprehensive benefits package including profit sharing, dental insurance and tuition reimbursement. If you are one of the innovators of today, we invite you to send your resume to: **Professional Recruiter, Motorola, Four-Phase Systems, Phoenix Operation, 3013 S. 52nd Street, P.O. Box 22345, Tempe, Arizona 85282.**

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Employment Office
North Carolina Memorial Hospital
Chapel Hill, NC 27514
(919) 966-8224
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SYSTEMS ANALYST

40 hours per week, 8 am to 5 pm. Salary: $29,080 per year. Requirements: Bachelor of Science in mathematics or computer science and 2 years experience in the position or 2 years experience as Programmer Analyst; 1 year experience of RSX-11 "real-time" operating system and Fortran 4 programming language included within the experience requirement. Duties: analyze scientific procedures and problems to refine data and convert it to programmable form for "real-time" electronic data processing requirements; detail mathematical operations to be performed by comprehensive computer programs, conducting studies pertaining to development of new information systems to meet current needs for scientific projects; prepare technical reports and instructional manuals for establishment and functioning of complete "real-time" operational systems.

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Data Processing

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SYSTEMS ANALYST and ANALYST PROGRAMMERS

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Please forward a resume outlining your role in systems development efforts and your current salary to:

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108-1
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TPF/ACP

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Systems Developers

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PROGRAMMER/ANALYST

Design code, modify, test, document, implement programs. Communication skills required. Must be team oriented. Interested in remaining state of art (continuing education & OJT provided). Must think creatively in our business environment. Good potential for advancement. We are an expanding DP shop, currently building a foundation for an integrated data base system. Challenging & rewarding opportunity. Degree in business DP or equivalent experience (1-3 yrs). Manufacturing's plus. IBM S38 - Good salary and benefits.

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BarclaysAmericanCorporation is located in Charlotte, North Carolina and offers an excellent salary, comprehensive benefits and relocation assistance. For confidential consideration, send your resume including your salary expectations to:

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  - Systems Programmers (MVS/VTAM/NCP)
  - Systems Analysts/Programmers (DB/DC)
  - Human Factors

ADR offers a comprehensive benefits package, liberal relocation assistance and compensation fully commensurate with your experience. For consideration, please forward your resume or call **Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.**

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- Manage 70 data processing professionals
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- Develop several large new systems in 1985-86
- Implement a user oriented fourth generation environment
- Manage an active Information Center

The successful candidate must have held progressively responsible positions, with a minimum of 3 years of management experience and 3 years of professional experience in data processing, systems analysis, or management consultation. A baccalaureate degree in Computer Science, Business Administration, Engineering, Mathematics, Quantitative Methods or related field may substitute for 1 year of the required professional experience.

The ideal candidate should have practical experience in the following areas:

- Managed a fourth generation data processing environment
- Successfully managed large multi-year projects
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Salary range: $46-$54K plus attractive vacation and benefits package. Please mail cover letter and resume, including the names and phone numbers of at least 2 recent job related references to:

Department of Administrative Services
Attn: Systems Engineering Director
Recruitment Panel
400 Yesler Building, 5th Floor
Seattle, WA 98104

(Principals Only)

Applications must be received no later than December 28, 1984.

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We know that December is a difficult month in which to make a career move, but it is an excellent month to reflect on your career goals and make plans for the new year. Our recruiters will begin interviewing now for a variety of exceptional career opportunities that will be available in early 1985.

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Our systems development area needs someone who can direct and prepare project plans, insure project feasibility, provide technical support and assist project staff. This candidate should have 6 years experience in areas of programming, systems analysis, project control and management. Experience in a hospital environment is a plus.

SYSTEMS ANALYST II

This position analyzes and evaluates existing or proposed systems and provides guidance to user areas in the application of systems analysis to business and medical problems. This candidate should have 2-3 years experience in systems analysis and be knowledgeable of all processes involved in the design of the utilized business and medical systems.

INSTALLATION SPECIALIST

You'll identify and recommend information system educational needs, then assist in the development and preparation of training programs/workshops needed to insure effective and efficient installation of systems and enhance staff and user skills. Strong interpersonal skills are essential as you work closely with Information Systems personnel to insure the implementation of systems within specified time frames and a thorough understanding of applications being developed for end users. A background in information systems implementation is essential as you participate in a variety of special projects providing support to FSI and other information systems personnel. A degree in Computer Science, Business, Hospital Administration or equivalent experience and previous exposure to education related to information systems training are required.

PROGRAMMER ANALYST III

The qualified candidate will have a minimum of 4 years experience in programming analysis and design. Health care a plus. Software experience required: MV, Panvalet, PL/1, DL/1 and CICS. PCS/ADS would be helpful. Written and verbal communication skills are essential for coordination of projects.

PROJECT LEADER - PROGRAMMING

Our programming services area has a key position available for an individual who can direct the programming and installation of new computer and manual support systems developed in-house and purchased from software vendors. Reporting to the Manager, Applications Programming, you will provide direction for Programmers and Programmer Analysts assigned to project implementation. A Bachelors degree in Business Administration, Computer Technology or a related area, 5-6 years experience in the analysis, design, programming and development of complex systems and good interpersonal skills are required. Previous project leadership experience is preferred.

SYSTEMS PROGRAMMER II

You'll be responsible for installing and maintaining various systems software to insure effective implementation, performance and interaction with other components within the operating system (MVS, VTAM, CICS and DL/1 environment). You will monitor and analyze system performance and perform appropriate technical applications to tune systems software, and assist in the development or enhancement of documentation standards and procedures. To qualify you should possess applicable technical education or 2-4 years data processing experience in areas such as applications programming or computer operations. Prior work experience (1-2 years) as a Systems Programmer within an IBM installation is preferred.

We provide excellent starting salaries, complete benefits and real opportunities for professional growth. While you establish your career objectives for 1985, learn more about Evangelical Health Systems by sending your resume in complete confidence:

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ACP SYSTEMS PROGRAMMER/ PROGRAMMER ANALYST

Position open for an ACP Systems Programmer/Programmer Analyst, electronic data processing. Duties include: Converting symbolic statements of administrative data for business problems to detailed logical flow charts for coding into computer language. Analyzes all or part of work flow chart or diagram representing business problems by applying knowledge of computer capabilities, subject matter, algebra, and symbolic logic to develop sequence of program steps. Confers with supervisor and representatives of departments concerned with program to resolve questions of program intents, output requirements, input data acquisition, extent of automatic programming and coding use in modification, and inclusion of internal checks and controls. Writes detailed, logical flow charts in a symbolic form to represent work order of input, output and arithmetic and logical operations involved. Converts detailed, logical flow charts to language processable by computer

Three years experience in airline control programming (ACP) environment required. Ability to work well in a group situation is a must. Applicant must also be familiar with CMS programming systems. Minimum salary to be $25,000.00 per year for a 40 hour work week, however, additional salary up to $44,000.00 per year will be paid if applicant possesses additional experience and a college degree

Interested applicants should contact the Oklahoma Employment Security Commission, 3105 East Skelly Drive, Tulsa, Oklahoma 74105. Phone (918) 749-6881. Refer to job order #080818

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CICS SYSTEMS ANALYSTS & PROGRAMMERS

Saudi Arabia

SCECO

Saudi Consolidated Electric Company (SCECO) is responsible for the generation, transmission and distribution of power in the Eastern Province of Saudi Arabia. There currently exists a need for qualified **degreed** EDP professionals to work in SCECO's modern computer center in Damman, Saudi Arabia. There currently exists the following opportunities within the organization:

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CICS SYSTEMS PROGRAMMER

Experience with installation and program support of CICS under MVS/SP with knowledge of CICS internals and externals

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Experience with IMS/VS, DL1, use of data dictionary, DBA functions, data base design, reorganization, tuning, backup and recovery.

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tmsi

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Contact:

Julie Halliday, Employment Mgr.
SUTTER COMMUNITY HOSPITALS
2800 "L" STREET, SUITE 104
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EOE M/F/H

Data Processing

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City of Milwaukee

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DIRECTOR, Administrative Computing Services

Old Dominion University is engaged in an ambitious five year plan for administrative computing, implementing new on-line, data base systems in all major administrative areas. An urban institution with emphasis in Science, Business and Engineering, ODU's FTE enrollment is 11,200.

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EOE

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To apply, please send your SF-171, OPM Form 1170 and OPM Form 1203X to: **Personnel Office, Internal Revenue Service, National Computer Center, P.O. Box 1208, Martinsburg, West Virginia 25401.** Application material may be obtained from any Job Information Center, with the Office of Personnel Management or any Federal Personnel Office. U.S. Citizenship is required.

CLOSING DATE: January 10, 1985

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EOE

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COORDINATOR FOR ADMINISTRATIVE COMPUTER SERVICES

UNION COLLEGE OF NEW YORK

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George R. Richards, Director of Personnel
Union College, Schenectady, N.Y. 12308

PROGRAMMER/ANALYST

Heritage Publishing, the nation's number one producer of special events publications and a leader in telemarketing has two openings for experienced system/36 programmers. Successful applicants will have two years S/36 experience using RPG II and a strong background in accounting and/or a printing/publishing/typesetting environment. Good skills in an interactive/communications environment also a plus.

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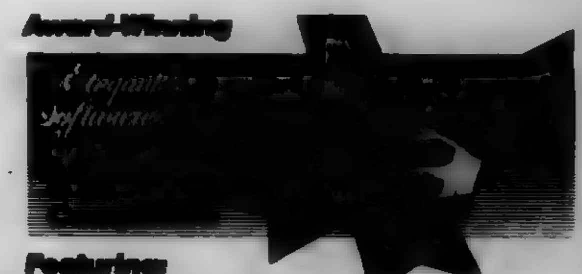

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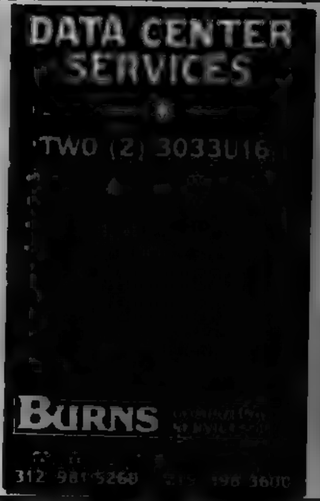

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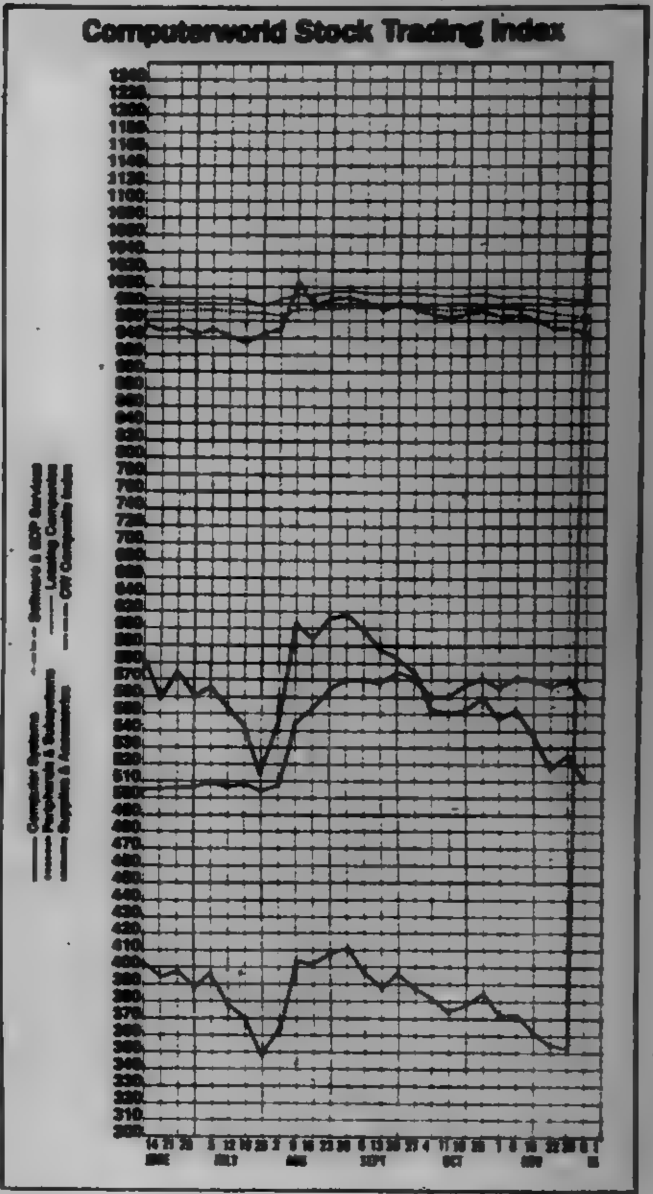

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by
TRADE QUOTES, INC
Cambridge Mass 02139

CLOSING PRICES WEDNESDAY, DECEMBER 5, 1984

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	6- 24	5 3/8	-1 1/8	-20.7
O	ALTOS COMPUTER SYST	7- 21	7 1/8	-1 1/8	-13.6
A	AMDAHL CORP	10- 30	11 1/4	0	0.0
O	APPLE COMPUTER INC	18- 63	26 1/8	+ 1/4	+0.9
N	AT&T	16- 21	19 7/8	+ 1/4	+1.3
N	BURROUGHS CORP	44- 58	56 5/8	- 1/4	-0.4
O	COMPAQ COMPUTER CP	4- 13	4 1/8	- 3/8	-8.3
O	COMPUTER AUTOMATION	4- 17	6 1/8	- 1/4	-3.7
A	COMPUTER CONSOLES	6- 26	8 1/8	- 1/8	-1.5
N	CONTROL DATA CORP	25- 62	30	+ 3/8	+1.0
O	CONVERGENT TECHNOL	5- 41	6 3/4	-1 1/8	-14.1
N	CRAY RESEARCH INC	38- 70	60	-3 1/8	-4.9
O	DAISY SYSTEMS CORP	14- 39	24 3/8	-1 1/4	-4.9
N	DATA GENERAL CORP	37- 70	53 3/8	+ 7/8	+1.6
N	DATAPOINT CORP	14- 38	17 1/8	+ 1/8	+0.7
N	DIGITAL EQUIPMENT	84-125	104 3/8	-4 1/8	-3.8
A	ESCO INC	12- 16	14 3/8	+1	+7.3
N	ELECTRONIC ASSOC.	7- 16	3 1/4	- 1/4	-7.1
N	FLOATING POINT SYST	12- 44	18	+ 1/8	+0.7
N	FOXBORO	25- 47	28 3/4	- 3/8	-1.3
O	GENERAL AUTOMATION	4- 10	5 7/8	+ 3/8	+6.8
N	GOULD INC	24- 44	29 1/8	-2 3/8	-7.5
N	HARRIS CORP	23- 50	28 1/8	-1 1/4	-4.2
N	HEWLETT-PACKARD CO	31- 48	33 3/4	- 1/2	-1.5
N	HONEYWELL INC	40- 69	57	- 5/8	-1.0
N	IBM	100-134	117 7/8	-5 1/8	-4.2
O	IPL SYSTEMS INC	1- 14	1 3/4	- 1/4	-12.5
N	ITT CORP	22- 47	28 1/8	+3	+11.9
N	M/A-COM INC	13- 35	16 7/8	-2 1/8	-11.2
N	MANAGEMENT ASSIST	9- 19	17 1/8	- 1/8	-0.7
N	MATSUSHITA ELEC(ADR)	94- 99	96 3/8	-1 1/8	-1.2
N	MODULAR COMPUTER SYS	4- 16	6 1/4	- 1/4	-3.8
N	MOHAWK DATA SCI	3- 17	11 1/4	+ 1/2	+4.6
N	MOTOROLA INC	29- 49	30	+1 1/8	+3.9
N	NAT'L SEMICONDUCTOR	11- 30	11 5/8	+ 1/8	+1.0
N	NBI INC	15- 36	15 1/8	+ 1/4	+1.6
N	NCR	21- 36	25 5/8	- 1/4	-0.9
N	PERKIN-ELMER	20- 37	24 5/8	- 3/4	-3.0
N	PRIME COMPUTER INC	11- 34	15 1/4	-1	-6.1
N	SPERRY CORP	35- 50	37 1/4	- 1/2	-1.3
O	STRATUS COMPUTER INC	8- 17	9 1/4	- 1/4	-2.6
O	TANDEM COMPUTERS INC	15- 40	17 1/2	- 3/4	-4.1
N	TANDY CORP	26- 42	33 1/2	- 7/8	-2.5
O	TELEVIDEO SYSTEMS	2- 21	2 3/4	- 1/8	-4.3
O	TELXON CORP	9- 17	13	- 3/8	-2.7
N	TEXAS INSTRUMENTS	101-180	117 7/8	- 1/2	-0.4
A	ULTIMATE CORP	10- 26	16 1/4	- 3/4	-4.4
O	VECTOR GRAPHICS INC	0- 9	1/8	0	0.0
A	WANG LABS "B"	24- 42	24 1/2	- 7/8	-3.4
A	WANG LABS "C"	24- 42	24 1/4	-1 1/8	-4.4
N	XEROX CORP	35- 52	36 1/8	-1 7/8	-4.9
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	10- 22	13 7/8	- 3/8	-2.6
A	CIS CORP	4- 10	5 3/8	- 7/8	-13.9
N	COMDISCO INC	5- 42	9 1/2	+ 5/8	+7.0
O	CONTINENTAL INFO SYS	3- 16	4 3/8	-1 3/8	-23.9
N	DPF INC	10- 16	15 1/2	+ 1/4	+1.6
O	FINALCO GROUP INC	4- 12	4	- 1/4	-5.8
O	PHOENIX AMERICAN INC	4- 17	5 3/8	- 3/8	-6.3
O	SELECTERM INC	6- 22	7 1/4	-1 1/8	-13.3
N	U.S. LEASING	28- 44	34 1/2	- 3/4	-2.1
	COMPONENTS				
N	ADVANCED MICRO DEV	25- 41	30 1/4	+1 1/4	+4.5
O	ADV'D SEMICONDUCTOR	13- 30	14 3/4	- 1/2	-3.2
N	ANALOG DEVICES INC	20- 32	23 1/2	-1 1/2	-6.2
O	ANALOGIC CORP	10- 21	11 1/2	-1	-8.0
O	APPLIED MAGNETICS CP	9- 27	9	- 1/4	-2.7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 6	2 1/4	+ 1/8	+6.0
N	ADVANCED SYSTEMS INC	12- 23	12 1/2	- 3/8	-2.9
O	AGS COMPUTERS INC	10- 22	10 3/4	+ 1/8	+1.1
O	AMERICAN SOFTWARE	12- 31	12 3/8	-1 1/8	-8.3
N	ANACOMP INC	1- 13	1 5/8	- 1/4	-13.3
O	ANALYSTS INT'L CORP	5- 17	4 1/2	- 1/2	-10.0
A	APPLIED DATA RES	10- 27	13 3/8	-1 3/8	-9.4
O	ASHTON TATE	4- 15	6 1/4	- 1/2	-7.4
O	ASK COMPUTER SYSTEMS	12- 22	13 1/4	-1 3/4	-10.2
N	[illegible] CORP INC	1- 7	2 1/2	0	0.0
N	AUTOMATIC DATA PROC	30- 44	38 1/4	- 7/8	-2.2
O	COMPUTER ASSOC INT'L	13- 30	16 7/8	- 3/8	-2.1
O	COMPUTER HORIZONS	8- 30	8 1/8	+ 1/8	+1.5
O	COMPUTER NETWORK	5- 11	9 5/8	- 1/8	-1.3
N	COMPUTER SCIENCES	11- 22	13 1/8	+ 7/8	+6.8
O	COMPUTER TASK GROUP	12- 18	16 1/4	- 1/8	-0.7
O	COMPUTER USAGE	4- 10	4 3/8	- 5/8	-12.5
O	COMPUTONE SYSTEMS	6- 23	6	-1	-14.2
O	COMSERV CORP	1- 15	2 7/8	- 1/4	-8.0
O	COMSHARE	7- 14	8 1/2	0	0.0
O	CULLINET SOFTWARE	20- 30	28 3/8	-2 1/8	-7.1
N	CYCARE SYSTEMS INC	14- 25	18	- 1/4	-1.3
O	[illegible] SYSTEM INC	8- 27	7 3/4	-1 1/4	-13.8
N	GENERAL ELECTRIC CO	48- 58	56 3/8	-1 3/4	-3.1
N	GTE CORP	36- 46	38	- 5/8	-1.5
O	INFORMATICS GENERAL	15- 22	13 7/8	+ 1/4	+1.3
O	INFORMATION SCIENCE	4- 17	4 1/8	- 1/2	-10.8
O	INFOTRON SYSTEMS CP	13- 41	13	-4 1/4	-24.6
O	KEANE ASSOCIATES	4- 13	9 1/2	0	0.0
A	LOGICON	19- 31	26 3/8	-1 1/4	-4.5
O	LOTUS DEVELOPMENT CP	15- 44	22 1/4	- 3/4	-3.2
O	MCI COMMUNICATIONS	6- 20	7 3/8	- 1/8	-1.6
O	MGMT SCI AMER INC	8- 23	10	- 1/8	-1.2
O	MATHEMATICAL APP GRP	6- 10	7	- 1/2	-6.6
O	MICOM SYSTEMS INC	20- 34	22	-4 3/4	-17.8
O	MICROPRO INT'L CP	2- 10	2 1/4	0	0.0
O	NATIONAL DATA CORP	8- 35	9	+ 1/2	+5.8
O	ON-LINE SOFTWARE INT	5- 20	9	0	0.0
O	PANSOPHIC SYSTEMS	11- 20	15	0	0.0
N	PLANNING RESEARCH	10- 21	11 7/8	+ 1/4	+2.1
O	POLICY MGMT SYSTS CP	22- 30	24 1/2	- 1/2	-2.0
O	PROGRAMMING & SYS	4- 8	4 1/2	0	0.0
O	REYNOLDS & REYNOLDS	20- 33	26 1/2	-1 1/2	-4.6
O	SEI CORP	11- 30	13 1/4	- 3/4	-5.3
O	SHARED MEDICAL SYST	23- 43	23 7/8	- 3/8	-1.5
O	SCIENTIFIC COMPUTERS	3- 14	4 1/8	- 1/4	-5.6
O	SOFTWARE AG	9- 15	12 3/8	- 7/8	-6.1
N	URS CORP	10- 19	13 1/8	- 1/8	-1.0
O	UCCEL	7- 17	11 1/8	0	0.0
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	2 3/4	- 1/8	-4.3
A	ANDERSEN JACOBSON	4- 25	4	- 5/8	-13.5
O	AUTO-TROL TECHNOLOGY	6- 30	7 3/4	- 1/2	-6.0
O	AVANT-GARDE COMPUTING	15- 29	16	- 3/4	-4.4
O	BANCTEC INC	5- 33	6	- 1/2	-7.6
A	BEEHIVE INT'L	1- 11	5/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	20 7/8	+1 1/8	+5.6
O	CAMBEX CORP	1- 5	1 1/2	0	0.0
O	CENTRONICS DATA COMP	5- 20	8 3/4	- 1/2	-5.4
A	CETEC CORP	7- 12	7	- 1/8	-1.7
A	[illegible]	4- 30	5 1/2	- 3/8	-6.5

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUGRAPHIC CORP	20- 40	28 3/8	- 3/8	-1.3
O	COMPUTER TRANSCEIVER	1- 10	1/8	-	[illegible]
N	COMPUTERVISION CORP	30- 52	30 3/8	-2 3/8	-7.2
N	CONRAC CORP	11- 30	18 1/2	- 1/8	-0.7
A	DATAPRODUCTS CORP	14- 22	13 1/8	-1	-6.0
A	DATARAM CORP	6- 12	8 7/8	- 3/8	-4.0
O	DATA SWITCH CORP	2- 12	3 1/4	- 1/8	-2.8
O	DATUM INC	3- 17	3 3/8	- 3/8	-11.7
O	DECISION DATA COMPUT	9- 16	10 3/8	- 1/8	-1.2
N	DOCUTEL-OLIVETTI	4- 20	3 1/2	- 7/8	-20.0
O	ELECTRONIC M & R	9- 11	4 3/4	-1	-17.3
O	ENDATA, INC	7- 15	7	- 1/4	-3.4
O	EVANS & SUTHERLAND	18- 50	18 1/2	- 3/8	-0.7
O	[illegible] TECHNOLOGIES	9- 14	10	-4 3/8	-30.7
N	GEN'L DATA COMM IND	10- 20	15 3/8	- 1/8	-0.8
N	HAZELTINE CORP	16- 32	20 7/8	-1 1/8	-5.2
O	ICOT CORP	3- 8	4 1/4	+ 3/8	+9.6
O	INFORMATION INTL INC	10- 13	11 1/8	0	0.0
O	INTECOM INC	7- 21	8 3/4	0	0.0
O	INTEL CORP	27- 48	30 1/4	0	0.0
A	LUNDY ELECTRONICS	7- 19	10 3/8	0	0.0
O	[illegible] CORP	8- 21	12 1/8	- 5/8	-4.9
A	MSI DATA CORP	8- 20	16 3/8	- 1/4	-1.5
N	NASHUA CORP	19- 28	26	+ 1/4	+0.9
O	NETWORK SYSTEMS CORP	16- 26	19 7/8	-2 3/8	-10.6
N	NO AMERICAN PHILIPS	30- 48	37 1/8	-1 3/4	-4.5
N	NORTHERN TELECOM LTD	30- 47	34 3/8	-2 1/8	-5.8
O	OMEX	1- 4	1/8	0	0.0
N	PARADYNE CORP	11- 36	11 7/8	- 3/8	-3.0
A	PENRIL CORP	8- 14	11	- 3/8	-3.2
N	PLESSEY CO (ADR)	20- 41	36 1/2	+ 3/4	+2.1
O	PRINTRONIX INC	13- 30	13 1/8	- 3/4	-5.3
O	QANTEL CORP	4- 23	5 1/8	- 1/8	-2.4
N	RECOGNITION EQUIP	10- 27	10 1/8	0	0.0
N	SANDERS ASSOCIATES	30-150	37 3/4	-1	-2.5
O	SCAN DATA	1- 3	1/4	0	0.0
O	SCAN-OPTICS CORP	2- 10	11	+ 1/4	+2.1
N	SCIENTIFIC ATLANTA	8- 23	10 1/4	+ 3/8	+3.8
O	SEAGATE TECHNOLOGY	4- 30	4 1/2	+ 3/8	+9.6
N	STORAGE TECHNOLOGY	2- 23	2 3/4	- 3/8	-12.0
O	SYKES DATATRONICS	1- 12	1 1/8	-1 1/8	-57.1
O	SYSTEMS & COMP TECH	12- 30	13 3/4	-3	-18.0
A	T BAR INC	7- 17	7 1/4	+ 3/4	+11.5
A	TAB PRODUCTS CO	13- 20	17 1/8	- 3/8	-2.1
O	TANDON CORP	5- 30	5 3/4	- 7/8	-13.2
A	TEC INC	6- 13	8 1/4	- 1/8	-1.4
N	TEKTRONIX INC	52- 67	58 3/8	-2 3/8	-4.2
N	TELEX	19- 30	30	- 1/4	-0.7
O	[illegible] SYSTEMS CP	2- 17	2 3/4	+ 1/4	+10.0
N	TIMEPLEX INC	13- 23	17 5/8	-1 3/8	-7.2
O	VISUAL TECHNOLOGY	3- 20	3 3/4	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 23	20 7/8	- 1/8	-0.6
N	BARRY WRIGHT	23- 33	23 1/4	- 1/4	-0.9
A	DUPLEX PRODUCTS INC	22- 27	26 1/8	- 1/2	-1.8
N	ENNIS BUS. FORMS	18- 30	23 7/8	- 3/8	-1.5
N	3M COMPANY	69- 80	78 3/8	-1 7/8	-1.3
N	MOORE CORP LTD	30- 51	42 5/8	-1 7/8	-4.1
N	STANDARD REGISTER	27- 43	41	- 3/4	-1.7
N	WALLACE COMP SERVICE	23- 30	26 1/8	- 1/8	-1.6

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Top position?
AEA chairman's view of U.S. electronics/15

Bumpy road ahead
Seagate Technology on a crowded highway/73

In Depth
Warnings about moving Cobol to micros
Follows 60

IBM warns users of potential harm to head disk units

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — IBM has notified the approximately 10,000 users of its 3380 disk drives that using certain types of air-conditioning system antibacterial agents can cause head disk assembly problems, including head crashes.

IBM said it has discovered that a small percentage of 3380 users developed head disk assembly problems in buildings that use organometallic biocides, principally those that incorporate tin oxide. The biocide is a chemical used in certain types of air-conditioning systems to prevent growth of bacteria in stagnant water. Scientists blame such bacteria for causing potentially fatal illnesses, such as Legionnaires' disease.

An IBM spokeswoman said less than 2% of 3380 customers have actually reported head disk assembly problems traceable to use of the chemical. IBM

See 3380 page 8

DP fight brews at GM

Transferred workers seek to keep benefits

By John Desmond
CW Staff

FLINT, Mich. — General Motors Corp. data processing employees are fighting on two fronts — in the courts and via a fund-raising effort — against the perceived loss of benefits resulting from their scheduled transfer to Electronic Data Systems Corp. on Jan. 1.

A suit filed in U.S. District Court here Nov. 19 on behalf of two individuals alleges that the loss of certain retirement benefits by workers being transferred from GM to EDS is a violation of federal pension law. The suit was filed by attorney Jules Olsman of Southfield, Mich., on behalf of Thomas Omans and Gary Cattin of the GM Technical Center in Warren, Mich. The automaker acquired EDS for $2.5 billion in a merger approved by stockholders on Oct. 18.

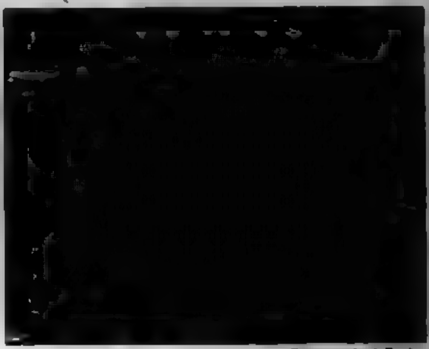
[illegible]

Meanwhile, in an action that may eventually have broader repercussions, a corporation called Legal Fund to Restore Benefits, Inc. has been formed by several transferred GM employees to raise funds and bring focus to the legal efforts.

One GM systems analyst said that each worker is being asked to contribute $100 until $50,000 is raised, and the analyst said he is very confident that goal will be reached. More than 300 workers attended an LFTRB meeting here in late November, and meetings have since been held in Detroit and Lansing, Mich.

GM and EDS are both required to respond to Olsman's suit within 20 days after being served. Olsman said the

See EDS page 4



CW photo by J. Bester

Sails pitch

Virtual Microsystems, Inc. took a novel tack in its effort to steal the attention of potential buyers at the recent Dexpo West '84 show. Story page 9.

TOP OF THE NEWS

Five years' labor bears fruit. The Ansi X3J4 subcommittee has begun steps to pass its Cobol-80 standard. Page 2.

■

Flying high in anticipation. Airline industry data centers and other big users of millions of instructions per second machines are preparing for the expected 1985 arrival of IBM's Sierra series mainframes. Page 5.

■

Not as compatible as it was thought to be. That is the consensus of several early users of IBM's Personal Computer AT. They also found several faulty data sectors in the AT's hard disk. Page 6.

■

The debate over VDT safety intensified last week as two national labor groups launched an 18-state lobbying campaign for legislation on VDT-related health issues. Page 8.

■

A large contingent of communications product vendors flooded Dexpo West '84, highlighting the growing industry demand for increased integration between Digital Equipment Corp. systems and those of other hardware vendors. Page 9.

■

The world is at his fingertips. A DP guru from the U.N. talks about life in a world of computerized global economic and social statistics. Page 10.

■

It'll be showdown time for IBM and NCR Comten, Inc. when they meet in court this month to battle over IBM's allegations that a consulting firm disclosed proprietary information. Page 73.

■

FYI

CAB prepares to ride off into 'sunset'

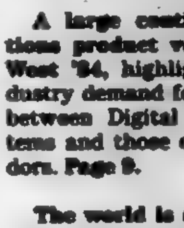
By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — An independent agency of the U.S. government will actually go out of business Dec. 31. It will terminate, disappear or "sunset," as it is euphemistically called here. This unprecedented event is having some unprecedented effects on the agency's data processing office.

The independent regulatory agency headed for extinction is the Civil Aeronautics Board, a victim of U.S. Congress' 1978 decision to deregulate the airline industry.

When Congress passed the Airline Deregulation Act of 1978, the reaction at the CAB's DP shop was a mixture of shock, disbelief and uncertainty. "It was an emotional roller coaster here for the last two or three years," according to Bradley H. Hoke, chief of the DP division for the past 10 years. "We didn't know if we were going to have a job from one day to the next."

Hoke, in a recent interview, said that after the legislation passed and the CAB's regulatory powers were whittled away, the DP budget was tightened, the aging hardware could not be replaced and the DP staff dwindled from a high of 67 to a low of 15.



CW photo by M. Betts

Hoke.

After years of unsettling rumors about the agency's fate, Congress settled the issue this year by approving the Civil Aeronautics Board Sunset Act, which states that the CAB will cease to exist Dec. 31, and most of its remaining regulatory functions will be transferred to the U.S. Department of Transportation.

"It was pretty obvious (after passage

See CAB page 7

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NEWSPAPER

Cobol-80 nears final stages

Ansi committee close to completion of draft standard

By Paul Gillin
CW Staff

Drained by more than five years of continuous debate and facing increasing pressure from the international community, the American National Standards Institute (Ansi) X3J4 subcommittee, which is formulating the Cobol-80 standard, has begun its final steps to pass the draft standard into the last stages of acceptance.

If all goes smoothly, the draft could be sent to the parent Ansi X3 committee in April, X3J4 members said last week after the committee wrapped up its final meeting of the year. "We can see light at the end of the tunnel," said Jerome Garfunkel, president of Jerome Garfunkel Associates, Inc. in Litchfield, Conn., and a member of the X3J4 committee.

However, because of lengthy approval processes, a standard will not be approved until late 1985 at the earliest, they said. The document must still be approved by two other Ansi groups, either of which could call for more changes to the proposed standard.

But further changes are not likely to come from X3J4, members said. "The sentiment of the committee is to get on with it," said Lemuel Skidmore, vice-president of Online Systems Support, Inc. in Kensington, Conn., and vice-chairman of the X3J4 committee. "I think at the next meeting we will vote to pass the standard along to the [Ansi] X3 committee."

The X3J4 committee completed another round of public comment Nov. 14. At its most recent meeting in La Jolla, Calif., in mid-December, the group drafted responses to the 23 comments that were received.

The committee will reconvene in February in Baltimore to consider the final responses. If no substantive opposition arises, it will vote to initiate a ballot for X3J4 members to vote on the proposed standard, Skidmore explained.

The X3J4 committee will then reconvene in April to tabulate the ballots and probably to submit the proposed standard to the parent Ansi X3 committee. The X3 committee will then be responsible for sending the proposal to the Board of Standards Review, the Ansi committee that decides whether or not to approve the standard.

Skidmore called late 1985 an optimistic date for implementation. He noted that changes could be called for at any stage of the approval process, delaying the standard further.

Garfunkel said action by the International Standards Organization (ISO) in February to adopt a draft international standard before approval by the X3J4 committee has contributed to the Ansi group's willingness to proceed.

The ISO standard is parallel to the "Pink Book," which is now under consideration within Ansi. If the Ansi standard can be implemented as it now stands, it would lead to identical standards at both the national and international levels.

"That is very much on the minds of the committee right now for selfish reasons," Garfunkel said. "IBM, [Honeywell, Inc.] and the rest don't want to have to support two separate compilers."

IBM's VS Cobol II not Cobol-80-based

[illegible]

Ronald A. Frank, 1934-1984

MONT VERNON, N.H. — Ronald A. Frank, managing director of the Frank Communications Group and a former *Computerworld* editor, died last week after an extended illness. He was 50 years old.

A graduate of Farleigh Dickinson University in Teaneck, N.J., Frank joined *Computerworld* in July 1969 as a technical news editor. He left the newspaper as a senior editor/communications in September 1979.

Long-time acquaintance William Leitch, general manager of the Communications Networks national telecommunications conference, said Frank, a regular speaker at the conference, will be missed. "We were always surprised at what superb ideas came out of such a small package," Leitch said.

Frank

Molly Upton, a fellow editor during Frank's tenure at *Computerworld* and currently director of publications at International Data Corp., remembered him as a man "who kept a lot of us honest." Frank, according to Upton, was a man with "very high standards."

Before joining *Computerworld*, Frank had worked at Bendix Corp. and as a technical writer at Honeywell, Inc.

A member of the Institute of Electrical and Electronics Engineers, Inc., he held an MBA degree from Babson College, Wellesley, Mass., and had been pursuing a Ph.D. at Boston University.

He is survived by his wife and two children.

Memorial contributions can be made to a scholarship fund being established by another of Frank's fellow ex-*Computerworld* editors, Vic Farmer. Farmer resides at 14 Catherine St., Newport, R.I. 02840.

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What's the news?

Hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of DP technology in your company? Have you implemented successful cost-cutting strategies? Is something in your DP shop not working as designed? Know any unsung heroes? Heard any hot news about vendors? Are you aware of technology or management trends the trade press is overlooking?

If so, we'd like to hear from you. *Computerworld* has established a reader hot line for information regarding items of interest to the computing community. Call us toll free at (800) [illegible]. Ask for Suzanne White, assistant managing editor.

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NLRB to review GM DP workers' unionization efforts

Hearings planned for next month; elections granting UAW representation may follow

By John Gallant
and John Desmond
CW Staff

DETROIT. — Hearings before the National Labor Relations Board (NLRB) are scheduled to begin next month on the attempts by some soon-to-be-transferred General Motors Corp. DP workers to win representation by the United Auto Workers union (UAW).

The NLRB told *Computerworld* last week that preliminary hearings will be held Jan. 7 to review four petitions the UAW submitted in late November on behalf of salaried GM DP employees seeking to become members of the union. The petitions were signed by workers at four GM facilities who were concerned about the perceived loss of benefits involved in the transfer of GM's DP and communications employees to the payroll of Electronic Data Systems Corp. (EDS) [CW, Nov. 12].

Following the hearings, the NLRB may approve elections for workers at four GM units — the Fisher Body facility at the GM Technical Center in Warren, Mich.; a unit at the GM assembly facility in Willow Run, Mich.; and the GM Photographic Division and the GM Information Systems and Communications Activities unit at GM headquarters in Detroit.

> *'We will vigorously oppose any effort to form a union in EDS. We feel strongly against the unionization drive because there is no need for it. There is no place for it within EDS. I am confident that no union is going to be formed.'*
>
> Ken Riedlinger, senior vice-president, EDS

A UAW spokesman was quoted in local press reports as saying that the petitions seek UAW representation for 324 workers at those units, although the union would not confirm that figure. If elections are held, a simple majority vote by workers in the proposed bargaining units would make the employees members of the UAW. GM currently employs some 7,000 DP workers at more than 115 locations within the U.S and another 3,000 at facilities outside the country. On Jan. 1, the automaker's U.S. DP staff is scheduled to be transferred to EDS, which was acquired by GM for $2.5 billion in mid-October.

According to a UAW spokesman, the drive for union representation began in early November after several GM DP workers approached the UAW following EDS' unveiling of its salary and benefits package. The spokesman said the union then began holding informational meetings — which sources within the automaker's DP operations said were attended by several hundred employees — and later sponsored petition drives within GM facilities.

Although the UAW declined to discuss the number of facilities involved in the petition drive, a union spokesman was quoted earlier as saying that, in addition to the four named units, the UAW was attempting to organize 25 other U.S. locations where GM DP workers are employed.

Several sources within GM's DP operations, who asked not to be named, said the unionization efforts were spawned by fears of a reduction in benefits following the transfer of workers to Dallas-based EDS. In addition to the UAW petition drive, employee concerns have manifested themselves in proposed legal action against GM and its newly won subsidiary (see story page 1).

The sources said workers were upset over the loss of annual cost-of-living allowances and overtime pay, changes in the structure of retirement plans and reductions in dental, vision and dependent health care benefits. EDS maintained that the transferred workers would be compensated for benefits changes with what the company described as a generous stock giveaway plan [CW, Nov. 12] and merit raises larger than those generally awarded by GM.

NLRB regulations require that at least 30% of the employees in a proposed bargaining unit sign the petition seeking elections for union representation. Although the UAW would not specify the percentage of GM workers involved in the petition drive, a union spokesman confirmed an earlier statement that more than 60% of the workers in the four units had signed.

"We are pleased with the progress of the campaign," the UAW spokesman said. "There will probably be separate elections for each petitioning unit. How many workers eventually come into the union depends on how many elections are held and how many of those elections are successful. If any of the units vote to join the union, we intend to arrange bargaining [with EDS] right away."

According to Henry Chiles, assistant to the regional director for Region Seven of the NLRB, the preliminary hearings will focus on the structure of the proposed bargaining units. Discussions will likely involve the job titles to be included in the units and the size of the employee groups for which elections could be held.

"The NLRB really controls the time period for the elections. It can be as short as a few weeks, or it could be months," the UAW said.

'UAW effort to increase rolls'

According to Ken Riedlinger, senior vice-president with EDS, only a very small percentage of GM employees actually want union representation. "I think it is the UAW trying to get the salaried workers to unionize, rather than the other way around," he said. "The thing you need to understand is that this is really not a GM/EDS issue; this is an effort by the UAW to increase its rolls. It really has very little to do with the merger.

"EDS is certainly opposed to any union occuring within EDS, and we will vigorously oppose any effort to form a union in EDS," Riedlinger said. "We feel strongly against the unionization drive because there is no need for it. There is no place for it within EDS, and I am very confident that no union is going to be formed."

One GM DP worker, a former UAW member, said he would not support the union's efforts. "The union takes everybody to the middle," he said. "If you are a highly motivated, success-oriented employee and the guy sitting next to you just wants to collect a paycheck and be comfortable, you are both going to get the same pay. I am not interested in being in the middle. I am interested in being on top."

EDS

from page 1

deadline will be reached this week.

Asked to comment on Olsman's suit, EDS Senior Vice-President Ken Riedlinger said, "It has no merits, and I think you will find that we will win. There are preliminary legal — I hate to use the word maneuverings — actions being taken in response to that suit. We are investigating their allegations." GM spokesman William Winters had no comment on the suit. He confirmed that the EDS retirement package does not include early retirement after 30 years of service, as does GM's package.

Attorney Donald Gasiorek of Somers, Schwartz, Silver and Schwartz, P.C. of Southfield, who said he was asked to get involved with LFTRB by some GM employees, said taking on GM would be "an expensive proposition."

"Their intent is to retain the benefits they had at GM," Gasiorek said of the LFTRB backers. "The question is how good is it for EDS to suddenly wind up with 10,000 disgruntled employees. You don't want people so distraught it has an impact on productivity," he added.

Neither GM nor EDS spokesmen had any reaction to the fund-raising activities. GM spokesman Winters said he was aware of the fund and added, "All I know is what I read in the paper." A spokeswoman for EDS said last Wednesday the company was not aware of the LFTRB fund.

Both lawyers said the actions are unusual, because when the larger company — GM — acquired the smaller company — EDS — the employees of the larger company were apparently given the same benefits as the employees of the smaller company.

"Usually, a smaller subsidiary becomes part of the larger whole. Here, you have the reverse. GM is putting the employees in a smaller subsidiary and reducing their benefits," Gasiorek said. According to Olsman, "The whole transaction is going to break significant new legal ground in the area of employment law. Everyone is at a loss to find a precedent."

He added, "GM offers a better benefits package to its employees than EDS does. You're talking about the biggest corporation in the world. If it works in uninterrupted fashion for GM, no one would be surprised to see [Ford Motor Co.] and [Chrysler Corp.] do it. It is an excellent move from management's point of view. They save the company hundreds of millions of dollars in benefits."

The two legal actions differ in scope. "I'm relying on statutory authority, and they're relying on case law evolved over seven years," Olsman said . He noted that his suit alleges a violation of the federal Employment Retirement Income Security Act, because employees who would have been eligible to retire after 30 years of service with GM would not have the same benefit at EDS. Olsman called this a "wrongful deprivation of vested pension rights."

Citing a case of potential hardship resulting from the transfer, Olsman said he was approached by two GM employees with multiple sclerosis, who at times have had to take disability leaves from GM. "GM gives them disability benefits; EDS doesn't have them," Olsman said. "If these people fall into a situation where they have to leave work, they're out. There's no legal protection for them" at EDS, Olsman said.

An EDS spokeswoman disagreed with Olsman, saying that any "preexisting condition" that qualified for health benefits at GM would also be covered by EDS.

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Airlines ready DP centers in anticipation of Sierra

By John Desmond
CW Staff

TARPON SPRINGS, Fla. — The Sierra series of mainframes has not yet been announced by IBM, but users with bulging processing demands are nevertheless preparing their data centers for an anticipated 1985 arrival of the high-end IBM series.

Analysts project that the initial Sierra will offer at least 29 millions of instructions per second (Mips) processing power at a price more favorable than 3081 series mainframes.

The heavy Mips-using data centers at commercial airlines, which process on-line reservation systems, are especially anxious for Sierra's arrival. According to Gerald Doherty, director of computer operations at Trans World Airlines, Inc. (TWA), "The demands are such that we will need another large uniprocessor in an early-1985 time frame."

Doherty said TWA's data center currently uses a 3033 CPU in tandem with high-performance version 3083 CPUs. "To help us bridge from our current capacity through 1985, we've implemented a support processor using an IBM 3033 in a form of multiprocessing," Doherty said. In a method transparent to users, the 3033 is used to answer all inquiries on seat availability, while the 3083s perform the reservation function. "The 3033 is thought of as a helper processor," Lewis said.

If the Sierra is delayed beyond its expected spring announcement, Doherty said, "other individual packages can be off-loaded based on need. But you do reach a practical limit for that concept to work. If Sierra is not announced in early 1985, we'll have to move additional loads to helper processors." Another possibility is to upgrade the helper 3033s to 3083s, he said.

Anticipated MVS/XA-only support

United Airlines, Inc. is converting its mainframes to the MVS/XA operating system in preparation for Sierra, which is expected to support only extended architecture, according to James Peyton, systems engineer with United's Chicago data center.

In its three data centers, United runs 9083s and 9081s, which are 3083 Model JX and 3081 Model KX specially modified by IBM for the airline industry. If Sierra is announced in the spring, United plans to replace its 9081s with Sierras, Peyton said. If Sierra is delayed beyond the summer, when United will need more processing power, the company will either go to a 3084 configuration or buy another processor, neither of which is as attractive an option, Peyton said.

To move from a 9081 to a 3084 Model QX, United would have to spend approximately $500,000 to make the 9081 look like a 3081, and in the process "enhanced Thermal Conduction Modules would have to be yanked out and more standard products installed," Peyton said. United would then have to upgrade the 3081 to a 3084, he said. "That is not financially attractive to us, because there is no migration path from a 9081 to a 9084; there's no such box," Peyton said.

Projections that Sierra would offer more processing power in the same or less floor space are also attractive to United, which has limited floor space in its data centers.

Dalton Wiley, American Airlines, Inc.'s manager of capacity planning, said, "We want Sierra now. We need more capacity." American is running its reservation system on four 9083s running the Airline Control Program (ACP). Since ACP would not run on an extended-architecture-only machine, American is now investigating what code changes would be needed to allow the software to run in extended architecture mode, Wiley said.

Wiley also said it is difficult for him to plan because the product's details are so uncertain. "What we're really after is some information as to whether it will be [extended-architecture-only]," he said. "We need some [specifications] so we can do some planning." He said American will consider entering IBM's Early Ship Program when the product is announced "if that's what it takes to get it early."

American has a backup plan should Sierra be announced later than expected. "Our contingency is to run more than four machines simultaneously," Wiley said. Changes by American's own programmers will allow up to eight CPUs to run ACP concurrently to gain needed capacity, he said. But the fallback position has the drawbacks of "investment in today's technology when tomorrow's is right around the corner," as well as the added complexity of more multiprocessors plus added personnel and operations costs, Wiley said.

Airlines are not the only users planning for Sierra. When the long-term 3033 mainframe lease of Martin Marietta Data Systems, Inc. in Orlando, Fla., runs out in 1985, the company plans to obtain a month-to-month lease in order to bring in Sierra sooner, according to E. Britt Crawford, manager of performance and tuning. His shop runs a total of six 3033 and 3084 mainframes. "We feel the Sierra will be available in June," he said, but if the product is delayed beyond July or August, "we'll have to decide on another 3080 series" mainframe, he noted.

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IBM AT falls short in Personal Computer compatibility

By Edward Warner
CW Staff

Early corporate users of the IBM Personal Computer AT say the unit is not as IBM Personal Computer-compatible as they had expected and that its optional 20M-byte hard-disk storage unit has faulty data sectors. But on the whole, they are happy with the machine, and some are even planning to buy it instead of the IBM Personal Computer XT.

Introduced in August, the Personal Computer AT features an Intel Corp. 80286 microprocessor that is nearly twice as fast as the Intel 8088 in the Personal Computer. It also offers from 256K to 3M bytes of random-access memory (RAM), a choice of 1.2M- or 360K-byte diskette drives, 20M-byte hard-disk storage and a somewhat redesigned keyboard.

The users, few of whom had worked with the AT for more than a month, said they like the AT's speed and storage capacity and would put it to use for work with spreadsheets and data base management systems (see story page 7). They tempered their praise with some criticism, however.

Software incompatibility

Most complaints centered on compatibility with the software, storage peripherals and add-on boards designed for the Personal Computer. Several users also voiced unhappiness with the inability of the AT's 1.2M-byte diskette drives to write in a format that can be read by the 360K-byte drives of the Personal Computer.

According to Richard Strauss, vice-president for products at Corporate Software, Inc. in Waltham, Mass., only about 35% of the Personal Computer's software base has been certified as usable on the new machine. He indicated that most popular applications packages will run, but Max Hughes, vice-president of systems and computing at the pharmaceuticals division of New York-based Pfizer, Inc., said he is unable to use Ashton-Tate's Framework integrated package. A version of Framework has since been announced for the AT.

Compatibility problems have also arisen when some users tried to insert communications add-on boards for the Personal Computer into one of the eight expansion slots of the AT. Roy Hill, chief programmer in the technical support section of Michigan Blue Cross/Blue Shield, said he found the Hayes Microcomputer Products, Inc. Smartmodem board would not work in any of his firm's four ATs.

Bad disk sectors

For users with the 20M-byte internal hard disk, the most common complaints involved disk sectors. Bob Lane, microsystems consultant for Merrill Lynch Pierce Fenner & Smith in New York, said one 20M-byte storage unit has 40K bytes worth of bad sectors with which his office is stuck until the disk's data can be backed up and the disk reformatted.

An IBM spokesman, meanwhile, admitted that 20M-byte storage units had been shipped with as many as 10 faulty sectors but added that the units were still in line with IBM's requirement of a minimum capacity of 21.8M bytes of usable storage. "We do not ship drives that fall out of an acceptable range of quality," he said.

Other problems cited by users included the following:

- Inability to access full potential RAM. The current lack of access, under IBM's PC-DOS operating system, to the AT's full potential for 3M bytes of RAM, led Moore McCormack Resources, Inc. to put off an AT purchase, at least for now, according to its controller, Andrew Langlois.
- Backup system needs. One user criticized what he called IBM's failure to offer a backup storage system for the AT, while another said the AT is not compatible with the popular Iomega Corp. Bernoulli Box storage system for the Personal Computer.
- Keyboard only slightly changed. Several users said IBM has yet to incorporate what they see as needed changes to the Personal Computer keyboard. Instead, they said, changes found in the AT keyboard are small but are still significant enough to confuse users.
- Screen update speed. Though the AT recalculates data quickly, one user said it is somewhat slow in updating screens of information.

Another corporate user pointed out that the AT can be upgraded from 512K bytes to its full 640K-byte RAM capacity only by addition of a 128K-byte memory add-on board available only from IBM.

Some users have no problems

On the positive side, problems with the 20M-byte hard-disk unit are not being reported by all users. Five corporate micro specialists said they had experienced no problems with their ATs' hard disk, but one of them, Hank Kee, vice-president for personal computing at New York's Chemical Bank, said he encountered other issues with the machine.

Kee said that among those issues was what he termed the lack of a viable backup system from IBM. Streaming tape drives are available from third-party vendors, he noted, but users must otherwise establish backup using a series of diskettes.

Another corporate user knocked the machine's lack of a detachable keypad, something he said would be especially useful for entering data to a spreadsheet. He said his firm's AT users find the AT's keypad so debilitating that they usually use the numbers at the top of the keyboard for numerical entries.

Why are users having problems with the much heralded machine? According to micro industry analyst Aaron Goldberg of Framingham, Mass.-based International Data Corp., IBM is "letting the power users [of the AT] shake it down fully" while making a profit on AT sales.

Power users most tolerant

The power users, Goldberg claimed, "will be the most tolerant of faults" and will put the machine to its toughest tests.

Dan Spinner, chief operating officer of Management Information Software, Inc. in New York, said problems with the 20M-byte hard disk were arising because IBM is "pumping them out much faster than they can get good quality control." An IBM spokesman responded to Spinner's claim by saying the drives are tested throughout their manufacturing process.

Though some users are enamored enough of the Personal Computer AT to see it as the eventual standard for their firms, others are not promoting the machine until they satisfy their concerns about users' needs, the Personal Computer AT's compatibility and its hard-disk quality problems.

The wait is the drawback

The greatest problem for users of the IBM Personal Computer AT may not be software incompatibility with the IBM Personal Computer, hard-disk data losses or getting used to a somewhat rearranged keyboard.

It could be the wait.

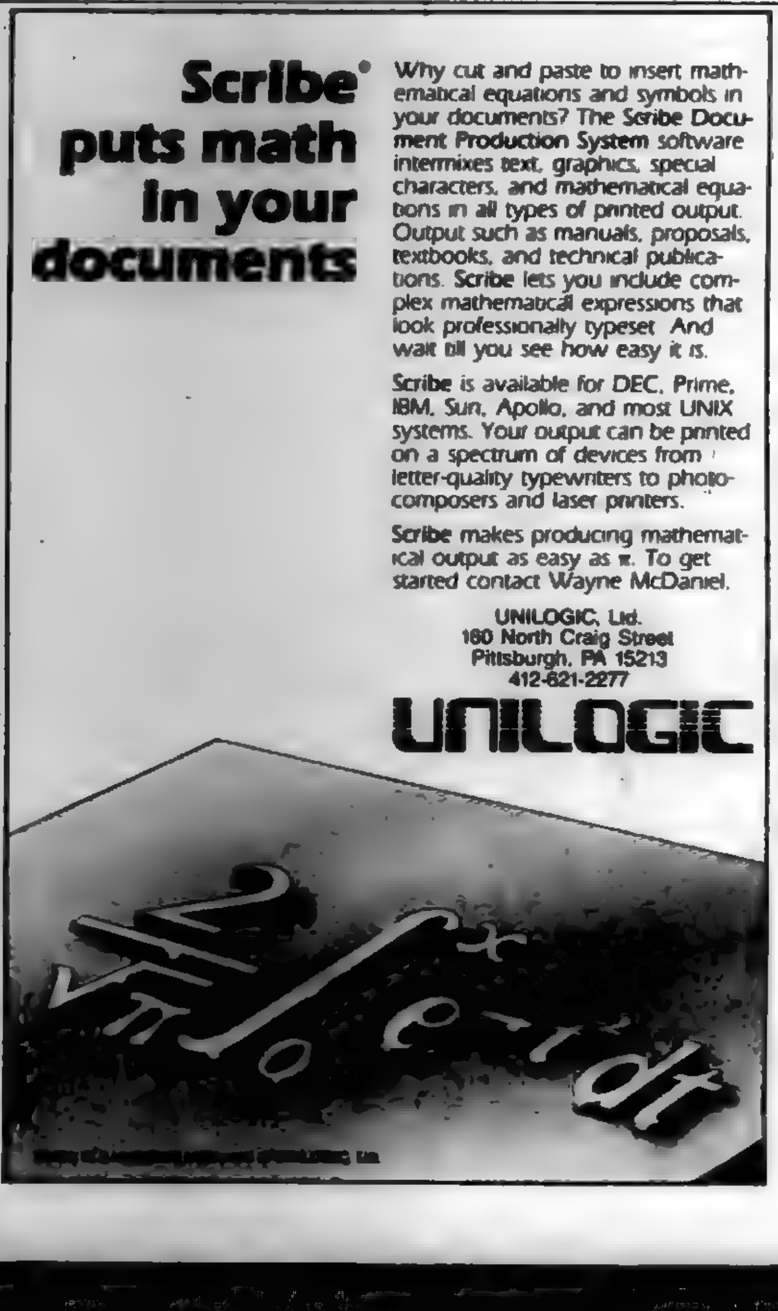
The Commercial Banking Group of San Francisco's Wells Fargo Bank, N.A. was among the first to order Personal Computer ATs, purchasing those units shortly after the machine was introduced Aug. 20, according to the group's senior systems analyst, Kingsley Mar. Mar said he is now "pacing the loading dock. They are due any day now."

The Budd Co., a Madison Heights, Mich., automotive parts manufacturer, also was an early buyer of the Personal Computer AT but does not expect to receive its first unit until early next year, reported Larry Hamilton, management information services director

Overall, "availability is a pain," according to Rich Reed, microcomputer manager with Cigna Corp. of Bloomfield, Conn., which has 10 to 20 ATs on order. Reed, who placed his order about a month ago, said his supplier has told him that orders being placed now will not be filled until March.

All that should change, however, according to data compiled by International Data Corp. (IDC), a Framingham, Mass., research firm. Though AT shipments in 1984 will total only 35,000, IBM will ship as many as 300,000 ATs by the end of next year, according to IDC analyst Steve Bosley.

Ironically, the demand for new machines may have limited the supply of demonstration models as well, according to Cigna's Reed. Reed said the AT loaned to his office by an IBM sales representative had seen so much intensive duty at other sites that, when it arrived at Cigna, "it looked like it had been dropped off a truck."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CAB from page 1

of the Sunset Act] that deregulation was a fact and was not going to be turned around," he said.

For Hoke, this was an important step because it meant he could begin planning for the transfer of the DP division's personnel, hardware, software and magnetic tapes to the DOT computer center. "The fate of the [Civil Aeronautics Board] had to be decided first, before we could get into that [planning] detail," he said.

During the last six to nine months, Hoke and DOT officials have worked out details on how to transfer hardware, maintenance contracts, personnel, software, data services and magnetic tapes. The applications programs and data files will not be changed by the transfer, so no new user training will be needed, Hoke pointed out.

"Our basic objective has been to make the transition without any serious degradation of support services," Hoke said. "We're in excellent shape right now" for the transfer on Jan. 2-3, he said.

Although most of the CAB's peripherals will be transferred directly to the Transportation Computer Center, Hoke said DOT officials insisted on replacing the CAB's mainframe with an IBM 4381. The old CAB mainframe, installed in 1976, is an IBM 370/158 Model II, which Hoke explained is an IBM 370/158 fitted with a dynamic address translation facility to make the CPU equivalent in throughput to an IBM 370/168.

By replacing the old CPU at the same time as the transfer, Hoke said, "I guess you could say we're killing two birds with one stone."

At DOT, the receiving end of this transfer, absorbing the CAB hardware will go smoothly because the modern Transportation Computer Center had the space, power and air conditioning available to handle the additional equipment, according to Don Southern, special projects officer.

But Southern said the installation of about 60 terminals and a communications network for the new users has been a headache. He said that high-level managers were slow to decide which users would be performing particular functions and in what offices. Until recent meetings resolved those details, it was difficult to plan how many remote cluster controllers were needed or how to run coaxial cables from the computer room to the offices, he said.

Hoke will join DOT's Office of Information Systems and Telecommunications Policy, while his staff will move to the Research and Special Programs Administration. "If we felt like boat people, this would be a terribly traumatic experience. But the reception we've had has been one of respect — very positive — and we're grateful for that," Hoke said.

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STC, others eye tin oxide

By [illegible]
CW Staff

While IBM reportedly determined that organometallic biocides can cause damage to some of its disk drives, makers of competing products using the same basic technology do not appear to be as worried.

IBM-compatible disk drives manufactured by Memorex Corp. and Storage Technology Corp. (STC) use the same flow-through technology which draws air through the drive's head disk assembly for cooling. But neither firm has been able to identify head disk assembly failures caused by tin oxide contamination. Spokesmen for both Memorex and STC, however, admitted that their drives have been in the field roughly half as long as many IBM 3380s. The spokesmen both said IBM's 3380 head disk assembly problems developed after the units had been operating for about a year. The bulk of STC and Memorex 3380-compatible drives has been installed in the past four to six months.

Randy Watson, STC's disk product manager, said his company is also recommending that users discontinue use of organometallic biocides in computer rooms. But Watson said there only appears to be a potential for damage to head disk assemblies when tin-oxide-based biocides are introduced into air-conditioning systems in large quantities. Watson contended that if the chemical is used in the quantities recommended by chemical manufacturers, the environment should be safe for disk drives.

STC originally decided to recommend that the use of organometallic biocides be restricted to chemical manufacturers' recommended levels. But since chemical manufacturers' recommended levels for the biocide appear to differ, STC decided to alter its position. STC researchers have discovered that many air conditioner maintenance personnel consistently misuse organometallic biocides. Watson explained that organometallic biocides are typically introduced into water flowing through an air-conditioning system at rates greater than the recommended dose of roughly five drops per 1,000 gallons of water.

Memorex has not yet determined whether organometallic biocides are having an adverse effect on its 3680 drives. Memorex has not discovered any 3680 head disk assembly problems directly attributable to tin oxide contamination. The three other makers of 3380-compatible disk drives, Control Data Corp., National Advanced Systems, Inc. and Amdahl Corp., each said their 3380-compatible drives use a sealed head disk assembly unit and therefore appear to avoid tin oxide contamination problems.

Groups to push VDT bills

WASHINGTON, D.C. — Two national labor groups last week launched an 18-state lobbying campaign for legislation on VDT safety. The Service Employees International Union (SEIU) and 9 to 5, the National Association of Working Women, plan to use their "collective clout" to push for VDT legislation in each of the 18 states targeted, according to Elaine Taber, program director at 9 to 5.

Karen Nussbaum, president of District 925 of the SEIU in Cleveland and a 9 to 5 director, said the "Campaign for VDT Safety" will consist of a traditional effort to lobby for the legislation. Letter-writing campaigns, educational programs and discussions with legislators are planned in each state.

Discussions will focus on two types of legislation: bills addressing VDT ergonomics, requiring installation of things like adjustable keyboards and chairs and glare reduction screens, and a bill giving employees a "right to know" the specifications of VDT machines.

To date, VDT safety bills have only been filed in Massachusetts, which has the earliest filing deadline, 9 to 5's Taber said. That bill, sponsored by 9 to 5, the SEIU and the AFL-CIO, deals primarily with ergonomic issues. It makes the state's Department of Labor and Industries responsible for enforcing regulations on semiannual inspections of VDTs, eye exams for employees and transfers of pregnant VDT workers.

NAS reassigns personnel

MOUNTAIN VIEW, Calif. — In an effort to "streamline operations to better deal with the increasingly competitive data processing industry," National Advanced Systems Corp. (NAS) on Dec. 10 reassigned some of its 1,150 U.S. employees and placed others on surplus status, according to a company spokesman.

The employees include roughly 70 people from headquarters and field services, according to an anonymous source. Personnel on surplus status will be paid for 30 days, during which they can interview for positions within National Semiconductor Corp., the parent company of NAS. After that period, these employees will officially be laid off.

The employee cutback is part of an NAS corporate directive to reduce the company's expenses by 20%, according to the anonymous source, who was uncertain what percentage the personnel changes would contribute. The NAS spokesman said that chances are very good that all employees will find jobs within National Semi, which has a worldwide work force of 42,000.

3380

from page 1

is recommending that all users of 3380, 3370 and 3375 disk drives discontinue use of the organometallic biocides. The spokeswoman added that, so far, only 3380 users have actually reported head disk assembly problems, and only they have been formally notified of the potential problems. International Data Corp., a Framingham, Mass., market research firm, estimated that IBM has installed roughly 90,000 3380s at approximately 10,000 user sites.

The IBM spokeswoman added that a notice, which has already been added to IBM technical documents, includes the 3370 and 3375 disk drives as a precaution. She said no head disk assembly problems have been reported on the 3370s and 3375s.

While IBM is not recommending that users stop using biocides, it is recommending that use of organometallic biocides be discontinued. Other biocides apparently do not have an effect on the IBM disk drives. A spokeswoman emphasized that while the organometallic biocides can cause problems in IBM equipment, there is no apparent health risk to workers in buildings where the chemicals are used.

The potential problem stems from the basic design of 3380, 3370 and 3375 head disk assemblies. These units draw air from the computer room to equalize pressure and cool the head disk assembly. While the air passes through a three-stage filter that can eliminate particulate matter down to the submicron level, the biocides enter the head disk assembly in a gaseous form.

Ford Motor Co. in Dearborn, Mich., has experienced 3380 head disk assembly problems, which IBM attributed to tin oxide contamination. A Ford executive, who asked not to be identified, called the contamination a nuisance that took several months to resolve. "It wasn't like all the 3380s were going down at once," he said, noting that only a small number of the firm's 3380s actually developed head disk assembly problems.

IBM recommended that Ford stop using the organometallic biocide and clean the tin oxide residue out of the computer room. Ford complied but still experienced intermittent head disk assembly failures, although the frequency of the failures appeared to decline. The failures continued to diminish with time, the executive said, noting that about three months after discontinuing use of the organometallic biocide, "the problem appears to be behind us."

Other large users of IBM disk drives whose air-conditioning units used the organometallic biocide also admitted experiencing a higher than normal incidence of head disk assembly problems when contacted last week. But they could not say whether the problems were attributable to the organometallic biocide used in their shops.

The IBM spokeswoman declined to explain exactly what potential problems the organometallic chemicals can cause, but she said 3380s that have developed head disk assembly problems attributable to tin oxide contamination have been replaced without charge. Some industry observers contend the buildup of tin oxide on read/write heads and disk platters can cause head crashes. Others, however, contend tin oxide contamination can cause other mechanical problems within the head disk assembly, such as short circuits in read/write head and actuator arms and damage to the disk media.

Bob Arnold, a technician with Empire Engineering, Inc., a Quincy, Mass., air-conditioning contractor specializing in computer room systems, noted his firm does not recommend the use of organometallic biocides because they have been known to cause mechanical problems with other types of machinery, such as the machinery used in air-conditioning systems. Arnold added that relatively few buildings use air-conditioning systems that require the biocides.

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Communications tools in spotlight at Dexpo West '85

CW AT DEXPO WEST

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — Like most other users, customers in the Digital Equipment Corp. orbit are increasingly demanding gateways to the non-DEC world and networking capabilities of their own.

In response, hardware and software vendors have recently stepped up production of DEC-oriented communications aids, according to Steven Barth, marketing vice-president for Expoconsul International, Inc.

Probably nowhere was the DEC community's growing emphasis on systems integration more clearly in evidence than at the sixth national DEC-Compatible Industry Exposition (Dexpo) West '84 here Dec. 11-14. Of the approximately 280 vendors that exhibited at last week's Dexpo at the Disneyland Hotel Convention Center, 60 or 65 were demonstrating communications products, Barth said.

Hardware, software split

Barth, whose Princeton, N.J.-based company sponsored Dexpo, characterized the data transmission aids as split fairly evenly between hardware and software. On the hardware side were offerings like fiber-optic links, modems and statistical multiplexers. Software packages included local networking facilities, electronic mail programs and micro-to-mainframe links.

Many of the communications products displayed had already been on the market for quite some time, like IBM's family of Device Attachment Control Units, which reportedly allow IBM processors to swap information with their DEC counterparts.

But a few of the Dexpo-showcased transmission aids made their formal industry debut at the show. Some newcomers included the following:

■ Ross Systems, Inc.'s Maps/Microlink, a software package that reportedly enables spreadsheets running on an IBM Personal Computer to share data with Ross' DEC VAX-based accounting and decision-support applications.

■ Data Processing Design, Inc.'s Wordlink, which reportedly allows IBM Personal Computers or Personal Computer XTs supporting Wordstar or Multimate to gain access to VAX series mainframes.

■ A Univation, Inc. controller board that is said to permit DEC Rainbow personal computers to be tied together to form full-fledged local networks.

■ National Information Systems, Inc.'s Teleport II, a program that reportedly connects micros such as Rainbows and IBM Personal Computers to each other or to larger CPUs such as VAXs, Decsystem-10s and Decsystem-20s.

■ An enhanced release of Exceptional Business Solutions, Inc.'s WPS-80, a Rainbow-based word processing package that, for the first time, can transmit documents among DEC micros running CP/M.

■ Able Computer, Inc.'s Softswitch feature, which, with the vendor's Attach terminal system, reportedly allows users of DEC Unibus processors to gain access to host CPUs, data files and applications.

Ross Systems' Maps/Microlink costs $10,000 and is available from its developer at 1860 Embarcadero Road, Palo Alto, Calif. 94303.

National Information Systems' Teleport II, by contrast, costs $5,000 for a basic license covering one mainframe and five micros and is available from the company at Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

Data Processing Design's Wordlink sells for a one-time fee of $1,300, plus $200 per Personal Computer and is available from the vendor at 1400 N. Brasher St., Anaheim, Calif. 92807.

Univation's local network controller board is priced at $750, with the associated software costing an additional $750 and can be bought from the firm at 1037 N. Fairoaks Ave., Sunnyvale, Calif. 94086.

The enhanced release of Exceptional Business Solutions' WPS-80 package costs $195 and is available from Suite J, 11738 Moorpark St., Studio City, Calif. 91604.

Able Computer's Softswitch communications feature licenses for a one-time fee of $1,000 and is available from Able at 3080 Airway Ave., Costa Mesa, Calif. 92626.

Integration with other systems

For Barth, the comparatively heavy concentration of communications-oriented products and vendors reflects a growing desire among DEC users to integrate their systems, not just with other DEC equipment models but with competitive gear as well — especially IBM's.

"Most of the people attending this show . . . want to find ways of getting more out of their current systems by attaching them to products from other vendors," he said.

Especially appealing to DEC users, he added, is the prospect of connecting their systems to the growing population of IBM micros or of integrating Big Blue's mainframes with VAXs operating in manufacturing and engineering environments.

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MVS TSO

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If you're developing programs under OS/MVS, you're probably using some type of time-sharing system. If that time-sharing system is TSO, a new book called *MVS TSO* is for you. It zeroes in on the tasks a programmer has to do most often, so you can master TSO in a hurry.

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- how to start and control background processing for batch jobs (a background job doesn't run in your time-sharing region, so your terminal's not tied up as the job executes)
- why you have to use native TSO commands for some functions even if SPF is available on your system

In short, you'll learn everything you need to know to use TSO commands or SPF for program development.

For experienced TSO users:
How to use command procedures

MVS TSO will also teach you how to use command procedures, or CLISTs. A CLIST is a series of TSO commands and statements that are executed in sequence (it's roughly equivalent to a JCL procedure). In this book, then, you'll find out:

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2 reasons why this book works

1. A technical subject like TSO is easier to master if you have plenty of practical examples to study. That's why *MVS TSO* is loaded with illustrations. For example, you'll find:

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- schematic drawings that show how TSO works and how it relates to MVS

These illustrations not only help you understand TSO in the first place. They also serve as handy references when you're working at your terminal.

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2. This book is organized in a way we've found works well. After chapter 1 (an introduction to MVS and TSO), the book is divided into 3 parts: one each on SPF, TSO commands, and CLIST. So if SPF isn't available at your installation, you can skip that part and concentrate on native TSO. If you already have TSO experience, you can go directly to the part on CLIST.

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DP chief at U.N. keeps tabs on worlds' worth of data

NEW YORK — Sidney Cashton has the world on an IBM. Global economic and social statistics are his daily bread.

Cashton joined the United Nations back in 1962 as a senior statistician. He is now an assistant director in charge of New York Computing Services, the group that provides computer systems and services to some 35 user offices throughout the organization, including Unicef, the U.N. Development Program and the World Hunger Organization.

Cashton

His department specializes in applications that track world population, national economies around the globe, international health and hunger — "everything from soup to nuts," Cashton said.

"I've seen data processing grow from using an outside service bureau, spending $10,000 a year for statistical processing, to what we have today, which is not an extremely large shop but a good-size shop serving a multitude of users," he explained.

"We have 85 people here that handle programming, analysis, development work and data entry for the United Nations. We use two computers, an IBM 3081 and an IBM 4381 with [40G] bytes of disk storage, and we have about 300 terminals hooked onto our systems," Cashton said.

But the magnitude of DP operations at the U.N. cannot really be measured in taking inventory of the equipment or by looking at Cashton's $5.5 million annual DP budget. The work done by the DP department here is far-reaching, serving users all over the world. Each word processing application, for instance, is custom-made because every U.N. report must be available in several languages (see story page 11).

"We've had multiple language capability on the mainframe since day one," he said. "What we did is, we got together with IBM and designed a train for the printers that contains the capability to print each line in combinations of English, French, Spanish and Russian. So the word processing capability that we now have got its start in the data processing department."

The scope of the organization also includes communications linkages with United Nations offices in Geneva and Baghdad [Iraq]. "We hope in the near future to link up Vienna and Bangkok [Thailand]," Cashton added.

> *'We are continually involved [with a flat budget] trying to ensure that we give the users adequate response with adequate facilities for their needs. It becomes extremely difficult after a while.'*
>
> — Sydney Cashton, assistant director, New York Computing Services

One of Cashton's more recent responsibilities has been to set policies for the selection of the personal computers and related software, "which has been slowly making its way into the U.N," he said.

Primary applications

He reported that personal computers were primarily requested by managers for spreadsheet applications, word processing and management information tools. He expects to have about 50 microcomputers in-house by the end of this year and around 200 by the same time next year.

Cashton said his biggest challenge for 1985 is "meeting the needs of the users — which are constantly growing — with the flat budget that's available to us.

"We are continually involved trying to ensure that we give the users adequate response with adequate facilities for their needs," he explained. "It becomes extremely difficult after a while."

Micros would compound problems

Asked if he thought the influx of personal computers would relieve some of the demands placed on him by end users, Cashton — a self-proclaimed personal computer advocate — said personal computers would only compound his problems.

"The [personal computer] used in an industrial complex such as this is not usually a device that is used in a stand-alone fashion," he maintained. "In most instances, the people are using subsets of data that is available on the host computers. They're really just an adjunct to the large computer.

"I think they're great, but I don't think we have reached the point where we know how to use them effectively," he concluded.

Office management strategies on bill at annual AMS conference

PHILADELPHIA — A business film festival, symposiums on high technology and advanced management and a special panel titled "Managing the Office of 1990 and Beyond" will headline the 66th annual Administrative Management Society (AMS) International Conference June 16-19 at the Wyndham Plaza Hotel here. The conference also will feature a computer and office show June 17-19 at the Franklin Plaza Exhibition Hall.

Discounts of $25 are available for registrations before April 1. Discounted nonmember prices are $425, including five meals, or $305 without meals. Discounted member prices are $395 with meals or $275 without meals. Single-day registrations are also available.

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U.N.'s OA veteran saves her ammo for big problems

Structured approach to change allows focus on what's 'new or going wrong'

By Susan Blakeney
CW Staff

NEW YORK — She moved from data processing into office automation instead of vice versa. She was an office automation manager before the term existed. Her biggest success is that everything she has implemented is doing what it is supposed to be doing.

This was how Carole Thompson described her career to *Computerworld* during a recent interview here. Thompson is the Coordinator of Technological Innovations in the Department of Conference Services (DCS) at the United Nations and has seen a hefty amount of innovation during her 19-year tenure with the U.N.

In the late 1970s, Thompson was selected from the U.N.'s data processing department to introduce Wang Laboratories, Inc.'s word processing system to the DCS. The DCS is a 1,700-member body that handles all meeting-related work at the U.N.

Thompson noted, "It's the largest department in the U.N. We handle the scheduling of meetings, interpreting, translations and reporting. We print and reproduce in six languages [English, French, Spanish, Chinese, Russian and Arabic] about [illegible] documents a year."

> *'In a world where there are no standards, keeping up with changing technology — the unknown — is the most difficult thing.'* — Carole Thompson, U.N.

Automating the department was no small task, and was further complicated by a fairly hostile user community that stalled the implementation of the project for more than a year. Eye strain, radiation and backaches were the cries from the would-be users. Thompson's DP background did not fail her, and she assembled a management committee and staff representatives to tackle the issues with which she was so familiar. After a long tug-of-war, the equipment came in.

"Ironically, we became known as the department that set the standards. People always call us for our guidelines. We've got a regular ophthalmologist; we let the people design their own work spaces; we've got some of the best ergonomic chairs around," Thompson said.

Her philosophy on introducing change is simple. Unlike plopping a typewriter on someone's desk, bringing in office automation requires a definite structure, she said.

"It's best if you concentrate on building a strong infrastructure so people won't be totally dependent on you. Each time you implement a system you have to pick a technical specialist — someone to act as systems expert and supervisor to train people and maintain the system. You have to off-load the day-to-day technical responsibilities as soon as possible.

"This way, I can keep my department small and lean, which is what I prefer," she added. "I only want to hear about things that are new or going wrong. This can only happen once you get rid of the day-to-day stuff."

Thompson has derived a great deal of satisfaction from knowing that people are comfortable and relaxed at work, and "they're not going home exhausted," as they had been before the automation.

She made a sports analogy about one of her biggest ongoing challenges: "You're shooting at a moving target. In a world where there are no standards, keeping up with changing technology — keeping up with the unknown — is the most difficult thing.

"You're essentially forced to decide what to order for a given application before all the facts are in. You have to plan far enough in advance to construct your budget accordingly. In a sense, you're forced to budget only knowing half the story."

To date, Thompson has automated the English, French and Spanish groups at the U.N.; the Arabic group will be on-line during 1985, and the Russian and Chinese groups will soon follow.

She said she is happy with the way things are going and "delighted at the fact that it all works."

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Get the graphics picture in March Special Report

What do users want from graphics systems and software, and how can DP managers best meet their needs? Find some answers in Computerworld's March Special Report on graphics systems.

The Special Report will focus on mainframe and microcomputer graphics and the blurring line between the two. It will examine computer-aided design for microcomputers and easy-to-use graphics for mainframe systems. The report will feature both stand-alone and integrated applications and will discuss emerging graphics standards.

Contributions to the Special Report should take one of two forms: either a tutorial article discussing issues or trends or an application story outlining a particular user firm's experience.

Articles may range from four to six typed, double-spaced pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a brief biography and a telephone number at which they can be reached.

The submission deadline for the March Special Report is Jan. 25.

If you have a story you would like to tell, an issue to speak on or any questions to ask, contact Janet Fiderio, Special Reports Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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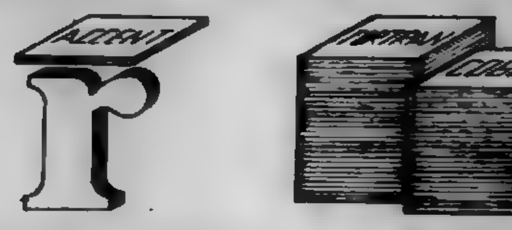

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Geisco repositions as telecommunications carrier

Firm to market Softran-based interface, file transfer, connector, communications software

By Bryan Wilkins
CW Washington Bureau

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) recently announced plans to reposition itself from a remote computer services company to an enhanced telecommunications provider offering electronic software distribution.

Geisco, a subsidiary of General Electric Co., said it will offer users electronic software distribution through its network warehouse software supplies and distribute — in conjunction with Bonneville Telecommunications Corp. of Salt Lake City — products to multiple points via the unused portion of FM radio waves. The firm has also released four software packages for the micro-mainframe environment.

Geisco said it has spent $80 million to develop its enhanced product line, which will be commercially available by the end of 1985, according to Bob McCalley, general manager of enhanced telecommunications operations.

The electronic software distribution service through Geisco's Mark III network is aimed at the 1,000 to 3,000 users who make up the Fortune 1,000 market, McCalley said. "The whole intent [of our repositioning] is to move information from intelligent providers," he added.

The areas of emphasis for Geisco, McCalley said, were value added, intelligent networking, office communications, micro integration with mainframes, professional services, electronic data interchange and remote computing.

McCalley said the company, which recently added GE's Intelligent Communications Services division as part of its business, has been beta testing the new software distribution products for one year outside and inside the company.

The major products announced by Geisco were based around its Softran Services, an electronic software management and distribution system. Users will be able to electronically distribute their own proprietary software programs, data files, test messages or spreadsheet templates. Additionally, Geisco also said it intends to be a retail distributor of commercially available software packages for micros and mainframes.

Softran is priced at $100 per package, plus there is a charge for each transaction — typically $6 to $24 per electronic download.

Softran is composed of two elements: an administrator module on Geisco's Mark III service and an end-user module for each micro. The administrator maintains a library of software for browsing and selection. The administrator can permit or deny end-user access to software and track usage for audit control.

Micro-mainframe packages

Four micro-mainframe software packages associated with Softran released by Geisco were:

- The Systems Interface, which provides enhanced interactive communications between micros and public network services such as Compuserve, The Source, Dow Jones and Mark III services. It is priced at $50.
- A File Transfer Utility, allowing rapid, error-free transmission of binary and Ascii data between micros and Mark III services over asynchronous communications lines. It is priced at $100.
- The Connector, which provides error-free data exchanges between micro spreadsheet packages and data files residing on Mark III service in an automatic reformatting conversion. It is priced at $100.
- Mark III Professional Workstation, a full screen micro-mainframe communications software package with flow control, full screen editing, print spooling and file transfer. Available electronically and by diskette, it is priced at $100.

Geisco also announced an agreement with Bonneville that will permit point-to-point and point-to-multipoint communications using satellite feeds to FM radio stations, which then transmit data over the FM subcarrier frequency to users who can receive information with addressable devices.

Bonneville has current contracts with 50 FM radio stations in 50 U.S. cities, according to President Kenneth J. Bentley. Two-way communications with a data provider and the end user via the FM satellite is made through the Geisco network.

Bentley said the service currently in operation can be used by grocery and other retail chain stores to transmit pricing changes, advertising promotions and other announcements, as well as stock and commodity price changes.

The end-user receiver/demodulator that translates the FM feed into an RS-232 communications port on a micro is manufactured by Bonneville and costs $610.

Finally, Geisco said it would also provide Quik-Ware, an electronic software warehouse users may browse through at $10/hr in search of software packages.

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DP forecasters often still in dark despite CPE tools

Conferees cite impact of fourth-generation languages, capacity shortages as concerns

By Kathleen Burton
CW West Coast Bureau

> *'DP managers still tend to underestimate future capacity resources consistently because of poor forecasting, changing specifications and pilot samples that are too small.'*
>
> —Bert Palermo, manager of Computer Performance Evaluations at Crum & Forster Insurance, Inc.

SAN FRANCISCO — Though sophisticated computer performance evaluation (CPE) tools are flooding the market today, forecasting future computing needs is still a hit-or-miss proposition for many DP professionals.

So said a group of CPE analysts and end users surveyed at the recent International Conference on the Management and Performance Evaluation of Computer Systems here.

In addition, several users voiced concerns over the assimilation of personal computers into the DP environment, the impact of fourth-generation languages, the lack of integration between systems and the recent increase in capacity shortages due to improper planning by users.

CPE tools flooding the market

Bert Palamaro, manager of computer performance evaluations at Crum & Forster Insurance, Inc. of Morristown, N.J., said that even with the sophisticated CPE tools that are flooding the market today, DP managers still tend to underestimate future capacity resource needs consistently because of poor forecasting, changing specifications and pilot samples that are too small.

Palamaro also said the most promising new CPE tools are those for measuring and forecasting networking performance and for transferring networked data to mainframes for analysis and integration.

According to Palamaro, the most important criterion a data processing manager should use to judge these new CPE tools is, "will they help our department meet the service levels that have been set?" The object of CPE tools is to allow installations to maximize the returns on their hardware and software investments, he said.

Dr. Hubert Engelbert, assistant vice-president at Irving Trust Co., a financial management firm based in New York, claimed that exceptional new CPE products have recently emerged fpr evaluating network performance and for Dasd management.

Users may face capacity shortages

Despite these product improvements, however, Engelbert said that many users will underestimate the impact of new applications on capacity and performance and will face severe capacity shortages over the next several years as a result. "Commonly, new applications have a much more demanding impact on systems than was originally planned for," he warned.

Lionel Silva, a data processing capacity planner at Amdahl Corp. in Sunnyvale, Calif., said that some CPE tools, such as a recently released MVS real-time analyzer presently being manufactured by several vendors, are "breaking new ground in the industry."

According to Silva, personal computers will play an increasingly important role in CPE capacity planning. "Attitudes have changed, and now corporations see personal computers as an asset to be managed, not just as an unintegrated orphan child," he said. However, Silva cautioned, users do not always know if a microcomputer will add to or subtract from a system's capacity, a problem that often results in severe capacity shortages for unsophisticated users.

Problems of inadequate capacity are also due to the increasing use of fourth-generation software languages, which, he said, require a great deal more processing than lower level languages.

George Simon, an analyst for the Teleprocessing and Technical Services Division of the Prudential Insurance Co. in Fort Washington, Pa., said that CPE tools have not been able to keep up with the pace of change in hardware technology, with the result that lack of integration between systems is the major problem facing the data processing world today.

According to Simon, another critical problem in the industry is that, because of their widely divergent needs, users and capacity planners speak different languages. As a result, he said, users and operational CPE planners are often at loggerheads on critical CPE issues.

Report on user satisfaction with WP systems released

DELRAN, N.J. — Datapro Research Corp. has released a report on user satisfaction with word processing systems.

The report was based on the firm's seventh annual survey of more than 27,000 users of word processing systems, in which 3,400 responses were tabulated.

According to Datapro, users rated their equipment against 10 criteria concerned with systems operation and reliability, peripheral reliability, responsiveness and effectiveness of service, technical support, actual performance compared to anticipated performance and overall satisfaction.

The study found that manufacturing companies reported the greatest usage of word processing systems, with government and educational institutions, banking and financial organizations and insurance and legal firms continuing as major users. The study also revealed that purchase is the most popular means of acquisition.

Datapro said the highest ranked systems were NBI, Inc.'s Oasys 3000, Oasys 8 and Oasys 64, followed by the CPT Corp. 8500 Series and 8000/8100, the Compucorp Omega 60 and the Exxon Office Systems Co. Exxon 500.

The report, rating 63 word processing systems, costs $29 and is available from Datapro, which is located at 1805 Underwood Blvd., Delran, N.J. 08075.

Speech Tech '85 show to focus on voice I/O applications

NEW YORK — The Speech Tech '85 Voice I/O Applications Show, sponsored by Media Dimensions, Inc., is scheduled April 22-24 at the Vista International Hotel here.

Attendees will be able to discuss voice I/O applications for telecommunications, defense electronics, robotics, medical instrumentation and quality control and as aids to handicapped workers .

The scheduled keynote speaker is Michiyuki Uenohara, executive vice-president of R&D at NEC Information Systems, Inc. in Japan. Other speakers include Richard Wiggins from the computer science department at the University of Texas; Janet Baker, president of Dragon Systems, Inc.; and Edward Neuberg, research manager at the National Security Agency.

The conference will feature field trips to facilities using voice devices, a tutorial for potential users and vendor exhibits.

The registration fee is $195 for three days and $75 for one day.

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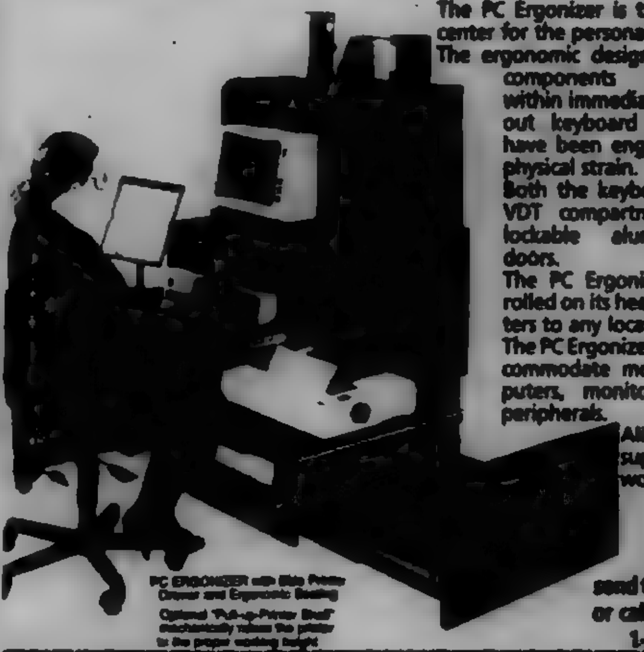

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WASHINGTON UPDATE
Mitch Betts
CW Washington Correspondent

Tax reform proposal may deter start-ups

WASHINGTON, D.C. — Officials from the American Electronics Association (AEA), at a recent press briefing, expressed concern that one provision of the Treasury Department's proposal for tax reform could choke off the venture capital needed by high-risk computer start-up firms.

William G. Moore Jr., newly elected AEA chairman and president of Recognition Equipment, Inc. of Dallas, told reporters he had sent a telegram to President Reagan commending the Treasury plan in general but strongly opposing termination of the capital gains tax preference section for high-risk investments [CW, Dec. 10].

Moore said the lower capital gains tax rate, in effect since 1978, has stimulated growth in the electronics industry and created new jobs.

Loss of the tax preference would sharply reduce the ability of small, start-up firms to get investment capital and weaken the industry's competitive position in world trade, he said.

The AEA supports Treasury proposals to lower the industry's effective tax rate and revive the 25% tax credit for research and development. Moore said these benefits would help the large, established firms but added that the small start-up firms would be harmed by the capital gains tax hike.

President Reagan vetoes NBS robotics program

WASHINGTON, D.C. — President Reagan recently vetoed legislation that would have created a $250 million federal research program at the National Bureau of Standards (NBS) to foster robotics and other automated manufacturing techniques.

Congress had approved the legislation (H.R. 5172) earlier this year as part of the NBS budget authorization for fiscal 1986, with support from the Robotic Industries Association [CW, Oct. 22].

In a statement detailing his objections to the bill, Reagan said that the variety of research, development and education programs would cost $250 million during fiscal years 1985-1988 and would "represent an unwarranted role for the federal government."

Reagan said, "Decisions on how to allocate investments for research on manufacturing technologies are best left to American industry." Furthermore, he said the proposed programs "could also serve as the basis for a federal industrial policy to influence our nation's technological development," an approach strongly opposed by the administration.

Commission supports Cabinet department

WASHINGTON, D.C. — The President's Commission on Industrial Competitiveness will recommend creation of a Cabinet-level Department of Science and Technology and a permanent federal tax credit for R&D expenditures, a commission spokeswoman confirmed recently. The panel held its final meeting Dec. 7.

The spokeswoman said the new Cabinet department is needed to "transform the current, fragmented formulation of policies for science and technology into one that would be far more effective in meeting long-term goals." Further explanation of the proposal is expected when the commission releases its final report in January or February.

The commission, chaired by John A. Young, president of Hewlett-Packard Co., was created by President Reagan on June 28, 1983. Its charter was to "review means of increasing the long-term competitiveness of United States industries at home and abroad, with particular emphasis on high technology and provide appropriate advice to the president through the Cabinet Council on Commerce and Trade and the Department of Commerce."

Infomart site of Uniforum '85 conference

DALLAS — Uniforum '85, the International Conference of Unix Users, will be sponsored by Usr/Group at Infomart here Jan. 21-25.

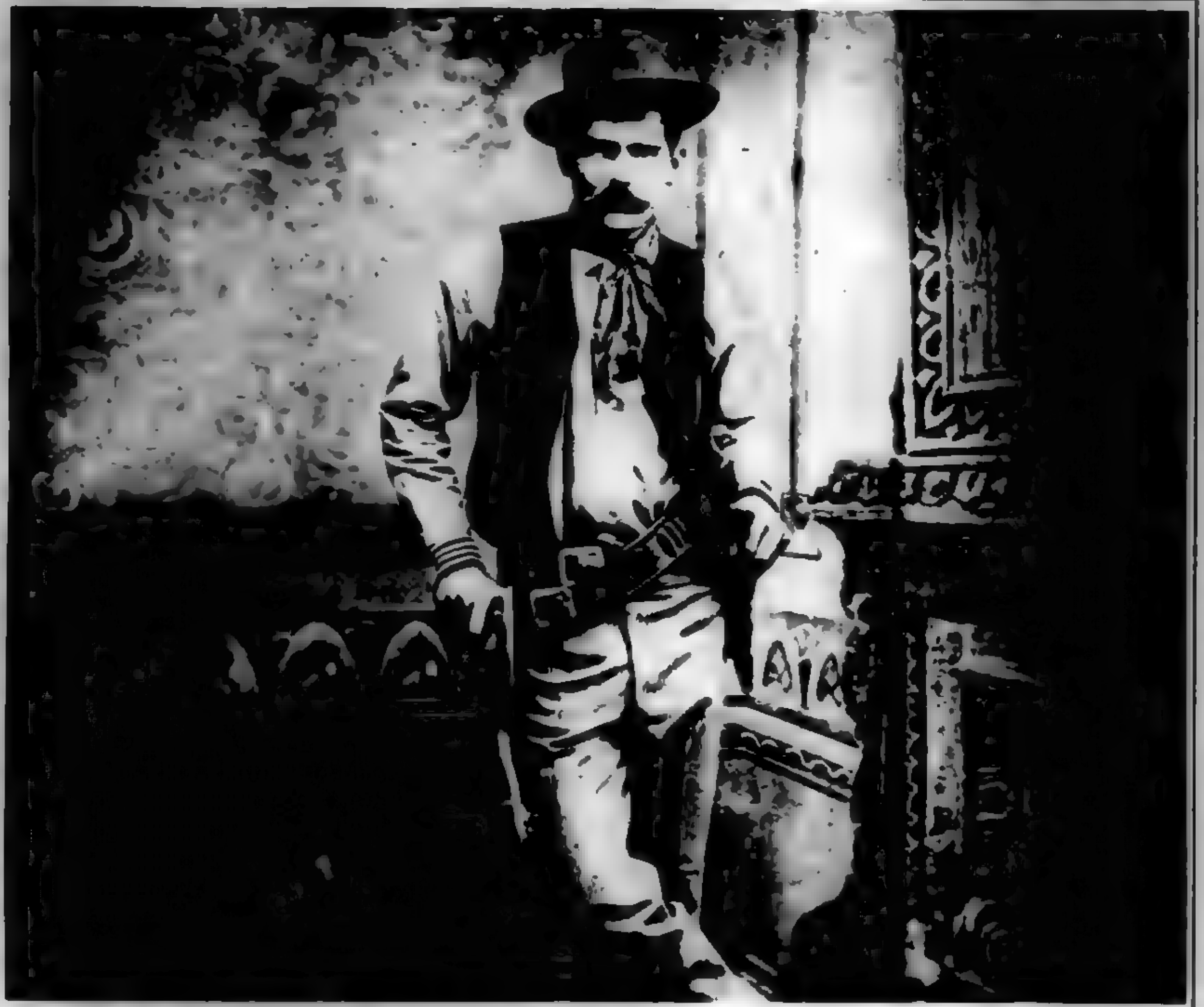
Fourteen all-day tutorial sessions will be held Monday, Jan. 21, and conference sessions are scheduled in four tracks: office systems, personal computers, engineering/programming and market trends.

Vendors of AT&T's Unix hardware, software and services will exhibit their products at the international event.

Registration prices are as follows: for the show only, there is no fee if preregistered, and registration is $10 on-site; for the tutorials, there is a $100 fee if preregistered and it costs $150 on-site; and the price for the conference is $125 in advance and $175 on-site.

Special conference rates apply for members and students.

More information is available from Uniforum, which is located at Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.



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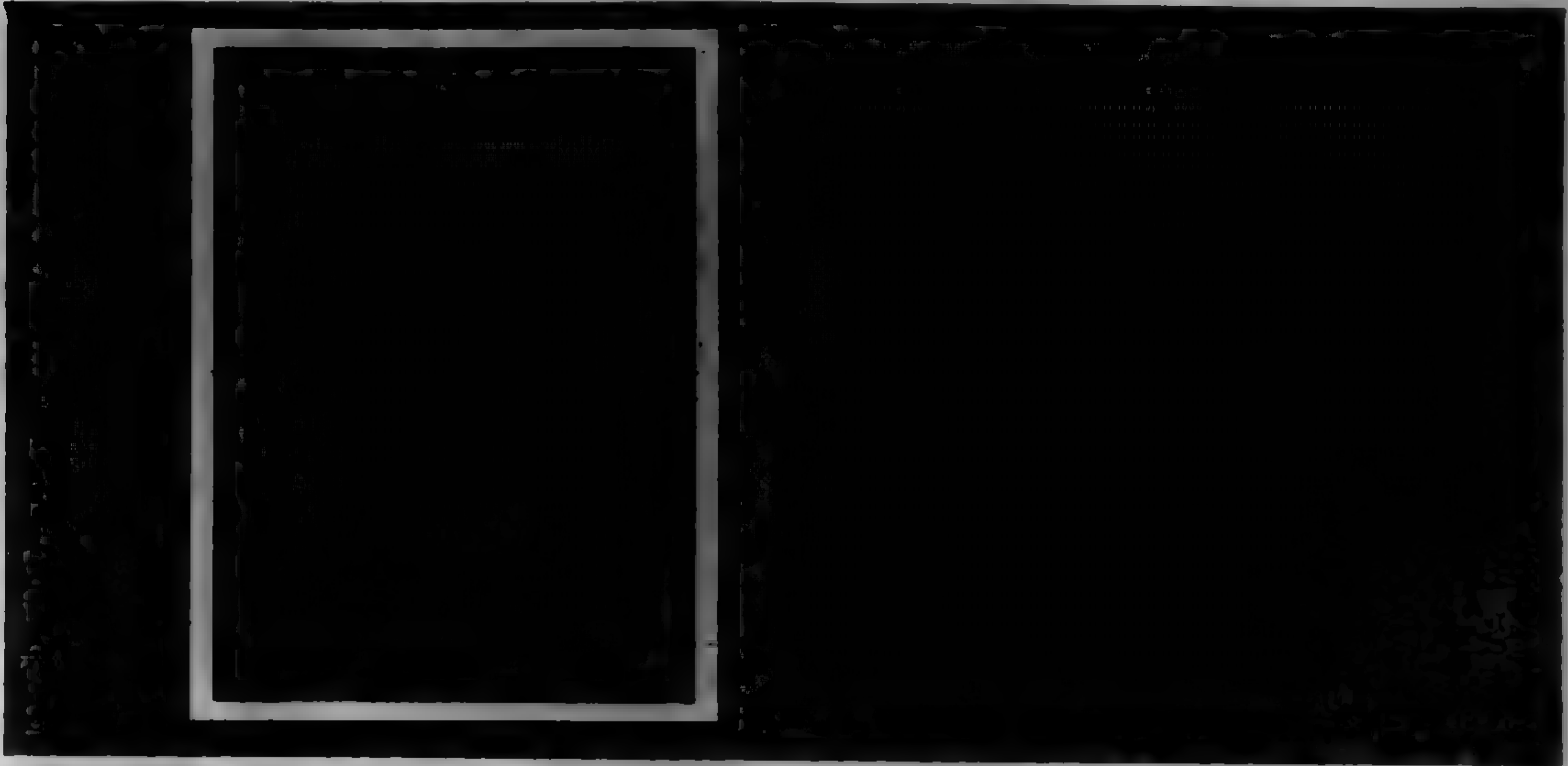

The American Electronics Association (AEA) is composed of 2,700 member companies. The members represent various aspects of the electronics industry, including manufacturers and suppliers of computer systems and peripherals, semiconductors and other components. The organization claims that 75% of its membership is small companies employing fewer than 250 people.

Recently, Computerworld *Senior Editor/Systems Tom Henkel interviewed the newly named chairman of the organization, William Moore. Moore, who is also president of Dallas-based Recognition Equipment, Inc., began the one-year term as AEA chairman Nov. 30. For the past two years, Moore has served as a member of the AEA's executive committee, and he has been a director of the organization for the past four years.*

Q *The AEA has been warning that the U.S. might lose its competitive edge in the world electronics market. So far, those predictions have not come true. Has the AEA changed its position?*

The relative position of the U.S. in the electronics industry is still of concern to us. One area where the U.S. will probably lose its edge this year is as an exporter of electronic equipment. We had a positive balance of trade last year, but marginally so. It looks like we are going to have a negative balance of trade in electronics this year.

There are a lot of reasons for this. One is the strength of the dollar, which affects our ability to sell products overseas. Another reason is the cost of capital, or the cost we have to pay vis-a-vis our Japanese competitors in getting capital for our businesses. The AEA continues to focus its lobbying activities in those areas. We'd also like to see the dollar become a reasonable standard for international trade without being an inflated dollar.

Q *What about the trend of more companies manufacturing overseas?*

I think you are always going to see that. There are a lot of incentives — not only access to foreign markets but also tax incentives for high-tech companies to go overseas. But you have to put that into context. The manufacturing side of the high-tech business this year became the largest manufacturing sector in the U.S., with 2.3 million jobs and a $50 billion payroll. That is like four steel industries. The industry has been growing, and there have been a lot of new jobs created. If we continue at this growth rate, we will continue to create a lot of U.S.-based jobs.

Q *Many start-up companies develop products that are closely patterned after successful products. For example, there was a flood of compatible products after IBM unveiled its Personal Computer. Currently, many companies are announcing workstations based on Motorola, Inc. 68000 series microprocessors. How do you feel about these look-alike products?*

I have more of a personal opinion than an AEA opinion. Basically, what you are talking about is the free market action in the entrepreneurial part of the computer business.

Take, for example, the problems that the floppy disk companies are having. It was very easy for someone to get a bunch of technicians together, put them in a garage, go out and get $2 million in venture capital and develop a floppy disk. But the market simply would not support that many products. So the people with the more marginal products are falling by the wayside.

You could argue the venture capitalists were excessive in financing all these companies. But in the net venture capital market between August 1982 and August 1983, almost anything they floated would sell. We had some excesses, and we're paying a price for those excesses now.

> *'A lot of these vendors [of look-alike products] are very resilient. If they try once and don't make it, a lot of them go back and try again.'*

Q *How do you view the long-term impact of look-alike products on U.S. vendors' ability to develop innovative products?*

It probably leads to a fair amount of conservatism from a user's point of view. Once he's been burned once or twice by this phenomenon, he probably favors the major vendors, such as the standardization around IBM or IBM-compatible products.

But does it limit innovation? I don't think so. I think what you really end up with is the survival of the fittest. In fact, a lot of these vendors are very resilient. If they try once and don't make it, a lot of them go back and try again.

Q *But if many small companies possess that resilience, what does that mean to users? For example, what is the user of a 68000-based workstation to do if ten years from now the supplier is developing Lisp machines or Ada machines?*

Over time, the market is much less responsive to the entrepreneur for that reason.

> *'The Japanese will dominate [the optical disk area] because it will be a commodity product supplied to various vendors.'*

Q *One advantage to look-alike products is that they are typically developed with inexpensive off-the-shelf components. That has led some industry observers to believe computer systems are becoming a commodity. Do you feel this is a trend? What future impact to you feel it will have on the electronics industry?*

It has become fairly clear over the past few years that the Japanese are extremely competitive when it comes to commodity products. We have seen them dominate in the random-access-memory development area. We are also beginning to see the same thing in the optical disk area; the Japanese will dominate because it will be a commodity product supplied to various vendors for personal computers, home entertainment and big systems.

But when you get into the systems side, although you may use commodity products to piece together your system, it is clearly the systems software, the operating system and the overall performance characteristics of the system itself that are most important. And I think that is where the U.S. will be preeminent, both as a manufacturer and exporter. You just have to understand that it is very difficult for us, given our short-term profit orientation, to be consistently cost-competitive in investing the amount of development funds you need to have these first-rate commodity products.

Q *The term "industry standard" is applied to many products in the electronics business. How do you feel about standards developed by recognized standards organizations such as the International Standards Organization and the American National Standards Institute?*

The best thing that has happened to the computer business, in my opinion, has been the proliferation of the personal computer. Because now you have people like you and me trying to plug a printer into a printer interface, trying to initialize a disk and trying to load a very fundamental piece of

See MOORE page 16

Firm to launch satellite-based micro teletext system

By John Dix
CW Staff

NEW YORK — A two-year-old company here is readying an information distribution system that will marry satellite and teletext technology to enable information providers to disseminate data to personal computer users.

Satellite Network Delivery Corp., which was founded with seed money from the Tribune Co. of Chicago and recently raised more than $2.5 million from a private placement by Cralin & Co., an investment banking and retail brokerage firm in New York, is building a teletext-based network targeted at business use.

Capacity of the company's Business Teletext Network (BTN) will be leased to information providers such as brokerage houses, investment services and publishers. These firms reportedly will use the system to distribute business information, provide quotation services for securities and commodities trading, distribute advisory services and broadcast electronic mail to personal computer users outfitted with special decoders.

A central BTN computer facility in New Jersey will accept real-time data from information providers. After formatting the data for network use, this computer will transmit the information via satellite to television studio receive-only satellite earth stations located in the top 75 markets across the country.

Data inserted in VBI

Participating television stations, many of which the company has already reached agreements with, will be outfitted with BTN-provided electronics that will insert the received data into the broadcaster's vertical blanking interval (VBI) for distribution like regular television signals. The VBI is the black line that appears between picture frames when the vertical hold on a television goes out of whack.

Information bundled into the VBI will be broadcast to and received by addressable tuner/decoders that service subscribers will attach to their personal computers. The memory and intelligence of the personal computer, coupled with the decoder's memory, will enable the user to view the information as it is being received or save the information for later use.

BTN plans to retain control of all user decoders, which will enable it to add and delete subscribers by remotely turning the decoders on and off. The identification number of each decoder will also enable BTN to address closed user groups or filter out information for delivery to specific subscribers.

When completed, the BTN network will reportedly be capable of supporting hundreds of concurrent information services. Each of these services can operate at its own speed.

Users will reportedly be able to use their personal computers and a single tuner/decoder to seize and save information — either directly or in an unattended mode — from several subscriptions, even if they are transmitted at the same time. Additionally, the decoders can be equipped with a decryption capability to lessen the likelihood of service piracy.

The company anticipates that the network will be used during business hours to distribute real-time information and that after-hours it will be used mainly to distribute larger amounts of data. A subscriber's personal computer, interfaced with a 9,600 bit/sec tuner/decoder, would enable a user to capture 5M bytes of information in an hour and a half, the company estimated.

In practice, an information provider could use this capability by downloading a large data base once every three weeks, for example, and update that information daily to keep it current, the company reported.

Although service costs are still uncertain, the firm estimated that user decoders will sell for approximately $300. Information providers network contract costs will reflect projected use. The network is scheduled to be operational by the end of next year.

MOORE

from page 15

software. Suddenly, the users of computers are no longer taken in by the idea of some all-encompassing set standards that will make their lives easy.

From this point forward, other than broad standards — such as how to shake hands in a communications protocol — standards are going to become less important because the user is more sophisticated.

The reason IBM was so dominant in the 1950s and 1960s was the user didn't want to be bothered. He wanted someone to hold his hand for him. And IBM was great at that.

***Q** How do you feel about the so-called "de facto" standards that center around popular products? Are these really industry standards or simply market trends that will change in a short time?*

Standards really mean that you have second and third sources for something.

I want to know that if I choose an Intel Corp. microprocessor as the basic building block of a system, there will be three or four other sources of supply — especially if IBM buys everything Intel builds. So I want to make sure there is a standard to make that particular chip.

Then there are interconnect standards. Basically, I want to know how I get onto a network, but it is more analogous to the telephone network.

What we are really looking forward to is to allow all these computer terminals to be able to talk to each other over some common network.

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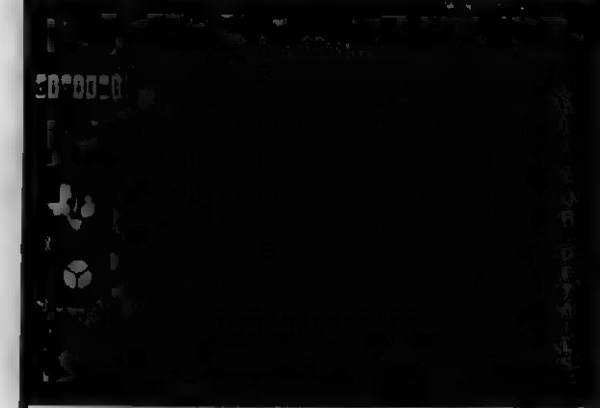

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CCDA statistics show 90% of Canada's programs illegal

Software piracy, plagiarism cost manufacturers millions of dollars, increase prices

By Laura Jo Gunter
Special to CW

TORONTO — Just one out of every 10 software programs in use in Canada is a legally produced program. The remaining 90% of the programs here are either pirated or plagiarized, according to statistics from the Canadian Computer Dealers Association (CCDA).

In dollars and cents, this means a considerable loss to software manufacturers, society at large and even the end user. Industry analysts in the U.S. estimate that in 1984 alone, U.S. software producers will lose $700 million in revenues to illegally copied programs.

Similar figures are not available in Canada, but the CCDA estimates that 10,000 jobs are lost annually in the software industry due to piratings. This costs the Canadian economy as much as $100 million per year.

Perhaps surprisingly, piracy also hurts the end user. Software companies must raise the price of their programs to compensate for revenues lost to pirates. Scott Brown, technical public relations director for Ashton-Tate of Culver City, Calif., admitted that this phenomenon has caused his company to increase prices for its software. The reason, he said, is that there are three to seven times as many pirated copies of the company's software circulating than there are legitimate programs.

The actual act of piracy can be as innocent as a student following the teacher's instructions to copy a disk. It can also be as irredeemable as someone being in business solely to copy the valuable results of the labors of others. With nearly no overhead, the pirate can undercut the originator by so much that the originator has little chance of competing.

Obviously, it is the latter case that worries most legitimate software producers. This kind of piracy can take one of three forms. The first type is the commercial pirate working out of a storefront, often going under the title of "software review club."

"This is the major way that pirates get around the law," maintained Bruce Hampson, president of the CCDA. "They tell the customer that he has to pay $10 for a copying charge and then he can take the program home to evaluate it. After the evaluation, the customer is on his honor to destroy the copy and buy a legitimate program, but nobody will. They [the pirates] can claim that they're charging a copying fee and not selling anything, so they're not breaking the law."

This is not to condemn all review clubs. There are legitimate clubs that loan software for review and have it returned in much the same way as a book library system.

Then there are the pirates inside corporations. In this case, the pirates are saving money by buying one program and then making several copies to be distributed among other employees.

This small network of users also fits the last type of pirate known as the "home hacker." These people copy software to sell or give to a small market, usually friends. This group is the largest in terms of the number of people involved but is the least likely to be prosecuted, Latner said, because they usually deal with less expensive software, such as game programs, in small quantities.

Because of piracy, software companies are developing sophisticated copy protection for their products. This makes it difficult, if not impossible, for a legitimate user to make a backup copy in case something happens to the original.

"It's also hard to put software onto the hard disk," claimed Glen Siegel, president of the Personal Computer Club of Toronto. "It [copy protection] makes life more difficult. If you ruin the master disk, then you're out of luck until you get a new one."

Robert Mittler, director of information services at Bristol Aerospace Ltd. in Winnipeg, Canada, said that he would not mind the hassles if it would help the software developer.

Gunter is a staff writer for Computer World Canada, *which is published by Rattray Publications Ltd. of Toronto.*

SAS users meet set

RENO, Nev. — Users of SAS Institute, Inc.'s SAS family of products will get an opportunity to discuss new applications and discover new techniques at the 10th annual SAS Users Group International (Sugi 10) conference to be held at the MGM Grand Hotel here March 10-13.

According to SAS Institute, more than 2,500 users of SAS products are slated to attend the conference, which will kick off with a Sunday evening opening session hosted by SAS Institute. Sessions will cover such topics as capacity planning and evaluation, systems software, econometrics, time series and operations research, education and consulting, graphics, information systems, interactive techniques, microcomputers and minicomputers.

In addition to the sessions and a roundtable luncheon discussion, SAS/Graph users will submit their best efforts in the first SAS/Graph Competition and Exhibit. Entries will be submitted for "Best Presentation of Data" and "Most Creative Use of the Software."

Registration for Sugi 10 costs $75. More information is available from SAS Institute, Box 8000, Cary, N.C. 27511.

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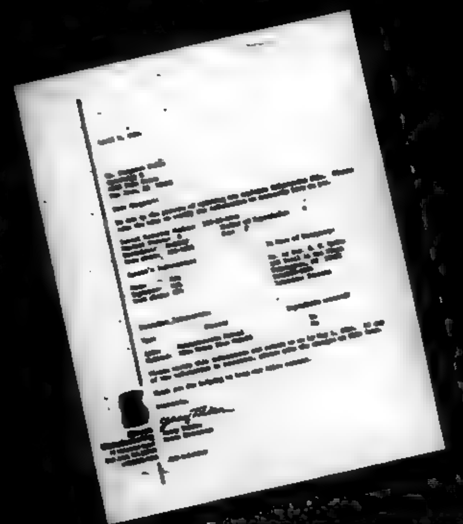

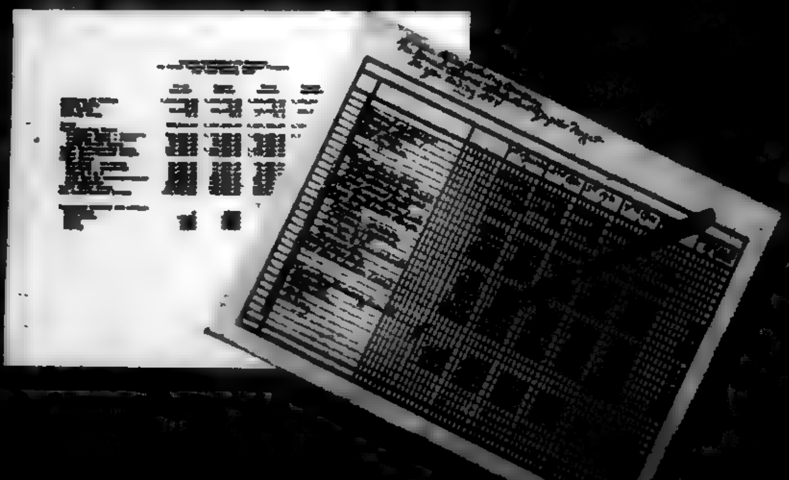

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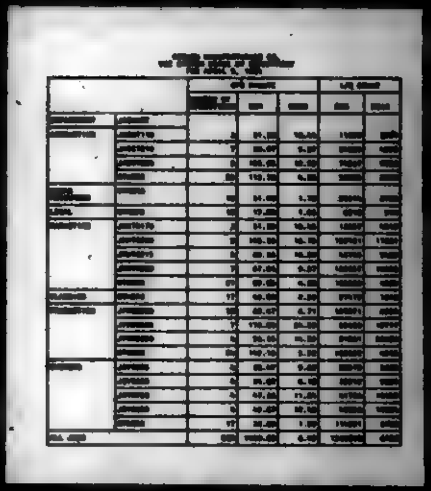

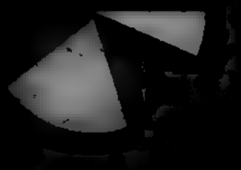

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INTERNATIONAL REPORT

CW International News Network

AUSTRALIA

SUMMER HILL — An expert system that provides quantitative measurement of the performance of software and systems will be the first project of an artificial intelligence research center to be established here next month.

The Productivity Research Center will be created by software consultant David Tow, with the backing of the Systems Research Institute of Australia in Perth. The system, called the Spacer 9 system, will reportedly provide audit and comparative evaluation and review.

BRAZIL

BRASILIA — Two policies on privacy are now under debate here in the Brazilian Congress. At issue is the recovery and use of information kept in a public data base. The latter proposal, seen as the more far-reaching of the two, is seeking to keep more information safe from potential government surveillance.

ITALY

ROME — IBM Europe President Kaspar Cassani told the European scientific press here recently that the company will award an IBM Europe Prize for the best European scientist in 1985. He also announced the establishment of a scientific engineering center here to be made available, free of charge, to 15 European engineers.

JAPAN

TOKYO — IBM Japan Ltd. has recently begun full-scale production of 5¼-in. hard-disk drives for the IBM Personal Computer XT. The drives reportedly will be available in 10M-, 15M- and 20M-byte configurations.

■

TOKYO — Densan Co. Ltd. has unveiled its Idea 2000 microcomputer, which runs on Unix 4.1 and operates at speeds up to 20M bit/sec using a local bus, the vendor said. The system is being targeted at schools, laboratories and in distributed, office automation and computer-aided design environments. Densan also announced that it will begin exporting its products on a large scale to the U.S.

■

TOKYO — Fujitsu Ltd. has announced a 16-bit personal computer, the FM-16 Bata, for business use. The machine is based on the Motorola, Inc. 80186 microprocessor and the Japanese CP/M 96 Kanji operating system. It reportedly handles Kanji character processing.

■

TOKYO — Nippon Telegraph and Telephone (NTT) has unveiled its Captan videotex service. The system currently lists 310 information providers and 1,790 terminals in use.

ENGLAND

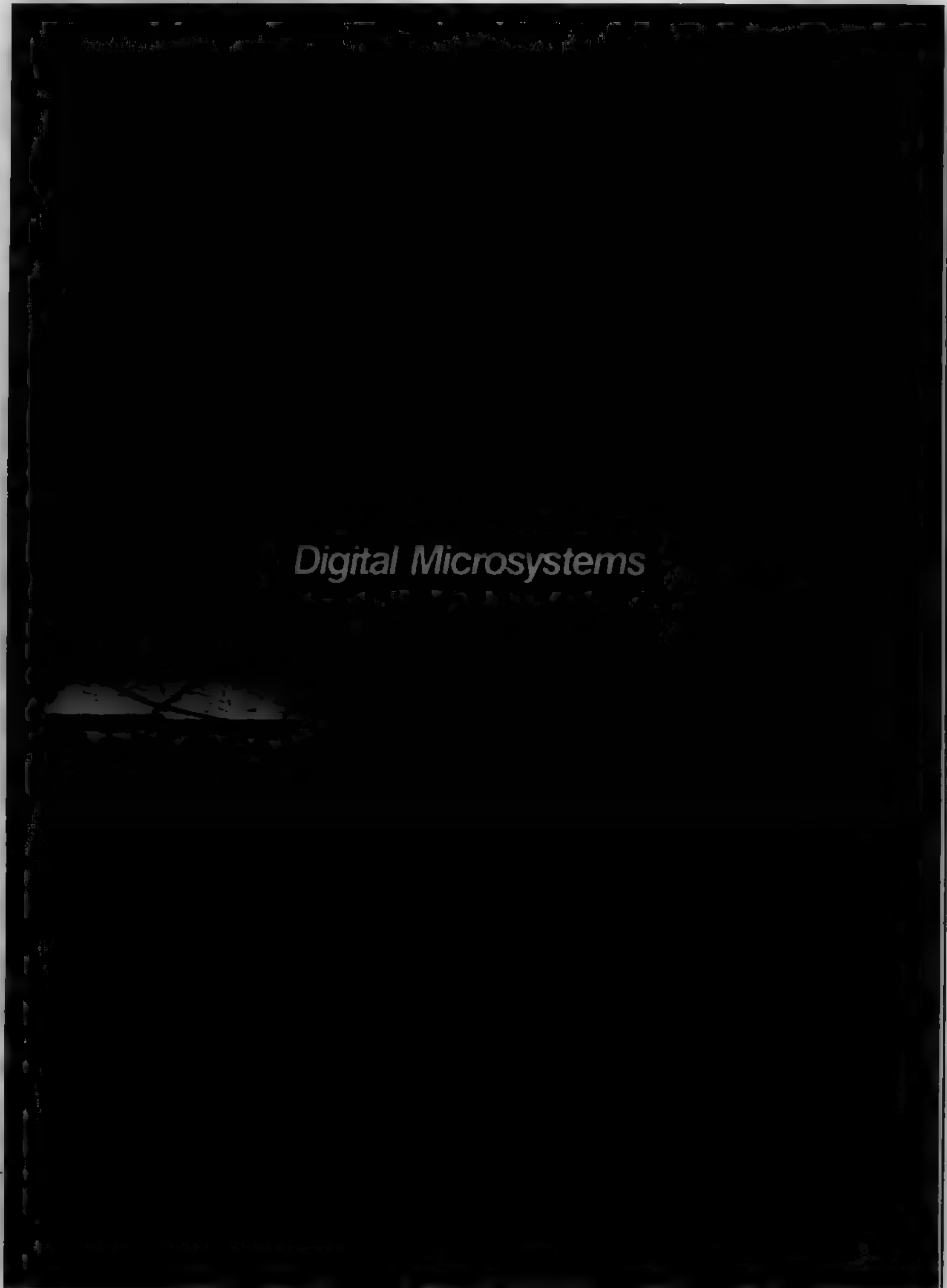
LONDON — The UK has gained a major presence in the Chinese computer market with the establishment of a $50 million joint venture company to produce microcomputers in China. The UK consortium, headed by Rair Computer Corp., will reportedly provide the Chinese with the knowledge and equipment needed to establish their own micro industry.

■

LONDON — Embarrassing news greeted Control Data Corp. here with the revelation that the Russian PS 2000 supercomputer, recently sold to India, is based on CDC technology. The system was originally conceived as a Soviet-CDC joint project, but the U.S. government forced the American vendor to pull out of the project. The PS 2000, which is said to be in the 400 million to 600 million floating-point operations per second range, makes the USSR the third independent source of supercomputers in the world.

WEST GERMANY

MUNICH — IBM is being accused of selling its machines for low prices through the back door in order to undercut competitors here. At the same time, the German subsidiary of the Swedish lessor ICS is thought to be profiteering on IBM's 40% university discount policy by leasing discounted machines to German universities and reselling them to commercial users for full price.



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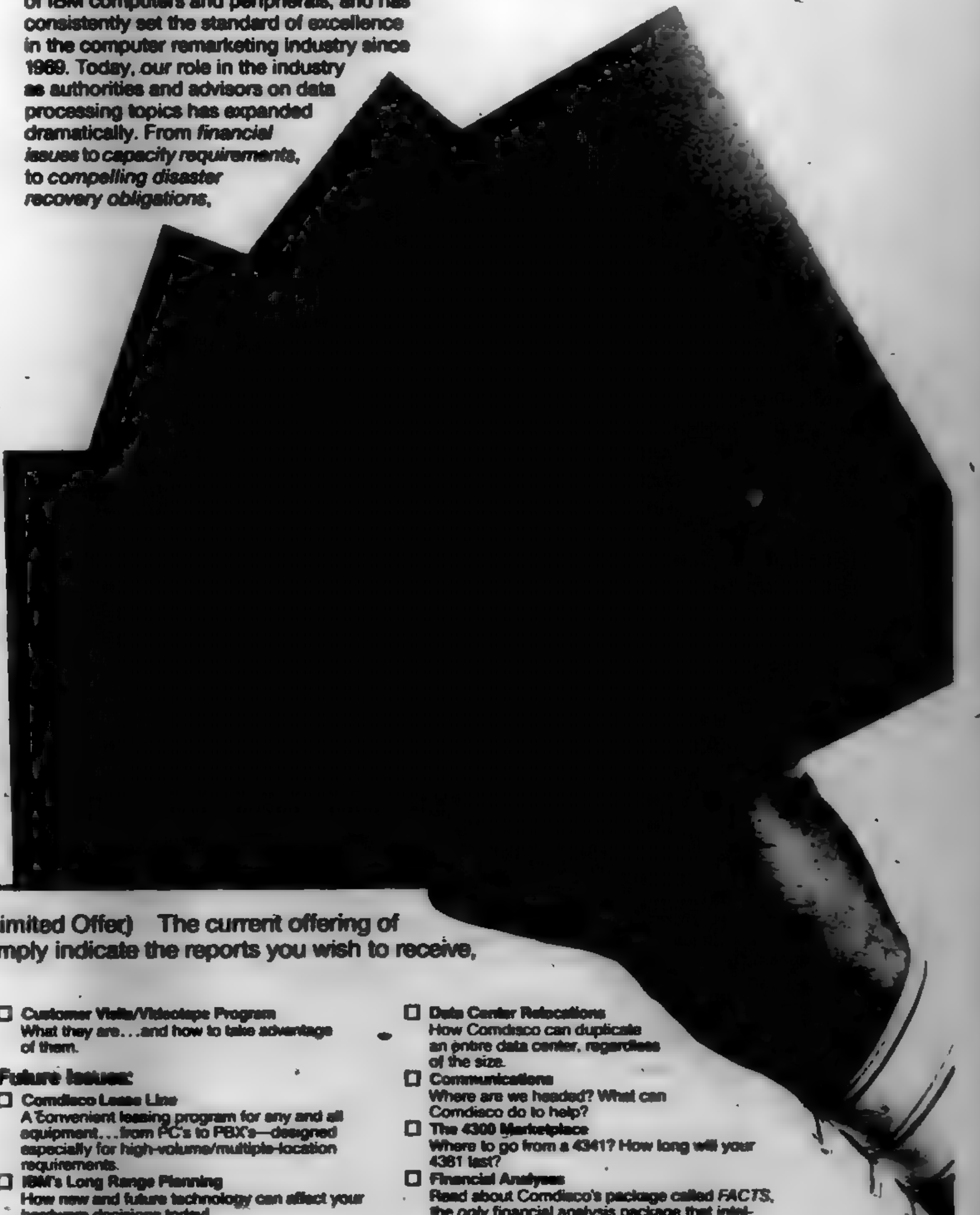

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NEWS

Computer-related training available for handicapped

By Donna Raimondi
CW Staff

STAMFORD, Conn. — Thirty of the top Fortune 500 companies are giving gifts of money, time and hope here to a group of handicapped people.

The companies are funding a program run by the Biped Corp. that trains handicapped workers to become computer programmers, according to Kathy Jarvie, instructor/coordinator at Biped. The one-year school, which is free of charge to enrollees, teaches Cobol, Basic, JCL and dump analysis to the physically handicapped and offers classes in additional subjects such as microcomputers and data bases, according to Jarvie.

The school's graduates have found jobs in a variety of businesses, she noted, and it usually costs the hiring business nothing for special equipment or accommodations.

At present, GTE Telenet Communications Corp. and Union Carbide Corp. contribute $70,000 to $80,000 worth of computer time each year, Jarvie said, and companies, including American Can Co., Xerox Corp., Reader's Digest Association, Inc., Texaco, Inc., IBM and Perkin-Elmer Corp. donate money, equipment, office supplies and anything else the school needs to do its job.

Representatives from donor companies sit on all school committees and advise the school staff on what job skills are in demand, Jarvie said, helping it to fulfill realistic business community needs.

Industry provides a better program

The program was started in 1980 by Joseph LaMain, Jarvie said. "LaMain was a programmer/analyst at the time, and he worked for the Easter Seal rehabilitation center in New Haven, Conn. He thought that industry would provide a better program, with less red tape, than any government agency could," she said.

The program now operates centers in White Plains, N. Y. and Stamford, Conn., Jarvie said. Twelve students are accepted into each program from the more than 200 who apply at each location. Each program has two teachers, she said.

The program accepts students with almost any handicap, including blind, deaf and quadriplegic people, Jarvie said, but it is not easy to get accepted. Jarvie administers IQ tests to all applicants, looks over medical reports and high school or college records. The student then sits with a psychologist for four hours and performs a number of computer aptitude and reading comprehension tests, she said.

The classes comprise a variety of age groups and education levels, Jarvie said. This year, two of the students she taught had master's degrees and two were straight out of high school, she said.

In addition to course work, the students are taught business etiquette, dressing for success and a variety of business related skills.

"We run the program like a company," Jarvie said. "We teach the students about status reports, presentation arts and other skills that the corporations tell us the students need to be ready for employment." The instructors hold students responsible for reporting equipment problems to vendors and seeing to it that repairs are made, she noted. "They basically run the company with my guidance," she added.

After completing the course, the new programmer receives a certificate and goes through a committee — made up of members of the sponsoring companies — for placement.

More information is available from Biped, 26 Palmers Hill Road, Stamford, Conn. 06902.

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IBM Software Notes

News for the DP professional

BancOhio is constantly improving its products and services, with help from IBM's DB2.

Managers at BancOhio Are Banking on DB2

"DATABASE 2 (DB2) is an efficient vehicle for providing our top management with financial and analytic details," says Jack Kiger, Vice President and Director of Data Processing at BancOhio in Columbus, Ohio.

The bank, which has more than 250 branches throughout the state, has been testing DB2, IBM's full-function relational data base system, for a year and a half. "In that time, we did a 22 man-year MIS project in only 24 man-months," reports Kiger.

The key to this outstanding productivity is DB2's powerful Structured Query Language (SQL), which makes corporate data available—simply, economically and with full data security and control.

Through its Query Management Facility (QMF), DB2 provides end users with a friendly interface to SQL, including a full set of helps and prompts. Users can query the data base directly, ask the system to generate reports or create their own unplanned reports.

But DB2 is much more than an end-user product.

It's a full-function relational system that lets professional programmers develop complex applications with greatly improved productivity. It provides them with the facilities they need for backup, recovery, restart and security. These functions can be incorporated in an application by simple statements and need little explicit programming.

With these security provisions, transactions are well protected. This means that DB2 can handle online applications while maintaining the integrity of the corporate data resource. Thus DB2 can meet the full range of needs: production work as well as end-user query and reporting services.

"Our experience with DB2 has been beneficial," Kiger adds. "From the standpoint of stability and ease of use, it's the best product IBM has delivered to us." ■

A NOTE TO THE READER

To keep you informed of software developments at IBM, we will publish *Software Notes* on a regular basis.

Software Notes will bring you news of programs that help make systems and people more productive. It will feature articles on high-productivity packages such as DB2, IBM's full-function relational data base system, and application development tools such as the Cross System Product Set. And it will tell you about users' experiences with IBM software.

We'll also let you know about new software courses and other IBM offerings that can help you get the most from your DP resources.

More *Software Notes* appear on the next page.

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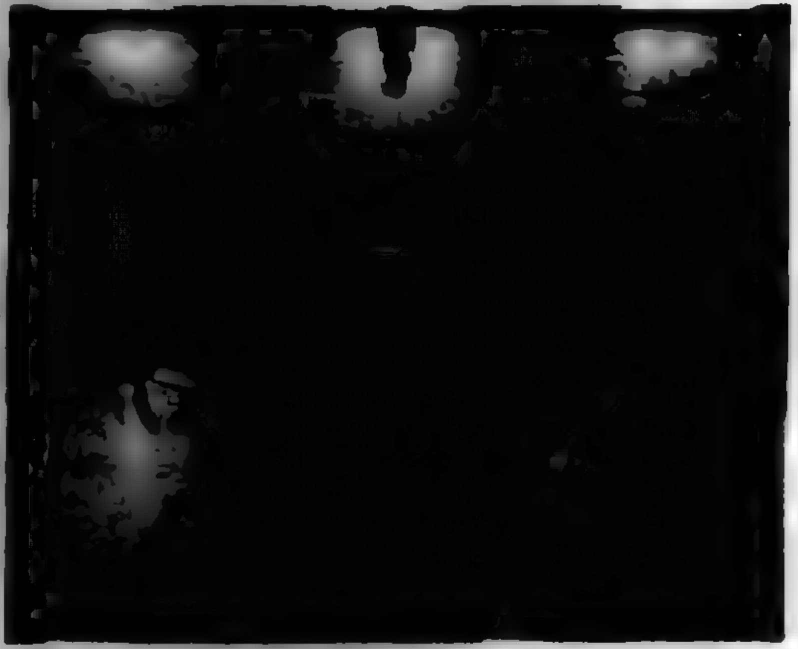
IBM Software Notes



Evaluator (rear) works with a piece of IBM software. Observers note her efforts and record them.

'Usability' Labs Help Make IBM Software Easy to Use

It's one thing to create software that works. It can be quite another to make that software easy for users to learn and operate, and to support it with documentation that's easy to follow.

Dr. Lewis Branscomb, IBM's chief scientist, puts it this way: "It shouldn't be necessary to read a 300-page book of instructions before using a computer, any more than it is before driving a new automobile."

That's why, prior to release, IBM evaluates many pieces of software for "usability." We've taken a scientific approach to this process in Usability Laboratories located in cities across the United States.

The evaluators are people who have not had software experience.

In each lab, we've set up a complete office environment, attractively decorated and comfortably furnished. On each desk is an IBM workstation which supports the software to be evaluated.

Here, evaluators at the workstations are handed the instruction manuals and assigned the task of putting a piece of software through its paces. As each evaluator works, he or she is observed and recorded. Every interaction on the workstation screen is recorded too.

Through this feedback we've learned a lot about our software—and our documentation. We've also made software, such as the IBM Business Management Series, a lot simpler to use. ■

IBM Offers Courses on IS Management

If you're interested in learning about management issues related to information systems, or in getting advice on training, or in just keeping current yourself, you'll be interested in the offerings of IBM's Information Systems Management Institute.

The institute offers over 38 courses in six information systems areas: Information Systems Planning, Applications Development, Service Management, Information Asset Protection, End User and Personal Computing, and Personal Development and Management.

The courses seek to help users increase their productivity in data processing. Lasting from two to five days, the courses are offered in over 25 cities and are taught by staff instructors who combine years of teaching with practical knowledge.

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The Cross System Product Set Aids Programmers at Corning

Through an innovation in application development, Corning Glass Works, Corning, New York, has eliminated most of the detail work involved in conventional programming.

The innovation is the Cross System Product Set from IBM.

With this program, a developer can complete every phase of a project interactively at a terminal. This includes defining and validating screens, files and logic; testing and debugging a program; running trial executions and putting the application into production.

The Cross System Product Set is especially effective as a development facility for applications designed to run under CICS, or in distributed 4300 and 8100 systems.

According to Steve Grace, Supervisor of Application Development Technology at Corning, "The program's interactive nature and extensive debugging aids lend themselves to developing applications quickly and accurately."

What's more, the Cross System Product Set requires fewer special CICS skills on the part of the programmer. Such features as trial screens and quick prototype executions improve communication between DP personnel and end users.

The program runs on all 4300 and 30XX series operating systems and on the IBM 8100 with DPPX/System Program. It's portable, so that an application developed on one supported system can be run on another.

Mr. Grace sums up Corning's experience with the Cross System Product Set like this: "As a result of its many benefits, we've been able to satisfy user requirements faster and more economically." ■

RACF Helps Protect Data At United Student Aid Funds

"We are pleased with the enhancements of the IBM Resource Access Control Facility (RACF)," says Dan Roddy, Manager of Data Center Support for United Student Aid Funds, Indianapolis, a nonprofit corporation which guarantees and services student loans.

"In particular, a new system of resource definition in RACF, called 'generic profile checking,' makes administration much simpler. Most data sets can be protected using only the first-level qualifier," Roddy adds.

Profile checking is just one of the many features that make RACF easy to implement and maintain. Flexibility of design and structure is another. In addition, with RACF you need not modify your operating system or system-level software such as CICS, IMS, DB2 or HSM.

RACF uses list orientation, a simple technique for access control. With little effort, you can establish ownership and control over your resources. You can also designate who else may have access—and how much access.

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Positive control, excellent security, simple maintenance and administration: These are the benefits that make RACF a widely accepted access control product. And RACF is designed to work closely with such IBM operating systems as MVS and MVS/XA. ■

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System used in protest

Students stage futile attempt to crash computer

By Donna Raimondi
CW Staff

OBERLIN, Ohio — Student activists here tried but failed to overload the campus computer system to bring attention to their demands that Oberlin College divest itself of stock in South African companies.

In response to an open plenary session of the school's board of trustees in the Mudd Learning Center — where the library and computer center are housed — a splinter group of the Student Coalition Against Apartheid decided to bring down the computers in protest of the stock holdings, said John Harvith of the school's public relations office.

"The student organization got together to determine how to protest, and the organization as a whole decided not to use computers to do it," Harvith said, but four to six students did it anyway.

"They were not sophisticated about it," said Kevin Weidenbaum, director of academic support services at the college. "It's possible that if a consultant had not come in and told me what was happening, we wouldn't even have noticed," he said.

The protesters decided to run programs that would grind on the system, Weidenbaum said, and several students sat at terminals with an old Basic assignment — a long iteration process to find sets of integers in a given equation, he said. Others did "even sillier things" he added, like setting up loops to keep the printers spewing out garbage printouts.

At the peak of the protest, the computer was running an average load, Weidenbaum said. "These are not hackers with novel and interesting ways to crash the computer," he added. Some of the student protesters had never used their accounts before, and the students did not really know what they were doing, he said.

The target computer was a 10-year-old Xerox Corp. Sigma 9 that is not used much anymore, Weidenbaum said. Students also tried to bog down the college library's automatic circulation system by checking out and returning huge numbers of books — another ploy that failed, he said.

"We deactivated a couple of student accounts because of it," he said, but no further disciplinary action will be taken.

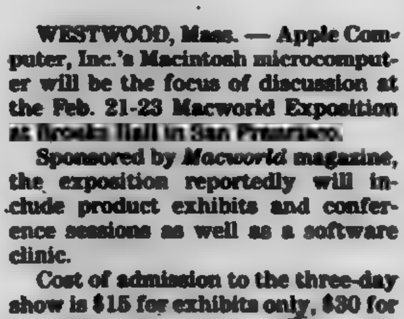
Apple Macintosh subject of meet

WESTWOOD, Mass. — Apple Computer, Inc.'s Macintosh microcomputer will be the focus of discussion at the Feb. 21-23 Macworld Exposition at Brooks Hall in San Francisco.

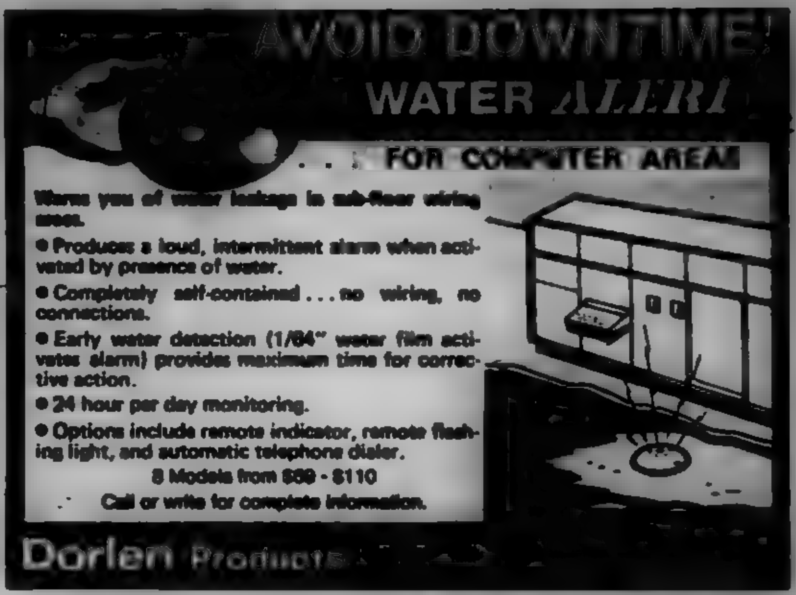
Sponsored by *Macworld* magazine, the exposition reportedly will include product exhibits and conference sessions as well as a software clinic.

Cost of admission to the three-day show is $15 for exhibits only, $30 for exhibits and conference. Charge for students is $5 for exhibits only, $15 for conference and exhibits.

More information can be obtained from Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.



"Do you remember the good old days . . . and the Christmas parties?"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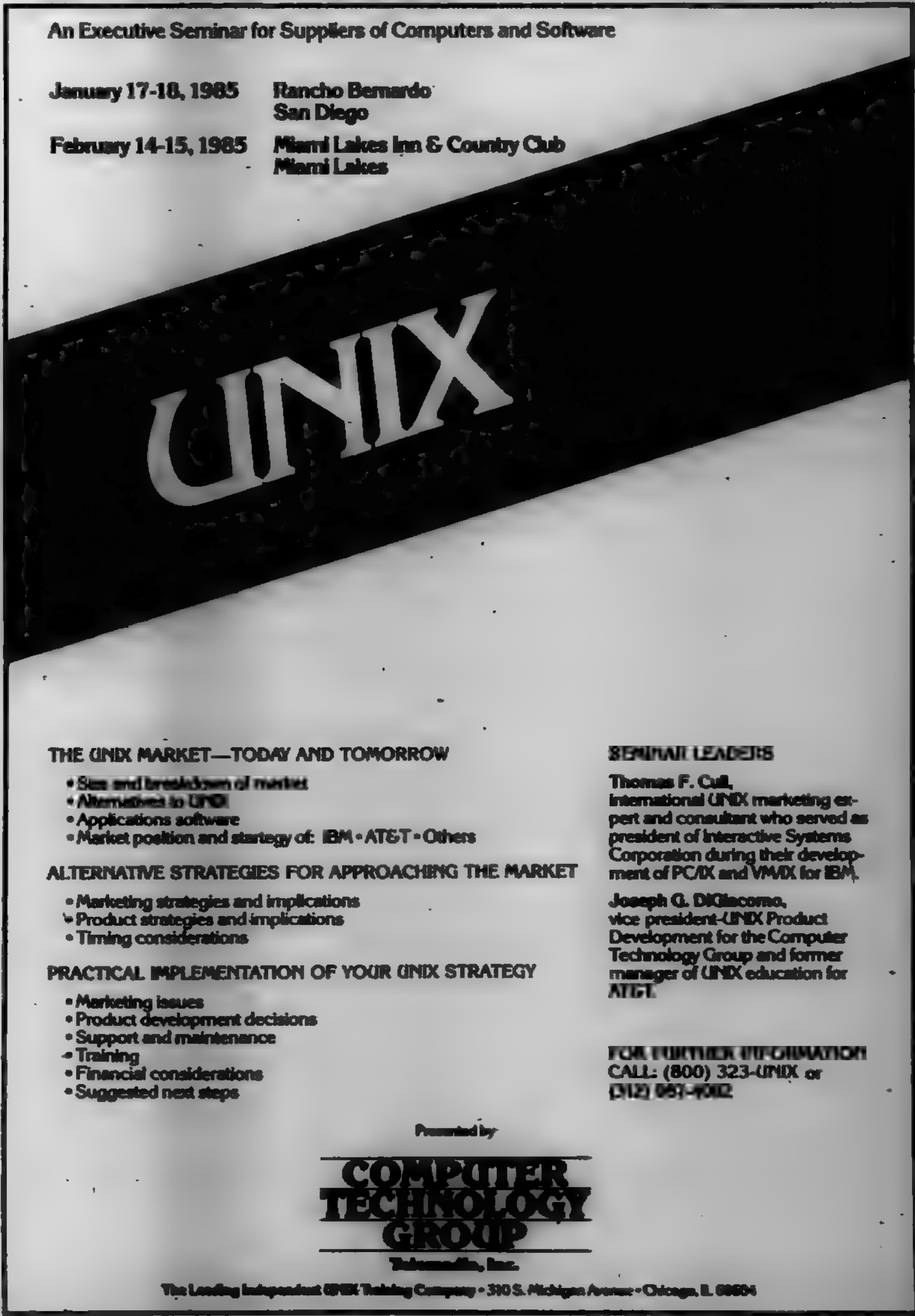
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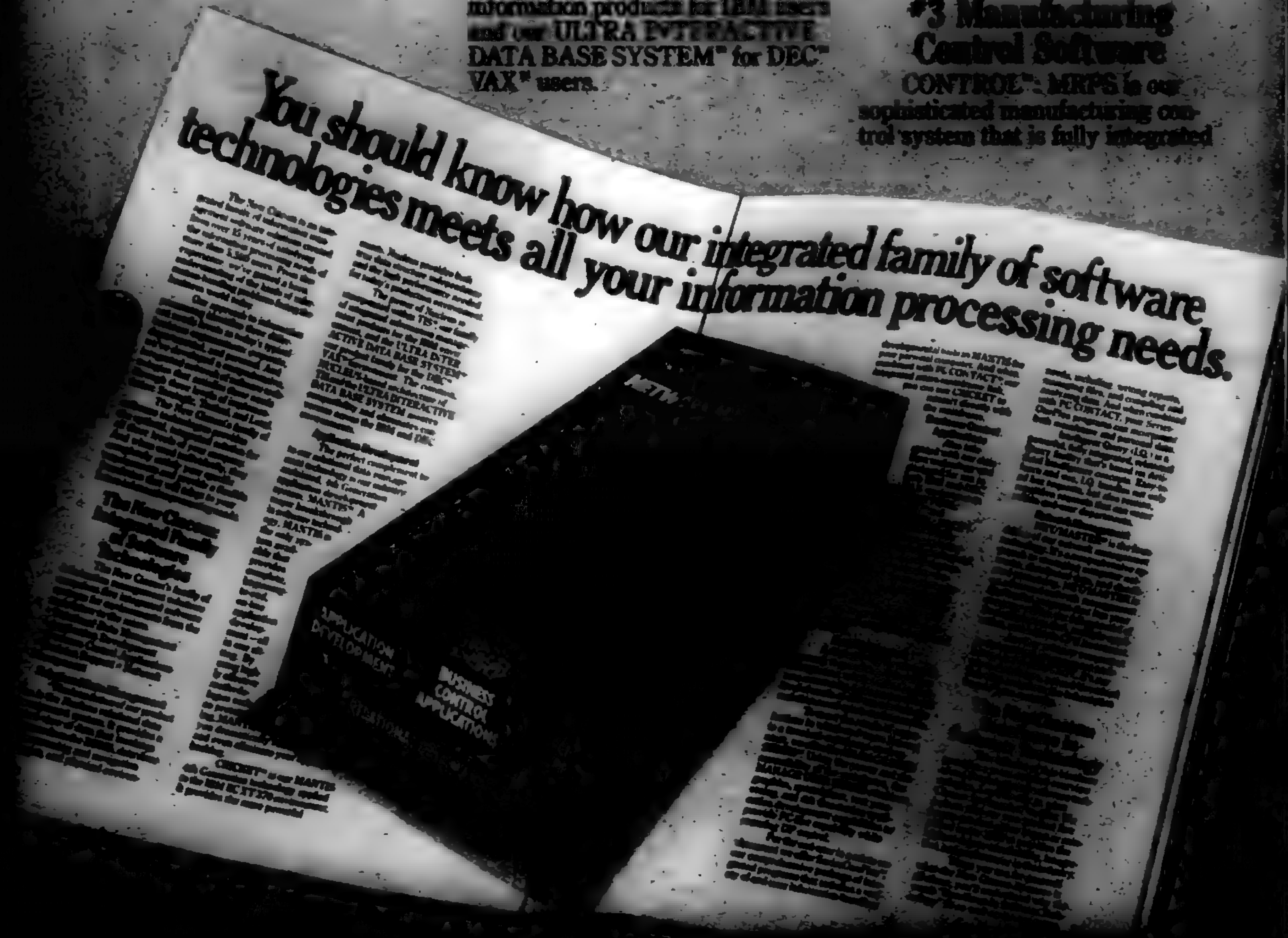
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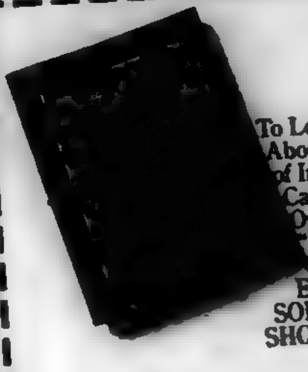

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BOOK REVIEWS

LOCAL-AREA NETWORKS IN LARGE ORGANIZATIONS
By Thomas Madron

The author's premise is simply stated: It costs a large organization more not to install a state-of-the-art local-area network than it does to build one — in the long run, of course.

Madron is in favor of the broadband approach, based on his experience as manager of Computer Services at North Texas State University. Nearly seven miles of trunk line, 3,000 outlets and several hundred nodes cover the campus in a broadband network that is still evolving.

The "manager's briefing" subtitle aptly reflects the book's purpose of bringing readers up-to-date on the issues without overwhelming them with detail.

Technical terms are defined, but Madron clearly regrets the kind of network debate based on technical comparisons of systems. The relevant question is not what networking scheme is better technically; the manager should ask himself, "What problems do I need to solve?"

Paperback, 150 pages, $16.95, ISBN 0-8104-6805-2. Hayden Book Co., 10 Mulholland Drive, Hasbrouck Heights, N.J. 07604.

ALAN TURING: THE ENIGMA
By Alan Hodges

No one in the computer industry really needs to know 587 pages worth of Alan Turing's life. Much of this biography, in fact, you don't even want to know — his until-now secret affairs with schoolmates and his predictably awkward passage through public school in England, for instance.

Turing the mathematician helped crack Germany's World War II code. Turing the designer devised the Automatic Computing Engine ("with a memory capacity of a minnow") at the time the Electronic Numerical Integrator and Calculator was taking shape in the U.S.

Decades ago, he debated the virtues of infallibility and intelligence as machine attributes. He wrote: "It is easy for us to regard [a human mathematician's] blunders as not counting and give him another chance, but the machine would probably be allowed no mercy. In other words then, if a machine is expected to be infallible, it cannot also be intelligent."

Could even an intelligent machine produce a sonnet the equal of Shakespeare's? Turing answered in 1949 that this question was "perhaps a little bit unfair because a sonnet written by a machine [would] be better appreciated by another machine."

After arrest for his sexual relationships, Turing submitted to hormone therapy. A year later, June 7, 1954, he poisoned himself.

Author Andrew Hodges laboriously researched one of the most intriguing minds in computer history and apparently felt compelled to write down everything he found. The result is that Turing loses the mystery that first draws you to him. He is no longer an enigma.

Paperback, 587 pages, $10.95, ISBN 0-671-52809-2. Touchstone Books, Simon & Schuster, 1230 Avenue of the Americas, New York, N.Y. 10020.

DIAGRAMMING TECHNIQUES FOR ANALYSTS AND PROGRAMMERS
By James Martin and Carma McClure

Another James Martin book, you ask? This one, with writing sidekick McClure, calls on the DP executive to prepare for the coming revolution — computer-aided systems analysis and computer-aided programming. It is a revolution that goes beyond structured programming: A computer will generate code from the systems design that the designer creates on his graphics screen.

Martin and McClure take analysts, programmers and their managers on a walk through conventional diagramming — a kind of refresher course. The authors picture Warnier-Orr and Michael Jackson diagrams, flowcharts, structure charts and much more in great detail.

This book is less an argument for one point of view than an explanation of many views on diagramming.

Hardcover, 396 pages, $40, ISBN 0-13-208794-4. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

BOOKS OF NOTE

THE COMPUTER CRIME LAW REPORTER, a compilation of laws in effect in 33 states, edited by Jay BloomBecker. Paperback, 200 pages, $45. National Center for Computer Crime Data, 4053 JFK Library, California State University-Los Angeles, 5151 State University Drive, Los Angeles, Calif. 90032.

ARTIFICIAL INTELLIGENCE & ROBOTICS: FIVE OVERVIEWS, covering AI, robotics, expert systems, vision and natural language processing. Hardcover, 643 pages, $103.50. Business/Technology Books, P.O. Box 574, 14 Evergreen Drive, Orinda, Calif. 94563.

THE SOFTWARE HANDBOOK, a guide to techniques and methodologies used in project management, systems analysis, programming, testing, documentation and quality assurance, by Dimitris Chorafas. Hardcover, 461 pages, $49.95, ISBN 089433-248-1. Petrocelli Books, Inc., 1101 State Road, Princeton, N.J. 08540.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, *P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

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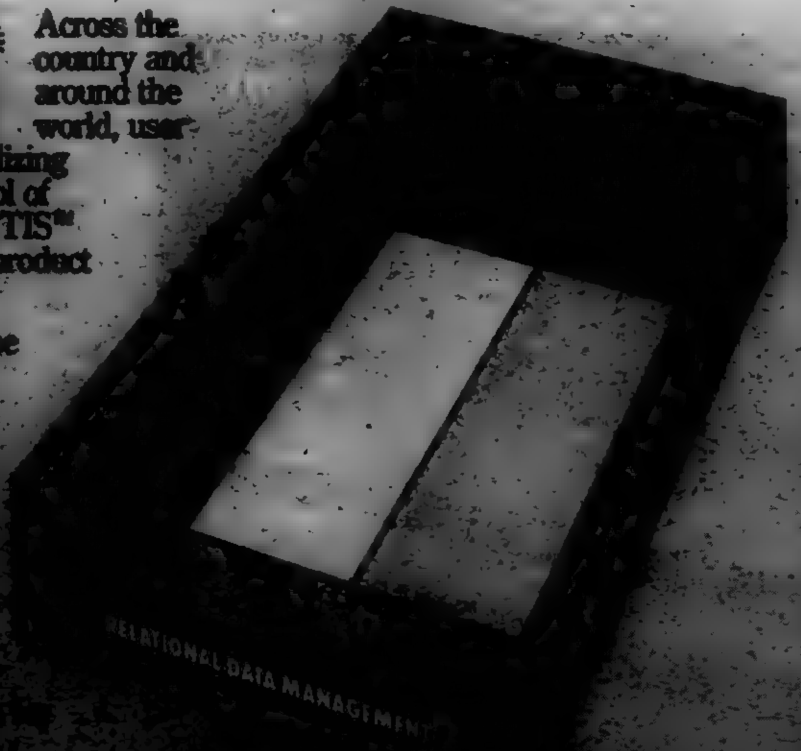

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Albany, New York	February [illegible]
Albuquerque, New Mexico	March [illegible]
Atlanta, Georgia	February [illegible]
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Pie shop deserts old system for speech board accounting

LONG BEACH, Calif. — A restaurant chain is saving up to $5,000 in service bureau fees by using microcomputers with speech boards to process daily sales and bank deposit reports from its restaurants.

Marie Callender Pie Shops, Inc. based here, had been receiving its daily reports for several years from Automatic Data Processing, Inc. (ADP) on a contract through Crocker Bank. That service required the restaurant accountants in the field to read their daily reports over the telephone to ADP operators, who keyed the data into ADP's system for daily downloading to a printer at the Marie Callender headquarters. There, the data was keyed into Marie Callender's Texas Instruments, Inc. 990/12 Model 53 minicomputer.

The chain wanted a new system and stumbled upon it when the minicomputer was being serviced.

"I got onto the idea when a TI serviceman was servicing the mini; and I noticed that he was calling Texas and punching numbers into the phone. It looked like he was communicating with a computer. He was using the phone to order parts. I thought we [could] use something like that here," said Frits W. Van Oppen, an internal consultant for Marie Callender.

Marie Callender purchased two TI Professional Computers equipped with TI's Speech Command Hardware Kit and TI's Speech Command System. Including the cost of off-the-shelf software, a memory expansion card and developing an application to handle the report accounting, the company spent $20,000 for the systems. Van Oppen said that cost should be recovered in January or February as the company saves the $4,500 to $5,000 it was paying to ADP.

The micros were installed in September, and the 58 company-owned restaurants and coffee shops were added to the reporting network in phases through mid-October.

Today, each restaurant makes daily reports that take from one to two minutes.

Touch-Tone preferred

Callers now familiar with the procedure prefer Touch-Tone input to the micros over talking to a service bureau operator using a CRT, Van Oppen said. Because it uses voice playback for verification, the micro is slower than the CRT operator, who verifies no data. The program that Marie Callender's staff wrote makes several tests of the data and will not accept the result if the entry is unbalanced.

"One of the big improvements over ADP is the editing capability. ADP didn't do any editing, which means making sure that the data is valid and that the details for the deposits agree with the total of the deposits. If they didn't agree before, ADP would throw them into the edit column. The [personal computer] forces the caller to resolve the problem before the call is terminated," Van Oppen said.

He added that the only expense for the remote restaurants is the cost of a telephone call. When making a report, a caller uses a standard Touch-Tone telephone to punch in details such as the restaurant identification number, the previous day's sales, the number of bank deposits and the number of credit card sales. The caller responds to voice prompts recorded by headquarters office manager when the system went on-line.

Van Oppen noted that the company appreciates the savings and the data integrity and that office personnel are happy with the system because it eliminates the need to key data into the minicomputer. "There's no cost at all at the store end, and it's much cleaner on our end," he said.

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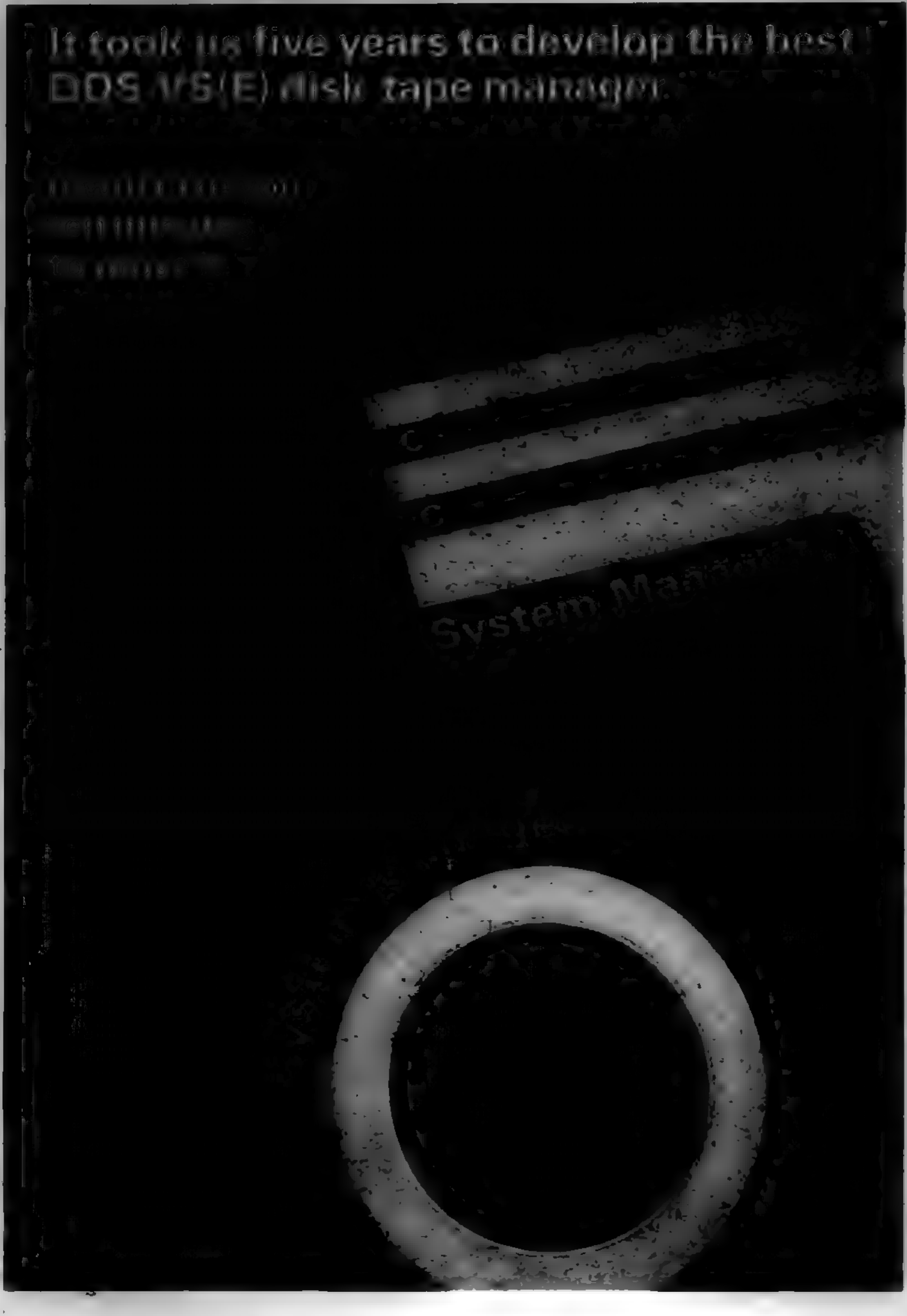
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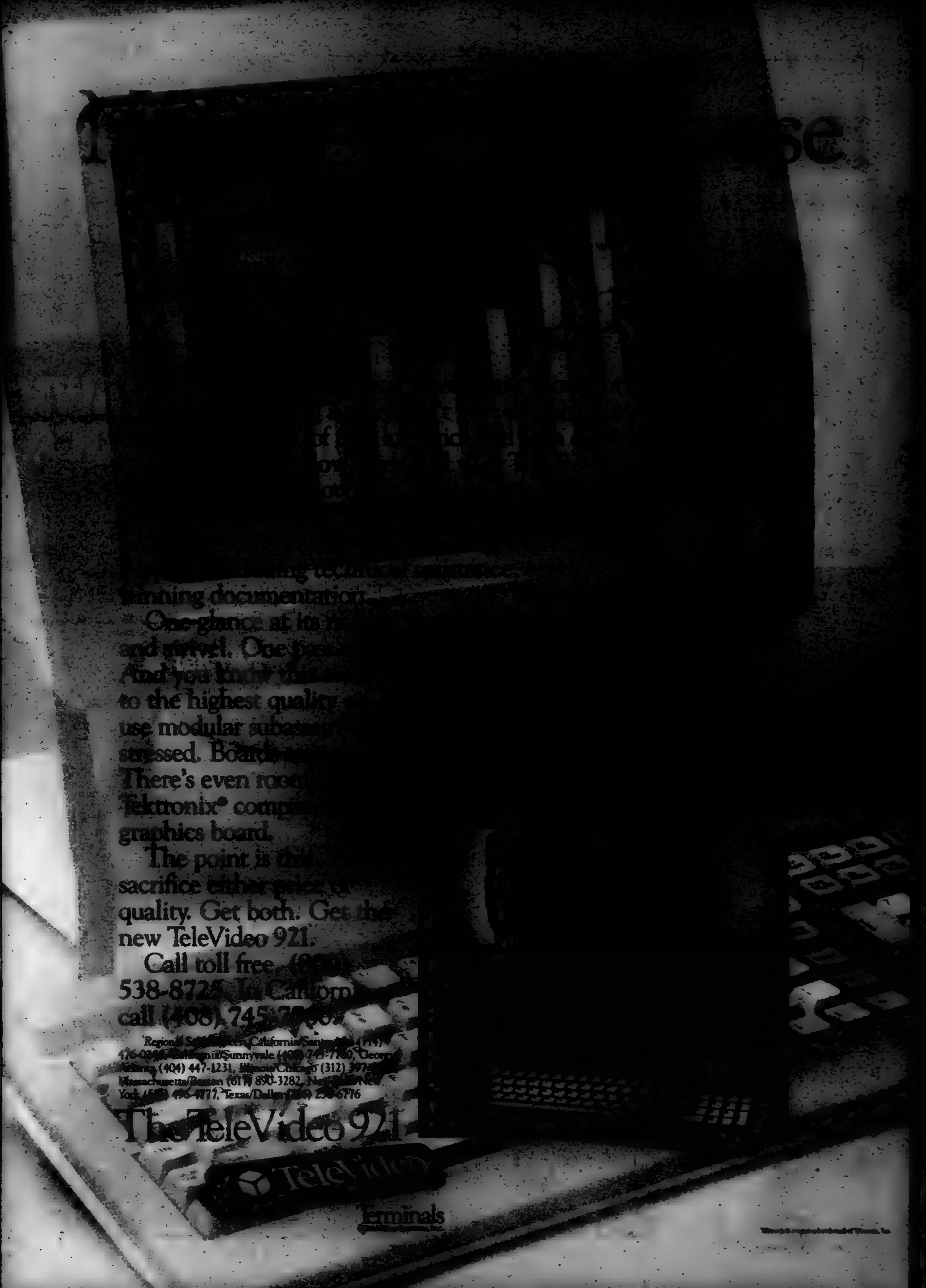

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DECEMBER 27, NEW YORK — **Sysed, Inc.'s Annual Training Forum.** Contact: Sysed, 35 W. 35th St., New York, N.Y. 10001.

DECEMBER 27-28, NEW YORK — **CICS Performance Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

WEEK OF DEC. 30

JANUARY 2-4, HONOLULU — **Hawaii International Conference on System Sciences.** Contact: Hem B. Lau, Center for Executive Development, College of Business Administration, University of Hawaii, 2404 Maile Way, C-202, Honolulu, Hawaii 96822.

WEEK OF JAN. 6

JANUARY 7-8, KANSAS CITY, MO. — **Discover Unix.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 10-11 in Boston, Jan. 14-15 in Houston and Jan. 17-18 in San Francisco.

JANUARY 7-8, HARTFORD, CONN. — **Unix Systems Users Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-8, DALLAS — **Operating Systems: A Comparative Analysis.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 14-15 in Boston.

JANUARY 7-9, ARLINGTON, VA. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 9-11 in Tampa, Fla.; Jan. 15-17 and Jan. 23-25 in Cary, N.C.; and Jan. 22-24 in San Francisco.

JANUARY 7-9, NEW YORK — **PC/Focus for Beginners.** Contact: Julie Leonard, Advanced Infostructures, Inc., 475 Fifth Ave., New York, N.Y. 10017.

JANUARY 7-9, DALLAS — **VM/SP Structure, Flow & Tuning.** Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 7-10, NEW YORK — **CICS Debugging.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

JANUARY 7-10, HARTFORD, CONN. — **Designing On-Line Systems.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, HARTFORD, CONN. — **CICS/VS Command-Level Coding Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, RALEIGH, N.C. — **Unix Workshop.** Contact: Suzanne Battista, Course Manager, Plum Hall, Inc., One Spruce Ave., Cardiff, N.J. 08232.

JANUARY 7-11, HARTFORD, CONN. — **OS/VS Job Control Language & Utilities.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 8-9, SAN FRANCISCO — **Integrating Multivendor Voice and Data Networks.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

JANUARY 8-10, CHICAGO — **Corporate Electronic Publishing Systems: A Conference/Showcase.** Contact: Corporate Electronic Publishing Systems, Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

JANUARY 8-10, LOS ANGELES — **Selecting a Local-Area Network.** Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

JANUARY 8-10, COLLEGE PARK, MD. — **Designing Interactive Computer Systems: A Software Psychology Workshop.** Con-

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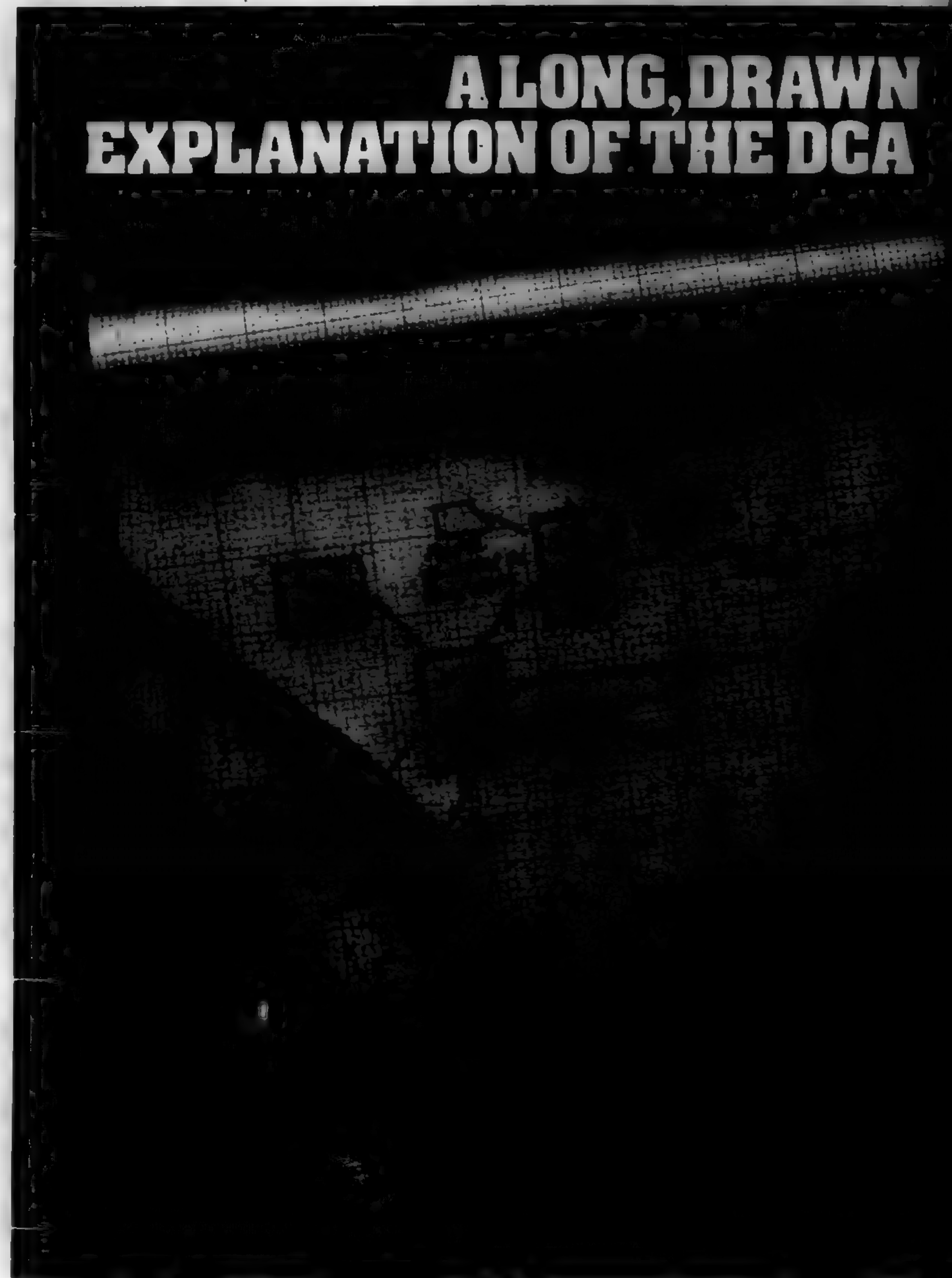

NEWS

tact: Conferences and Institutes Program, University College, University of Maryland, University Blvd., College Park, Md. 20742.

JANUARY 8-10, CARY, N.C. — **SAS Programming for New Computer Users.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 22-24 in Cary, N.C.

JANUARY 8-11, NEW YORK — **Veam.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 28-Feb. 1 in New York.

JANUARY 9-11, NEW YORK — **Systems Network Architecture: Concepts, Design and Implementation.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Gary St., Santa Ana, Calif. 92705. Also being held Jan. 21-23 in Los Angeles.

JANUARY 9-11, ARLINGTON, VA. — **SAS Macro Language.** Contact: SAS Institute, Inc., Box 8000, Cary, N.C. 27511.

JANUARY 9-11, HARTFORD, CONN. — **Unix C Programming Language Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 9-11, CARY, N.C. — **SAS Applied Time-Series Analysis & Forecasting Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 9-11, CHICAGO — **Relational Data Bases.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held Jan. 14-16 in Atlanta.

JANUARY 9-11, WASHINGTON, D.C. — **National Conference on Financial Management Systems for Government.** Contact: U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

JANUARY 10, SAN FRANCISCO — **T1 Carrier Strategies: The New Networking Imperative.** Contact: Marilyn Chasteen, The DMW Group, 2020 Hogback Road, Ann Arbor, Mich. 48104.

JANUARY 10-12, HOUSTON — **The Essentials of Productivity Management.** Contact: The Institute of Industrial Engineers, Continuing Education Program, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JANUARY 12-13, NEW YORK — **CICS Command-Level Intensive.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 19-20 in New York.

WEEK OF JAN. 13

JANUARY 13-16, NEW YORK — **Annual Convention and National Retailers Business & Equipment Exposition.** Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

JANUARY 13-16, HONOLULU — **Seventh Annual Conference of the Pacific Telecommunications Council.** Contact: Pacific Telecommunications Council '85, Suite 308, 1110 University Ave., Honolulu, Hawaii [illegible].

JANUARY 14-15, SAN FRANCISCO — **Taking Charge: New Directions for Data Entry Management.** Contact: Marilyn Bodek, Data Entry Management Association, P.O. Box 16711, Stamford, Conn. 06905.

JANUARY 14-15, HARTFORD, CONN. — **Personal Computers — Hands-On Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 14-16, ST. LOUIS — **DOS/VSE Internals, Debugging & Problem Determination.** Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 14-17, ANAHEIM, CALIF. — **Cadcon West '85 Conference & Exposition.** Contact: Morgan-Grampian Expositions Group, Two Park Ave., New York, N.Y. 10016.

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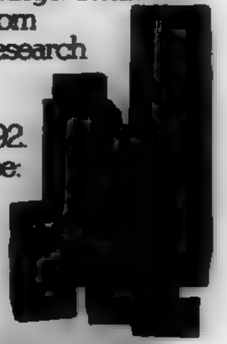

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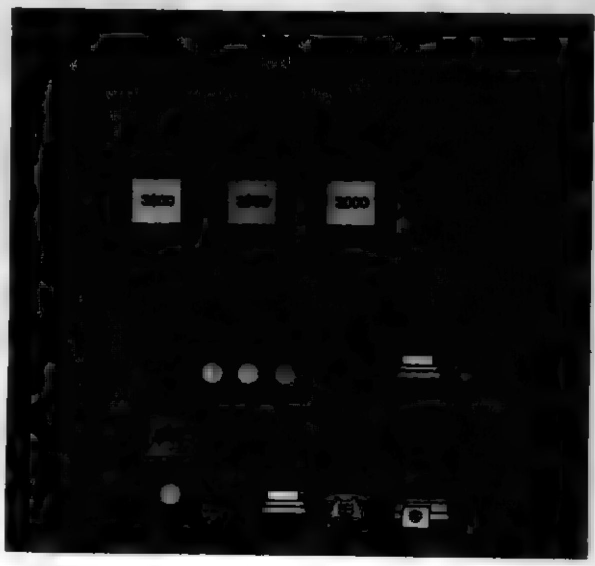

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EDITORIAL

Who's liable for DP security?

We went to some lengths last week in this space to make a case for the U.S. government's mass computerization of personal records, despite all the warnings to the contrary heard during this year of George Orwell.

Our point was that while the potential for harm to our civil liberties is ever present, the zeal to protect those liberties has acted as a defense against that potential harm.

During the past month, a titillating story has unfolded that makes a mockery of the term "system security," but this time in the private sector.

A reporter for *Newsweek* wrote an article in November casting youthful hackers in a bad light — to say the least — and recommended their punishment befit a serious crime. As television apparently no longer provides the vicarious thrills it once did to keep the youth of America preoccupied, hackers angry at the reporter broke into his credit files kept at TRW, Inc. They then posted the reporter's credit card numbers, purloined from the not-so-secure credit files. These were kids, using micros, telephones and modems, who have ingested a healthy dose of unmitigated gall and disrespect for privacy.

The hackers then proceeded to make life utterly miserable for the reporter, alerting others, via electronic bulletin boards, to make harassing phone calls to him. They also held what may be the first all-electronic "court" to decide what "sentence ought be imposed on the reporter."

A couple of points: First, the hackers probably found breaking into TRW's credit files as easy as stealing a bank's password, which probably involved nothing more than picking through garbage for discarded computer printouts.

Second, this wasn't the first time in very recent history that someone broke into TRW. The company, which maintains credit records on millions of private citizens (120 million records, according to *Newsweek*), had its files illegally accessed in June [CW, July 2]. That time, the hackers apparently were content just to break in, leaving the files intact.

But in the more recent incident, the hacking was done with a vengeance and with a specific target in mind. Someone said, "Let's get this guy; I know just how."

TRW said it has done what it can to make its system secure. Clearly, that is far from enough and a poor excuse for allowing, if not inviting, more of the same.

Yes, there are laws against hacking. There are also laws against littering. Get caught doing either, and you're not likely to end up in jail.

Clearly, the responsibility for security rests with companies like TRW that dispense potentially volatile information on private citizens and with these companies' clients who use personal credit information like the Lenox (Mass.) Savings Bank, whose password was used in the illegal entry to the reporter's credit information. And if these companies cannot assume responsibility for security of personal files, what would happen if they were government agencies?

LETTER

Siding with employees

Concerning the article "GM employees win some, lose some in transfer to EDS" [CW, Nov. 12], it should be realized that takeovers like this always produce touchy situations for employees caught in the middle, though EDS has had more than its share of problems in this regard. However, EDS Senior Vice-President Ken Riedlinger's statement that "I don't think there is a company in the world that pays greater attention to the needs of employees than EDS" is absurd and must not go unchallenged.

The fact is EDS does not extend to its employees some basic benefits that are universally accepted, such as shift differential for hourly employees on night shifts and pay for accumulated vacation time not taken when an employee leaves the company. The firm did not give hourly employees time and a half for overtime until forced to by a court.

Additionally, the strict dress code, military atmosphere, policy of escorting employees out the door instantly when they resign, merciless after-hour demands put on its programmers and the infusion of H. Ross Perot's personal values into the regulations by which EDS employees must abide are great infringements on the rights of the people who work for EDS.

EDS has long recognized that many of its employees were quite unhappy with EDS policies. They have used internal surveys and commissioned outside help to identify the problems and made some changes based on the results. But the fundamental way EDS treats its employees has not changed.

See EDS page 40

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Those lovable cash robots

LECHT ON SCIENCE
Charles P. Lecht

"I love those money machines," my friend said. No hassle; just walk right up, dial in your code, take a little quiz and if you pass it, the money machine pays off in twenties, tens, ones and sometimes even twos."

His statement got me thinking that almost all the people I work with, including me, use automated teller machines (ATM) — euphemistically referred to as money machines. While I don't know if I would ever go so far as to say that I "love" them, I must confess that they've proven to be an enormous convenience to me, and as far as I can see, to everyone else. They may qualify as the first white-collar robot in the history of mankind that most people actually like; in fact, some seem to love them.

For example, working New Yorkers seem to prefer them to lunch. Homemakers bring their kids in station wagons, which they leave double-parked with the motor running and a kid at the wheel, while they race in to use the machine. Often, a tail-wagging dog is seen in line. My Kerry blue terrier, Mozart, can't pass the place I use without lunging toward its door as he does in front of the deli.

Let's face it, we'll miss and perhaps never really be able to do without the clean-shaven, necktied, young teller who raised his eyebrow when given a withdrawal slip, checked your signature against his record card and begrudgingly handed over the cash. Or the sweet, crisply dressed woman who knew your entire financial history and tried to discourage you from wild spending by commenting on the weakening economy and what austerity measures a lame-duck president was likely to take after Christmas.

But, as much as we may miss this human interaction, we cannot let it stand in the way of progress and must bid it good-bye in favor of those lovable (oops, I said it) little cash-machine robots. Anyway, now you may withdraw more cash than you ought to with the confidence that no one but your computer knows.

Some ATMs are dressed like Santa Claus for the holidays. Because so many people will use ATMs for the first time this Christmas, I thought I'd give some practical advice on the subject.

First of all, I want to confirm that once having identified yourself to the machine by keying in your code name and answering all the multiple-choice questions correctly, the lovable robot's gaping, steel mouth usually opens to provide you with cold, hard cash. No recriminatory, guilt-producing remarks are made, nor does the robot change its expression. You are now free to go on a spirit-uplifting spending spree.

Visit machine alone, at night

This being an imperfect world, not all cash withdrawal encounters with an ATM actually produce cash. It's extremely rare that the machine is at fault (although they do run out of cash) and far more likely that you are (having run out of credit). While failure at the machine doesn't inspire the disapproving stares of a bank employee, it's usually better if you visit the machine alone at night if there's any doubt that you'll succeed in your contemplated transaction.

When you do this, it may be wise to ensure that a policeman is within earshot. Lose a video game, and no one pays attention; an unsuccessful session with an ATM can attract it. Most ATMs are situated in such a way that people awaiting their turns, accompanying friends or peering through windows may figure out what you're up to in visiting the machine, especially if you display any kind of negative emotion during use.

I advise that a transaction that doesn't produce the cash you wanted, especially around the holidays, should be responded to with a smile, as though the denial message on the tube were nothing more than confirmation of a large excess. Leaving disgruntled can cause others to wonder why you've been turned down and may inspire them to exhibit standoffish or aloof behavior. Mumbling "I guess it's out of cash," and posting a sign to that effect is unwise. If someone decides to try to use the machine anyway, it can ruin your credit with local merchants.

Faceless automation and societal breakdowns

If you have a friend waiting for your transaction to produce cash that you were going to turn over as a loan or, worse, as a loan repayment, and none appears, you may do well to curse faceless automation as the source of too many societal breakdowns and laughingly express a longing for the good old days when you could talk to someone to straighten the matter out there and then. Of course, you must make sure the bank isn't still open.

It's better not to take children under 13 to an ATM that is dressed as Santa because of the still unproven but suspected aftereffect of a hard-to-cure machine attachment in the still-believing-in-Santa child. And never send any kid under, say, 150 lb, however trustworthy he may be, to the money machine without first hiding a transmitter in his clothing. Remember, there's no bespectacled teller to see the child who's asking for the cash but plenty of people to watch him get it.

And, never key in your secret code with a baby who is on the verge of reading perched on your arm. Later on, he'll be able to reach the keyboard and gaping robot's mouth and, well, kids will be kids.

On rare occasions, our lovable cash robots break down and turn over more cash than you've asked for. Some have been known to exhibit extreme generosity by turning over all the cash they've got, hiccuping it out $200 at a time. The odds of this happening are very low, but I thought I'd mention it before I close.

Suppose the machine does start to hiccup up all its cash, what should you do? Procedures for handling this vary from bank to bank, so my advice ends here. But my instincts tell me that you may want to avoid rejoicing or kissing the lovable robot. Better to look disgusted, punch it, angrily tear up some withdrawal slips, and take the money and run. Happy holidays.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

DBMS role in fourth-generation languages

READER'S PLATFORM
[illegible] Zearfoss

With the current proliferation of user-friendly fourth-generation languages, there has also been an increase in the number of so-called user-friendly data base management systems. Many fourth-generation languages claim to be or include their own DBMS. As with other data processing terms, the term DBMS has been kicked around quite a bit, being applied to anything that uses indexed files. To what extent do these languages offer fully functional DBMS capabilities?

To answer this question, we should first identify the essential characteristics of a DBMS. I believe that there are four such characteristics a DBMS must provide.

- The ability to define logical access paths/methods that are distinct from the physical access paths/methods.
- The ability to define a logical unit of work.
- The ability to share data between various users and applications.
- Adequate recoverability and auditibility.

The lack of support from fourth-generation languages for a logical unit of work is a fatal flaw to their claim to provide DBMS capabilities.

Let's examine these characteristics in more detail and see if a fourth-generation language approach can provide the functions necessary for each.

The first logical access paths/methods, is in a traditional DBMS accomplished through pointers and/or secondary indexes. A fourth-generation language will create alternate paths through the data in the same way but will often not need to be told at file definition time what physical means to use to accomplish this logical access. (If physical means must be specified in a fourth-generation language, these specifications are considerably simplified from those necessary for a traditional DBMS.) The advantage of this is that time, effort and expertise need not be spent up front to develop a file which may be viewed in different ways. A disadvantage is that tuning for minimal usage of computer resources through these logical accesses is much more restricted, a disadvantage that will have less and less impact as man-hour costs rise and computer costs fall. Fourth-generation languages do a fine job of providing users with file views.

The second characteristic, a logical unit of work, can be considered to be a grouping of one or more transactions that must be either completed or aborted as a whole, if the data they operate against is to retain its integrity.

For example, consider the transfer of $1,000 from one account into 10 accounts of $100 each. It should be obvious that for this transfer to be completed properly, 11 separate update actions must be performed. (The $1,000 should be deleted from the first account, and 10 separate additions of $100 should be made against the other accounts.) By defining this transfer as a logical unit of work, one can expect a traditional DBMS to complete or reject the transfer.

A traditional DBMS supports a logical unit of work through two concepts. The first of these is the data queue. When, during a logical unit of work, changes are made to the data, these changes are written to the data queue and are not written back to the file until this logical unit of work is complete. Thus, if an abend occurs during an update action within a logical unit of work, none of the changes

See DBMS page 40

Zearfoss is a member of a newly formed Pittsburgh-based data base design group that develops subject data bases.

VIEWPOINT

DBMS from page 39

made by prior update actions within this logical unit of work are applied to the file. In this way, the integrity of [redacted]

At this point, the second concept, dynamic back out, takes over. Dynamic back out removes all the changes written to the data queue by the update actions for an unsuccessfully completed logical unit of work. This frees up the data queue for receiving changes from other update [redacted]

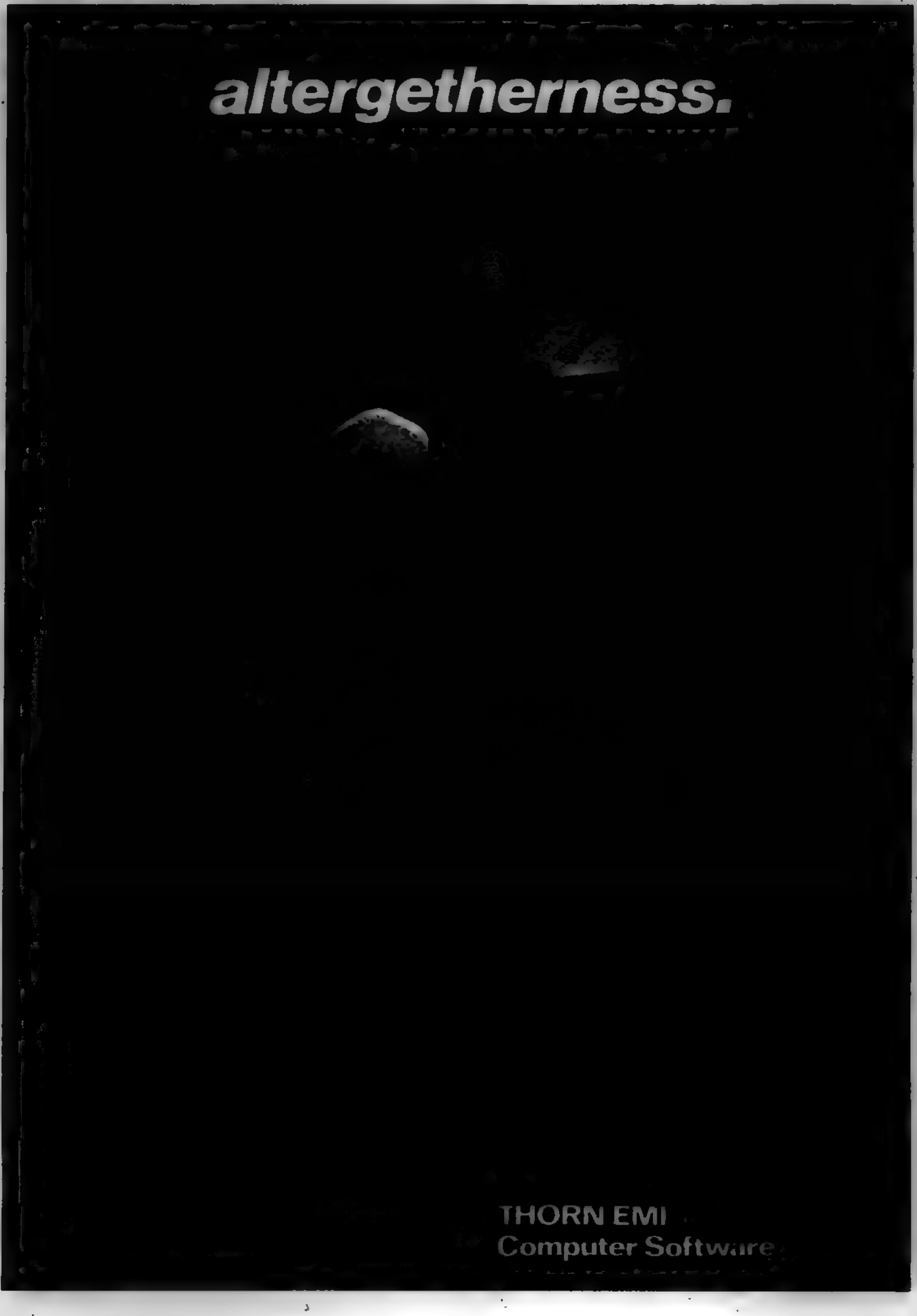
To the best of my knowledge, no fourth-generation language supports the logical unit of work characteristic. A fourth-generation language will provide data integrity to the data base call level, but as seen from the example above, this is not always sufficient to guarantee data accuracy. The lack of support from fourth-generation languages for a logical unit of work is a fatal flaw to their claim to provide DBMS capabilities.

Data sharing is the third characteristic, and one that, for the most part, fourth-generation languages satisfy. Files may be updated by more than one user simultaneously. However, there is an aspect of data sharing that fourth-generation languages do not address. This is program isolation, the resolution of data contentions. Since fourth-generation languages fail to provide for a logical unit of work, they must treat each data base call as a separate, recoverable action. This means that a procedure is unable to lock out any other procedure from using any data base record other than the one referenced by its most current call. If one considers the example of the $1,000 transfer given earlier and adds to it a separate transaction to update one of the receiving accounts, one can see where problems may occur. Since fourth-generation languages provide no data contention checks, it is up to the programmer to supply code for all possible conditions of [redacted]

The final characteristic, recoverability and auditability, refers to whether sufficient and usable logging of activity and updates against the file are maintained. In my experience, fourth-generation languages do not provide adequate logging capabilities. This means that logging functions must be created anew for each application. Worse yet, there can be no vendor-supplied utilities for reading a self-developed log file. Thus, it becomes the responsibility of the programmer to supply the code that will ensure that auditability and recovery can take place.

What can we conclude from all this? If the four characteristics I mentioned earlier are accepted as essential for a DBMS, then we can say that fourth-generation languages only partially satisfy two of these characteristics and entirely fail to support another one. This means that if you still wish to use a fourth-generation language as a DBMS, you will be forced to accept systems where your programmers coded the routines to resolve data contentions and provide auditability and recovery and where, because of a lack of data queues and dynamic back outs, the integrity of the data within this system can never be assured.

I believe that fourth-generation languages are extremely powerful and flexible tools for creating data processing systems and, as they continue to evolve, will play a larger and larger role in the overall data processing world. However, for the present, they provide incomplete DBMS capabilities and should not be used as such.



EDS from page 38

In 1980, EDS started requiring programmers to sign three-year, $9,000 promissory notes before taking part in EDS' programming training course. This unusual move was deemed necessary to keep programmers from leaving. Surely this would not be necessary if EDS "takes care of every legitimate employee need."

EDS is unique in many ways. It has been innovative, provided excellent education and developed very good computer systems. If EDS would like to take pride in its uncompromising methods, that is one thing. But Riedlinger's claims are just not true. EDS has gained a well-deserved reputation as a company out of touch with its employees' needs.

[redacted]
Foster City, Calif.

SOFTWARE & SERVICES

INSIDE
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Productivity Aids/44
Application Packages/45

Micro-mainframe links pose array of security risks

By Owen Boyd
Special to CW

The driving force behind micro-mainframe technology is simple: Today's end user wants to get at his mainframe data with his personal computer. He wants to manipulate that data, and he wants to have the ability to update these mainframe data bases in real time and interact with his data without having to wait on DP to perform batch runs.

The new technology he is using to do this is the microcomputer-mainframe link.

This tool allows companies to be more productive and to compete on a higher level at a faster pace than ever before. But with this freedom of access come some very serious security risks. Before a plan is described to offset these risks, it is important to understand how the technology works.

Before link technology, it was possible to access the mainframe, but it was a tiresome process. First the user had to key all of that data into his personal computer. Often the data was inaccurate or old, leading to the danger of making bad decisions. Once the user had done his analysis on the personal computer, there was no way for him to update directly the mainframe data bases with the results of his analysis — he needed to enter the data again.

Micro-mainframe link software, in the simplest sense, allows the passing of data from the mainframe data base to the micro and from the micro to the mainframe.

Users can now access live mainframe data, select what they want when they want it and manipulate the data in unrestricted ways. In some cases, they have the option of updating the mainframe in real time. While the benefits are striking, so are the security implications.

A typical user of a micro-mainframe link might be a controller who is trying to close his month-end books. Suppose it is the last day of the month, and he has per-

See LINK page 48

Boyd is manager of product marketing and systems at McCormack & Dodge Corp., a vendor of a micro-mainframe link.

Avoid system design troubles by taking one block at a time

Second of a two-part series.

By Mike Ruggera
Special to CW

A typical procedure used when approaching the problem of developing a major system that consists of subsystems is to view the system as a single project. An effort is then made to analyze the data needs of all the subsystems and then integrate those needs into a composite data base design.

The complete schema is written and all the anticipated subschemas are written. Work begins on programming the first subsystem. Usually there are some unanticipated data requirements necessitating changes in both the schema and subschema. These changes cause some programs to be modified or rewritten because techniques that result in a lack of independence between the data and the programs have been employed. This results in some time and cost overruns, but the subsystem is completed.

Then work is begun on the second subsystem. The project manager believes he has a good feel for how long this subsystem will take to develop and prepares time estimates and work plans. The programming begins. Invariably, there are unanticipated data requirements. The schema and subschemas have to be changed. As a result, not only do the programs in this subsystem have to be modified or rewritten, but the programs of the first subsystem also have to be modified or rewritten. This is because they are tied to the structure of the data base. Consequently, when the second subsystem is completed, it overruns its time and cost estimates by about 20%.

The project manager usually believes he understands how to estimate the third subsystem and includes an inflation of 20%. The anticipated but unknown data

See [illegible] page [illegible]

Ruggera is a data processing management consultant based in Fords, N.J.

Honeywell offers HDMS in U.S.

MINNEAPOLIS — Honeywell, Inc. has announced that its Distributed Manufacturing System (HDMS) for the company's DPS 6 line of minicomputers under Honeywell's Gcos MOD 400 or TPS 6 operating systems is now available in the U.S.

According to a spokesman, HDMS operates on-line and is designed to support a variety of manufacturing functions, including long-range planning and daily shop floor control. Developed by Honeywell Information Systems in the UK, HDMS reportedly enables users to integrate their manufacturing systems with office automation and other DPS 6 applications. Key features of HDMS include requirements planning, contract control and material traceability.

HDMS allows requirements planning to run on spare machine capacity to reduce overnight processing loads. This feature reportedly lets users see the immediate results of shop-floor or purchasing activity as updated replanning suggestions.

Using contract identification of work and purchase orders, HDMS relates the cost of all activities to their appropriate contracts. The integration of job costing with the production planning function is said to enable the system to determine the remaining work on a contract and the cost of completion.

The system's material traceability features allow it to maintain the identity of individual material batches and record the subsequent use of each batch in manufacturing operations.

Other features include bill of materials, inventory control, sales order recording, purchase order recording, work order control and master scheduling functions. The system is priced at $55,000 for a one-time license. The price includes one year of support, training and installation.

Honeywell is located at Honeywell Plaza, Minneapolis, Minn. 55408.

DEC adds voice messaging options to All-In-One system

Tools automatically notify users of messages, allow telephone access; OA options offered

MAYNARD, Mass. — Digital Equipment Corp. has broadened its All-In-One Office and Information System software with the addition of voice messaging options and support for several other optional office automation products.

The two voice products — Dectalk Mail Access and Voice Messaging Support — reportedly allow users of DEC's All-In-One package to access electronic mail messages and other All-In-One documents over any Touch-Tone telephone and receive voice message notification in their All-In-One mailboxes.

According to the company, Dectalk Mail Access permits users to "read" messages or documents stored in their All-In-One filing folders by using their telephones. Users can call an electronic mailbox and listen to electronic messages translated into voice by Dectalk, a text-to-speech voice synthesizer. The telephone can also be used to listen to mail in the user's in-box, select specific messages, delete mail and answer mail. Users can stop, pause, resume or repeat the messages.

Voice Messaging Support is an option that automatically notifies users of voice or text mail through their All-In-One terminals. Information on who sent the message, when it was received and the message length is included in the text. By entering a command, the user's telephone will ring, and the message is delivered.

Dectalk Mail Access software for the All-In-One system is priced at $4,500. All-In-One Voice Messaging Support is available for $7,500. Both products will be available in the spring, the company said.

Along with the voice messaging option, DEC introduced versions of a full-function word processing system for All-In-One and for its VMS operating system. WPS-Plus/VMS Version 1.1 and WPS-Plus/All-In-One are said to include Decmate-style word processing, a scientific and technical character set and equation editing.

Users can delete and insert text to different pages and documents without losing word processing functions, the company said. Letters can be combined with spreadsheets, calendar information and other text created through the All-In-One application and distributed by electronic mail. WPS-Plus/All-In-One is licensed for $4,000. WPS-Plus/VMS is licensed for $6,000. Both products will be available in January. Also announced by DEC:

- Decpage Version 1.1, for VAX computers, reportedly allows text, line drawings and graphics to be printed in one compound document. It will be available in January for $5,000.
- Message Router Version 1.1 is a store-and-forward message transport system for the VAX line

See DEC page 49

IF YOU'RE BUYING YESTERDAY'S ...WILL YOU BE PUTTING YOUR

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SOFTWARE & SERVICES

SYSTEMS SOFTWARE

TRIANGLE SOFTWARE CO.
Prodict 2.0

Triangle Software Co. has introduced Version 2.0 of its Prodict systems utility for IBM mainframes running IBM's VM and MVS operating systems.

According to the vendor, Prodict 2.0 now includes an option that permits users to access data by their assigned job network names.

Context-oriented Help panels have been added to the Structured Programming Facility interface and are said to provide information about the subcommand or function when the help is needed.

Prodict 2.0's control statement reportedly allows users to delete entire sets of jobs by specifying a combination of the job name and wild card characters, the vendor said.

Release 2.0 is available for $8,750.

Triangle Software, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

EXECUTIVE SUPPORT PRODUCTS, INC.
Aces

Executive Support Products, Inc. has announced an editing system for the Honeywell, Inc. Level 66 DPS 8 series and DPS 88 mainframes.

According to the company, the Aces package was developed for use with the Honeywell 7700 and 7800 series terminals to provide a program and documentation development tool to improve productivity.

Aces reportedly maintains full control over cursor position within the edit screen and recognizes and directly supports most Honeywell file formats, including Ascii, Binary Code Decimal, compressed deck and print formats.

Aces is available for a license fee of $7,900 per CPU.

Executive Support Products, Suite 211, 3901 MacArthur Blvd., Newport Beach, Calif. 92660.

CHAKRA SYSTEMS INTERNATIONAL
Go/38 Release 4.0

Chakra Systems International has introduced Release 4.0 of Go/38, designed to enhance control of the IBM System/38 on-line environment.

Enhancements to the product are said to include a command that allows users to remotely execute commands at any workstation linked into Go, statistical reports designed to identify workstation and program use and a restricted sign-on function that can be used to permit unattended start-ups.

According to the vendor, other enhancements include a list option that reportedly dumps detailed status of active workstations to the printer and simplifies backup procedures.

Go/38 is priced at $3,000, according to the vendor.

Chakra Systems International, 8465 Victoria Drive, Vancouver, B.C., Canada V5P4A8.

BOOLE & BABBAGE, INC.
XPF/Cobol Version 1.1.2

Support for IBM's IMS/VS and MVS/XA has been added to Boole & Babbage, Inc.'s interactive testing and debugging tool for use by Cobol programmers.

XPF/Cobol Version 1.1.2 allows application programmers to monitor and correct programs at their terminals, the vendor said. Other enhancements added to the product allow users to obtain a storage dump after a program abend.

Pricing for XPF/Cobol Version 1.1.2 is $30,000 for the first site, and each additional site costs $22,500.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

PRODUCTIVITY AIDS

DBMS, INC.
Developer Tool Kit

A package of application development products for users of Cullinet Software, Inc.'s IDMS has been announced by DBMS, Inc.

According to a spokesman, the Developer Tool Kit is a package of eight software modules, three of which are currently available.

Online Test is designed for testing Cullinet's ADS/Online dialogs and IDMS-DC Cobol and Assembler programs.

Dictionary Module Editor is a full-screen editor that reportedly allows IDMS users to do on-line edits of Cullinet's Integrated Data Dictionary.

The Dictionary Migrator is designed to simplify migration of systems from testing into production, according to the vendor.

The package sells for $14,900. Users of DBMS's DBA Tool Kit can buy the Developer Tool Kit for $12,500.

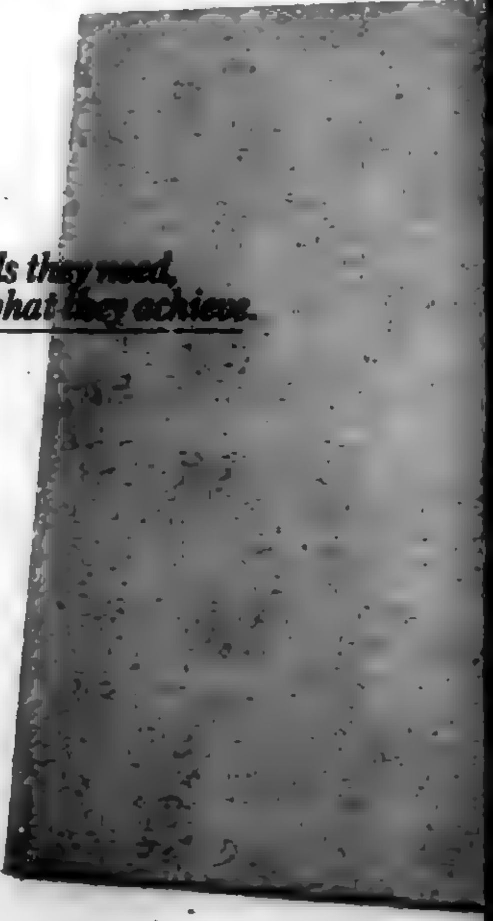
DBMS, 1801 Mill St., Naperville, Ill. 60540.

APPLIED DATA RESEARCH, INC.
ADR/DL

Applied Data Research, Inc. (ADR) has announced that its ADR/DL, an interactive application development system for ADR's Datacom/DB and IBM's IMS data base management system, now allows for Cobol-based application development and maintenance. The package runs on IBM and compatible mainframe computers under IBM's OS and DOS environments.

The new function allows programmers developing and maintaining Cobol applications to access conventional files as well as Datacom/DB and IMS data bases. Existing Cobol programs not originally developed with ADR/DL can also be maintained.

ADR/DL is now compatible with Sketch, the CICS screen painting fa-



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"Windows" allows you to work on different documents—simultaneously. "Undo" lets you replace text you mistakenly removed. A built-in spelling corrector checks and corrects misspellings from over 97% of the most commonly used words.

WordStar 2000 also has a "typewriter mode" to fill in forms or envelopes easily. Plus "format sheets," which give you ready-made headings, tabs and margins at the touch of one key. It can even create and update footnotes.

Finally, a truly integrated word processing system.

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The only word processing program that interacts with you on your level, whatever your level.

Before we created WordStar 2000, we studied the way people worked, and thought. We also drew from our experience with over 1,250,000 WordStar owners.

cility of ADR/Roscoe and ADR/Vollie for OS and DOS respectively.

The permanent license price for ADR/DL is $25,900 for OS environments, $21,300 for DOS environments and $16,000 for IBM Models 4321, 4331, 4361 and 370/115, 370/125, 370/135 and 370/138 or plug-compatibles.

Applied Data Research, Route 206 and Orchard Road, CN-8, Princeton, N. J. 08540.

APPLICATION PACKAGES

SHAWWARE, INC.
Facilities Maintenance Management System

Shawware, Inc. has introduced a facilities maintenance control software system for the IBM System/38 minicomputer.

According to a company spokesman, the Facilities Maintenance Management System consists of seven modules.

These modules include work order management, manpower allocation, equipment management, preventive maintenance, stores' inventory control, purchase order management and accounts payable.

The modules can be purchased separately or together as the fully integrated Maintenance Management System.

Prices for the software range from $10,000 for a single module to $80,000 for the complete system, the spokesman said.

Shawware, Suite 21, 3075 S.W. 1st Ave., Portland, Ore. 97201.

VERSATEC
Versaplot Color Random software

Versatec, a Xerox Corp. company, has introduced plotting software to support electrostatic color plotting with Prime Computer, Inc. computers running under Prime's Primos 19.2 operating system. The software is used in conjunction with the Versatec Random Element Processor and Versatec electrostatic color plotter.

The Versaplot Color Random software supports 16- or 32-bit integer mode, allowing a 16-bit host to produce up to 13.65-ft-long plots and a 32-bit host to produce up to 40-in.-wide plots of virtually any length, the vendor said. The plotting software provides for eight line colors, 256 predefined area colors and 256 user-definable colors. The software also supports black-and-white plotting, Versatec said.

The price of the Versaplot Color Random software for Prime computers is $4,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

HERITAGE COMPUTER CORP.
Business Oriented Support System

Heritage Computer Corp. (HCC) has released inquiry software for the property and casualty insurance industry. The software is a supplement to HCC's property and casualty software products and runs on IBM 30 and 4300 series computers under IBM's DOS, OS or MVS operating systems.

The Business Oriented Support System (Boss) was designed to give executives direct control of the corporate data base without any data processing knowledge, the vendor said.

Users can formulate questions either against the data base through a series of menu choices or by using a series of tutorial screens.

Boss will be available at the end of first quarter of 1985. Pricing starts at $50,000.

HCC, 2800 S. Taylor Drive, Sheboygan, Wis. 53081.

DATA PROCESSING DESIGN, INC.
Word-11

Data Processing Design, Inc. has announced that its Word-11 word processing software now interfaces with the Hewlett-Packard Co. Laserjet printer and the Xerox Corp. 2700 Distributed Electronic Printer. The software runs on Digital Equipment Corp. computers under DEC's VMS, RSTS/E, RSX-11M and P/OS.

With laser printers, the user can choose multiple fonts on a single page without stopping the printer. Word-11's spooled printing allows users to share printers, and users can continue to create or edit while other documents are printing.

Word-11 for the Professional 350 costs $795, and prices for larger machines range from $6,000 to $9,500, depending upon configuration.

Data Processing Design, 1400 N. Brasher, Anaheim, Calif. 92807.

DATA PROCESSING DESIGN, INC.
Figure Module in Graphics-11

Data Processing Design, Inc. has added a two-dimensional drawing module to its Graphics-11 software that runs on Digital Equipment Corp. processors under DEC's VMS and RSTS/E operating systems. Figure requires either DEC VT125 or VT240 series terminals.

According to a company spokesman, the Figure module enables users to create and edit graphics images and then receive hard-copy output from printers, plotters or 35mm slide generators. Objects can be moved, scaled or copied to create almost any graphics image needed for business applications, the vendor said. Colors, patterns and text can be added to enhance the illustration.

The price of the module ranges from $2,000 for a DEC Micro-11 to $3,500 for a VAX-11/780, and the Graphics-11 package, including Figure, ranges from $3,200 to $5,600, depending upon host configuration.

Data Processing Design, 1400 N. Brasher, Anaheim, Calif. 92807.

As a result, the keys you press are the keys you'd expect to press ("c" for copy, "p" for print, etc.). You may also use your computer's function keys. Menus have been uniquely designed for easy access to all functions. And MicroPro's exclusive "tutor-in-your-computer™" makes learning fast and fun.

WordStar 2000 is the easy word processing program you'll never outgrow. Of course, the original WordStar and WordStar for PCjr will continue to provide substantial and proven word processing capability for those with more modest budgets.

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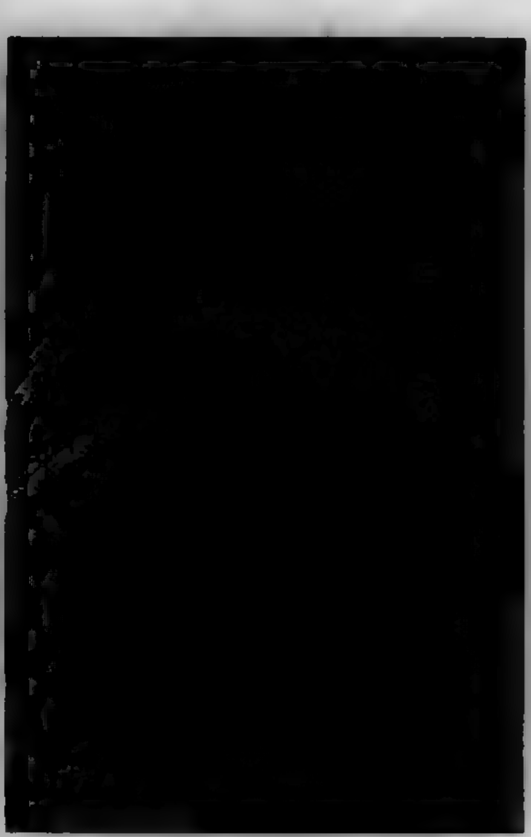

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LINK from page 41

formed his preliminary close in the traditional manner. A big block of paper has been printed out in multiple copies, and he is evaluating his performance to budget for the month. He has some final adjusting entries to make, errors to clear up and he is under pressure from his board to produce the numbers for an important meeting in two days.

The controller needs to be able to call up the journal entry screens from his personal computer, enter his adjusting transactions, post them in real time to the production data bases and bring this updated data down again to the personal computer to see the results. With a micro-mainframe link that allows real-time update, he can do this in a few minutes.

Real-time uploads are going to become more common as available products improve. But this evolution should have the user thinking about security in terms of uploads as well as downloads and real-time access to production data bases. Do not expect too much from the mainframe software packages in terms of security. Internal procedures are still going to have to play the major part.

Once an end user has proprietary data on his micro, there is little the mainframe software package can do about security. It is up to you to institute rules like locking offices, enforcing procedures of three generations of backup on the personal computer files, using data encryption software on the personal computer and insuring the computers and the data. However, personal computer link software can do something about security. Because the links generally treat the micros as terminals, the user should be aware of some of the important options that should be available.

■ Does the package have security at the level of the data base and at the terminal or personal computer? Is there a feature for user identification and user password? Is there security at the record, field or partial field level? These are some of the levels of security that a comprehensive personal computer link software package should have.

■ Can each personal computer be secured by its location, by the time of day and the days of the week that it can access certain data and for periods of time to handle temporary assignments or project situations?

■ A security log is also important. This is a set of records, built by the software, that allows an on-line display of anyone who has been attempting to violate the security system by getting into unauthorized data and includes information such as which data base and what functions, the personnel and terminal ID and the date and time.

■ Another good feature for security users is providing the ability for the end user to change his own password although not necessarily to add new passwords.

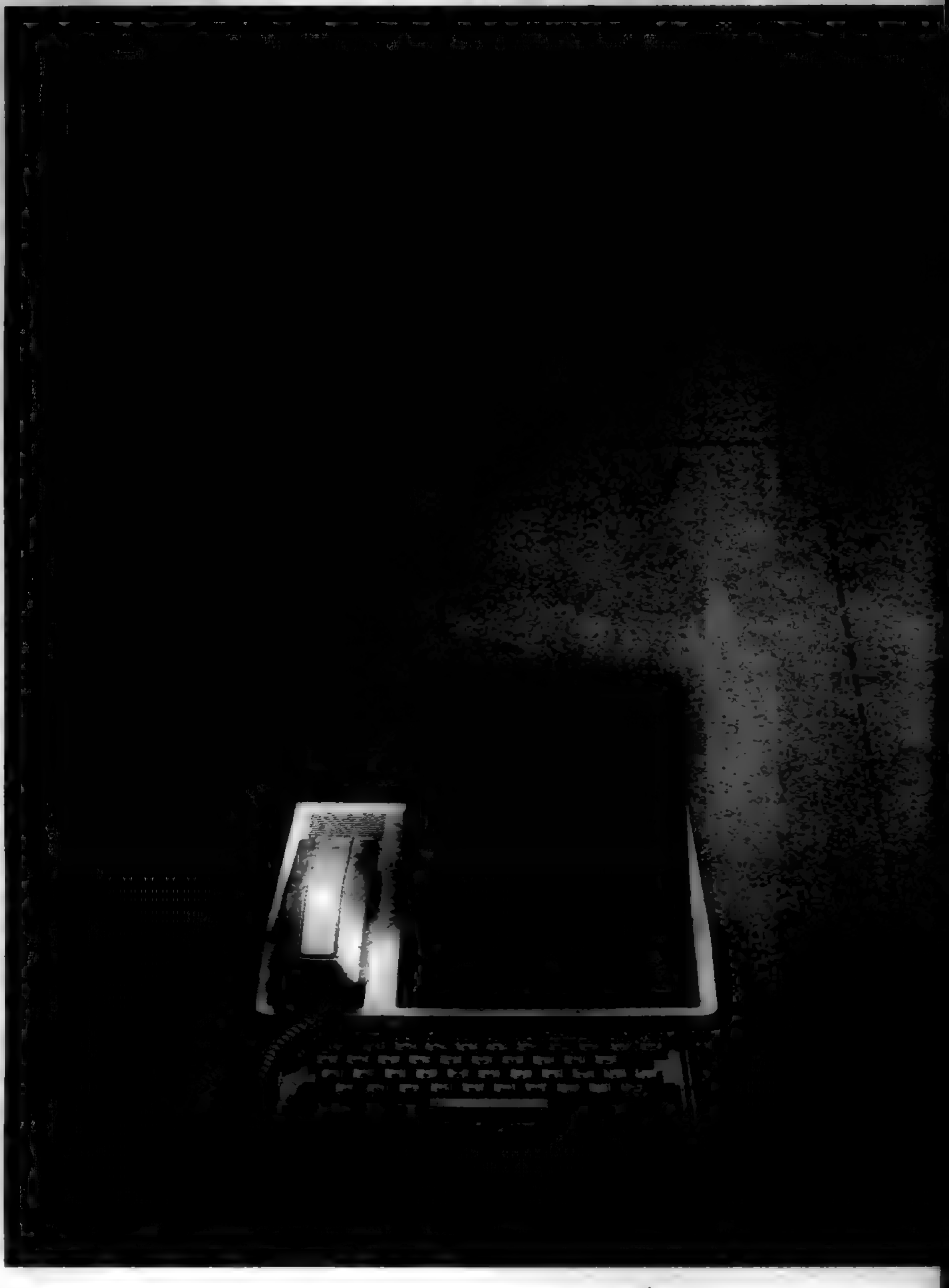
■ Look for the ability to get security interactively in real time. This can be important when a problem employee has been terminated, and there is a need to eliminate his password before he goes back to his office and does some last-day damage to the system.

Another basic philosophy that should be in the software is the concept of two profiles of users, one each for download and upload. In other words, all of these things should be definable in one way for download or data access but in another way for upload or data update, for each individual user.

For example, only our financial vice-president has upload and update capability to the budget fields of a general ledger. But each end user can access his own budget data for download purposes.

Look back at the example of the controller updating a mainframe data base. Security features in personal computer links work like this: First, he can only update his defined data base from his defined personal computer, and he must use his ID and password. Then, he can only get at current amount figures; he only has this capability for a couple of days at the end of the month. The data security function handles the setting of all those security levels.

Being aware of the security risks involved is half the battle. But it is a battle that is easily won when the user supports the new technology with a structured security plan.



DESIGN

from page 41

requirement changes occur after which the schema and the subschemas are changed. Then the programs in the first and the second subsystems have to be modified or rewritten. When the third subsystem is finally finished, it overruns the inflated estimate by 20%. Why?

The above scenario is by no means fictional. What happens is the time required to complete each subsystem grows quadratically. This is because the time required to modify each of the previous subsystems is a linear percentage of the initial development effort. As each new subsystem is added, the number of subsystems that has to be modified, as well as the number of interactions, increases.

By using the data base navigation techniques discussed in the accompanying article, the percentage of development time required to modify the previous subsystems can be greatly reduced. What is also desired is the elimination of the quadratic growth in its entirety. This is achievable if the other subsystems can be insulated from the impact of changes in the data base. The key to providing this insulation is the subschemas.

The process works like this. First of all, do not try to design a data base in the beginning that encompasses all the subsystems anticipated in the final system. Besides being a futile effort, the reduction in initial system analysis time will make possible earlier delivery on the first subsystem.

Analyze the data requirements and design a data base schema only for the first subsystem. Write and implement the schema and any subschemas that this subsystem requires. Finally, write and implement the programs this subsystem requires using the techniques discussed in the previous two sections.

When the time comes to build the second subsystem, perform an analysis of its data requirements. If this subsystem is an independent extension of the first subsystem, its data requirements will be an extension of the schema designed for the first subsystem.

Combine the data requirements for the second subsystem with the existing schema for the first subsystem. A large number of the data elements will already exist in the schema for the first subsystem.

Write a new schema for the integrated data requirements. Regenerate the subschemas from the first subsystem to use the new schema. Write the subschemas for the second subsystem. These subschemas should only include the data elements specifically required by the second subsystem.

Finally, write the programs for the second subsystem using the integrated data base.

This process is repeated for each of the succeeding subsystems. The steps to implement each subsystem are the same: Expand the schema, regenerate the subschemas of the previous subsystems to use the new schema, write the subschema for the new subsystems including only the data elements required for that subsystem, and write the programs for the new subsystem using its subschemas.

DEC

from page 41

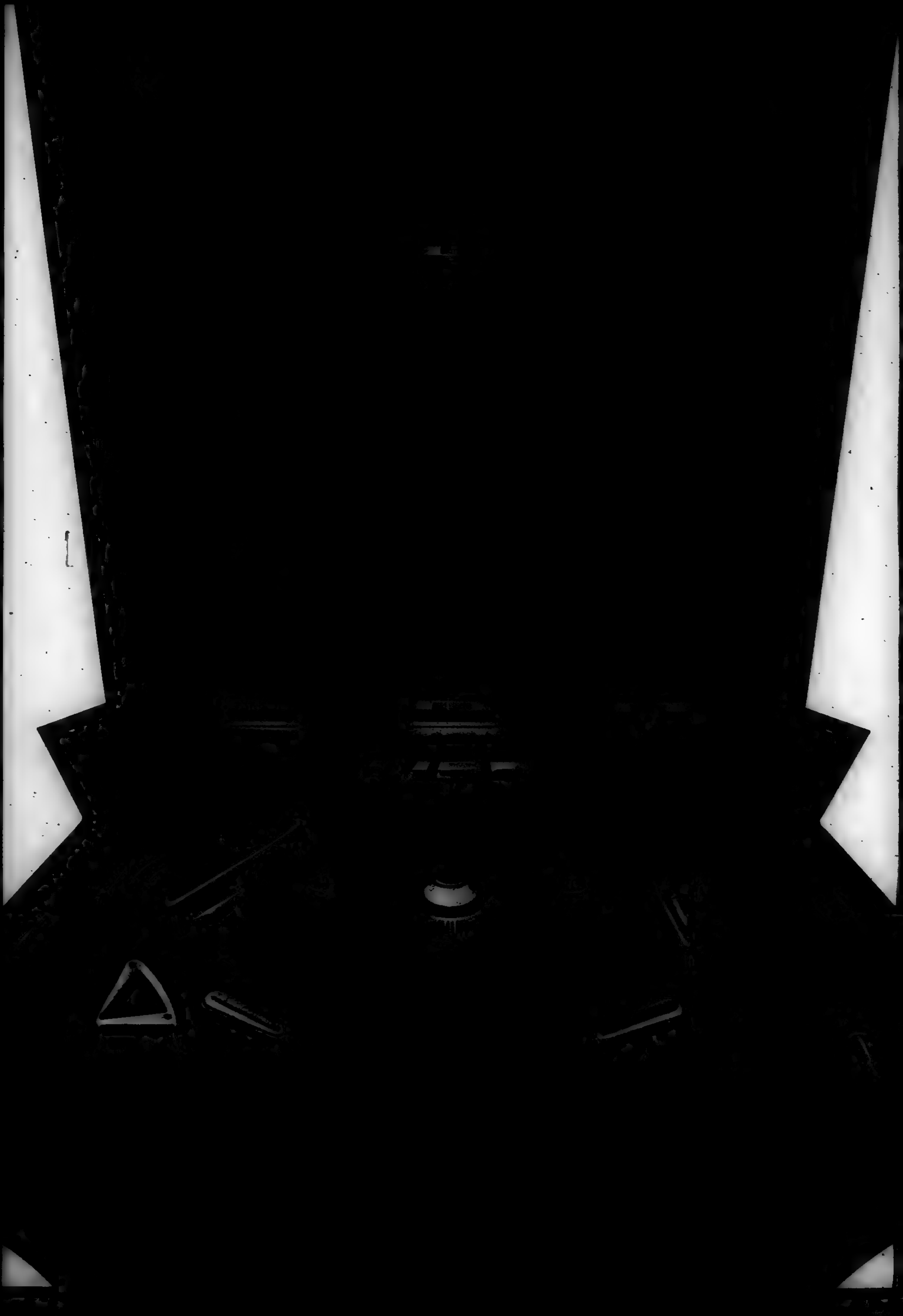
that is said to optimize message delivery. It includes existing standard support for network protocols. The product reportedly gives users the ability to log progress of messages within the network and provides VMSmail gateways for accessing DEC's VMS Personal Mail Utility. Message Router sells for $4,000 and will be available in the spring, DEC said.

■ Decspell Version 1.1 includes expanded lexicons and compatibility with the All-In-One system. The product reportedly includes correction capability for documents created with the WPS-Plus/VMS. It will licensed for $1,850 and will be available in January.

■ Decslide Version 1.2 is said to allow VAX/VMS and MicroVMS users to create slides containing text and graphics. The new version includes compound document capabilities. Decslide is priced at $2,500 and is available immediately.

■ Decgraph Version 1.3 is a general-purpose graphics package for VAX computers and MicroVMS systems. The product is priced at $2,500 and is available immediately.

DEC is located at 146 Main St., Maynard, Mass. 01754.



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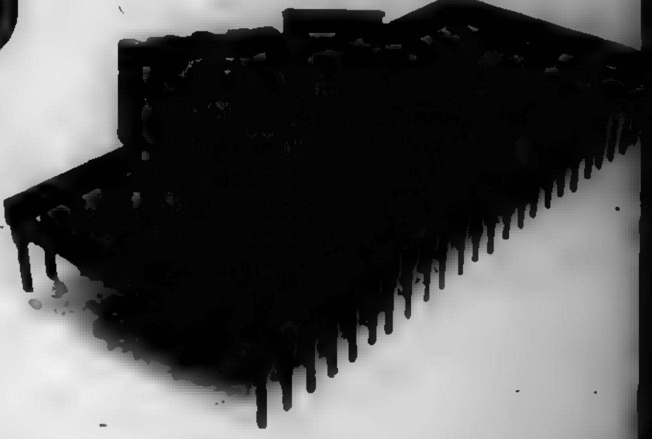

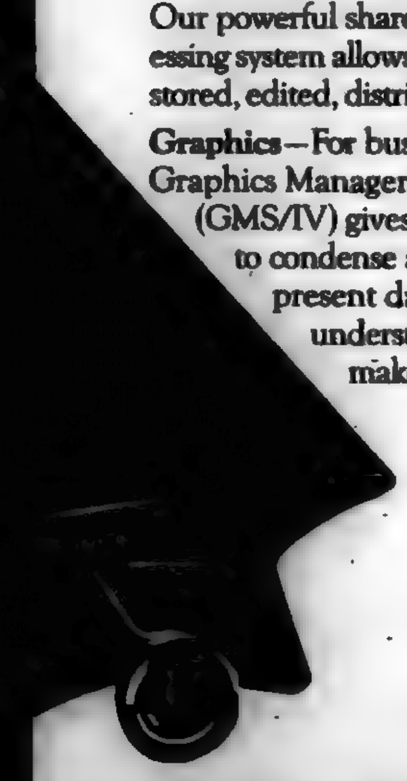

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***Computerworld, August 20, 1984**

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COMMUNICATIONS

Dual-port muxes help users cope with cable woes

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Members of the San Francisco Police Department's Gang Task Force were beginning to get a little edgy.

For some time, the task force had sought to install an IBM 3287 printer in its fifth-floor, downtown administrative control center. The printer was earmarked to be located with an existing CRT terminal that the police use to receive administrative messages from around the state.

But the installation, though seemingly routine, hit a snag: Because the task force lacked the necessary coaxial cable, it was unable to connect the newly acquired printer to its existing hardware.

So the police approached the city's Department of Public Works (DPW) and asked that an additional coaxial cable be strung between their first-floor IBM 3274 controller and the printer. But the DPW, with its job order backlog already lengthy, was unable to respond promptly.

In fact, the delay in pulling the desired coaxial cable probably would have ranged from one to two months, according to John Barr, DP manager at the City of San Francisco's Hall of Justice.

News of the extended lead time reached the local police chief, whose reaction was less than sympathetic. Police Sgt. Bill Shoaf explained that the chief, in a memo to the Gang Task Force, said, in effect, "I know there are a hundred reasons why you can't do it. Just get it done."

One day later, a task force member spied a newspaper ad extolling the virtues of a modest-looking communications accessory that allows two I/O devices to be run from the same coaxial cable. The accessories, dual-port coaxial multiplexers, were developed by Fibronics International, Inc., a Hyannis, Mass.-based fiber-optics communications company.

Intrigued and desperate, the task force decided to try the coaxial doublers. Within 15 minutes of their arrival, two were fully installed and were allowing a shared coaxial cable to support both the IBM printer and its companion terminal, Barr recalled.

See DOUBLERS page 56

Southwestern Bell to expand digital transmission services

ST. LOUIS — Southwestern Bell Telephone Co., noting that a third of the customers who are bypassing the company do not know that it offers services they need, has announced a series of digital transmission services.

Tariffs for some of the Digital Link Services, including Megalink and Microlink, will be filed in Kansas, Arkansas, Oklahoma, Missouri and Texas in the next several months and in other states in 1986, according to the Southwestern Bell Corp. subsidiary.

"Our own research indicates that about a third of the customers who bypassed us didn't know we could have provided the network services they needed. Too many customers think we only provide plain old phone service.

"But our business is moving information — voice, data and video," said James W. Callaway, vice-president of marketing for Southwestern Bell Telephone.

Callaway said digital transmission throughout the region will be enhanced by installation within the next two years of at least 32 new digital switching systems serving up to 450,000 customer lines. The company now has 27 digital switching systems serving 95,000 lines.

Dedicated data lines

The Megalink services, designed for customers needing dedicated data lines, include Megalink I-Standard Digital Service, Megalink II-Premium Digital Service and Megalink III-Wideband Digital Service/1.54Mbps.

Megalink I and Megalink II, the latter of which is currently offered under the name of Dataphone Digital Service, offer transmission speeds up to 56K bit/sec. Megalink II will feature 24-hour monitoring and 99.5% accuracy, according to the company.

Megalink III, featuring a 1.54M bit/sec transmission rate, was designed for high volumes of data, voice, video, electronic mail, facsimile and other services.

Microlink I-Public Switched Digital Service and Microlink II-Packet-Switched Digital Service are targeted at businesses and residential customers who transmit data less frequently.

Microlink I provides dial-up digital transmission on the established telephone network using a digital link between the computer and telephone line.

The tariffs for that service will be filed in 1985.

Microlink II will allow various customers to transmit packets over the same lines and save money by only paying for their own usage.

The Microlink II tariffs will be filed in 1986.

INSIDE

Controllers/56

Tymnet plans Japanese net

SAN JOSE, Calif. — Tymnet, Inc. has announced a joint venture that it hopes will lead to the establishment of a value-added network throughout Japan.

Tymnet, a packet-switching network, said the joint venture with the Tokyo-based Marubeni trading company will become effective April 1, when the firms expect approval of a proposed telecommunications bill in the Japanese parliament that would allow private companies to offer value-added network services.

A Tymnet spokesman said that all of the value-added services that Tymnet offers in the U.S. will be available through the Japanese network.

Much hardware, software installed

The spokesman said the venture, Japan Network Ltd., will use Tymnet hardware and software, much of which already has been installed.

The network initially will support the cities of Osaka, Tokyo, Sendai, Nagoya, Fukui, Kanazawa and Toyama.

It also will connect to the Tymnet network in the U.S. and other worldwide public data networks, according to Tymnet.

There are 22 secondary shareholders in the joint venture.

Reagan position on Intelsat competition may be moot

DATA STREAM
James Connolly
CW Senior Editor

The Reagan administration's approval of limited private competition for the International Telecommunications Satellite Organization (Intelsat) may be good news for Intelsat's potential rivals.

But the president's action may have little influence on what already seemed to be developing as a buyer's market in international communications. Even before the president issued his memorandum to the secretaries of state and commerce, communications industry observers were predicting drastic price cuts for intercontinental traffic because Intelsat overestimated demand for its transponder space, and terrestrial transmissions are increasingly available as an option.

The administration said it will allow the five private rivals of Intelsat to fight for up to 15% of Intelsat's U.S.-based data, video and intracompany voice traffic. Those rivals are Orion Satellite Corp.; International Satellite, Inc.; Pan American Satellite Corp.; Cygnus Satellite Corp.; and RCA Americom, a subsidiary of RCA Corp.

Unanswered question

However, one question that remains unanswered is how soon, and under what conditions, those companies that last year asked the Federal Communications Commission for permission to compete with Intelsat can get into the satellite market. Reagan said that those who compete with Intelsat must consult with Intelsat about their plans, that they cannot offer switched public circuits and that they must meet the technical compatibility standards of regulating bodies in the countries they plan to service.

Fritz Ringling, director of telecommunications research for the Gartner Group, Inc. in Stamford, Conn., speculated that RCA and Orion are most serious about offering satellite services.

"I anticipated that the administration would allow private satellite companies to compete with Intelsat. I also anticipate very agressive pricing strategies, which could mean significant savings for customers," Ringling said.

Ringling said one reason for the lower prices is the current and future lack of demand for transponder space. He said Intelsat overestimated the need for circuits by 15%, "which translates into 12,000 voice-grade circuits." He observed that even the National Aeronautics and Space Administration has predicted a 10.3% decline in the growth of full-time satellite traffic. He added that the U.S. International Service Carriers last year revised downward their estimates for satel-

See INTELSAT page 56

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CONVERTING TO IBM?

Based on previous success and popular demand, Touche Ross & Co. is hosting another conference for companies converting from non-IBM computer environments to IBM.

The purpose of the conference is to provide a forum for participating companies to exchange ideas and share experience. All participating companies will be asked to make informal presentations and participate in breakout groups. Touche Ross will act as conference host and moderator.

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COMMUNICATIONS

CONTROLLERS

EMULEX CORP.
Commxchange

Emulex Corp. has announced a data switch that is said to allow connection of 180 terminals to single- or multiple-host computer networks.

Commxchange, also called the DS01, reportedly supports 180 terminal-to-computer port connections, or 360 lines, and can be expanded for an additional 480 connections, or 960 lines.

According to the vendor, the Commxchange is compatible with virtually any type of computer or asynchronous terminal, and performance is unaffected as the number of users increases.

The basic system includes a central unit, power supply and central board set. The backplane reportedly is fully redundant, while redundant control boards, expansion bus boards and power supplies can be added as options. It also features a standard battery backup to ensure saving configuration parameters in the event of a power failure.

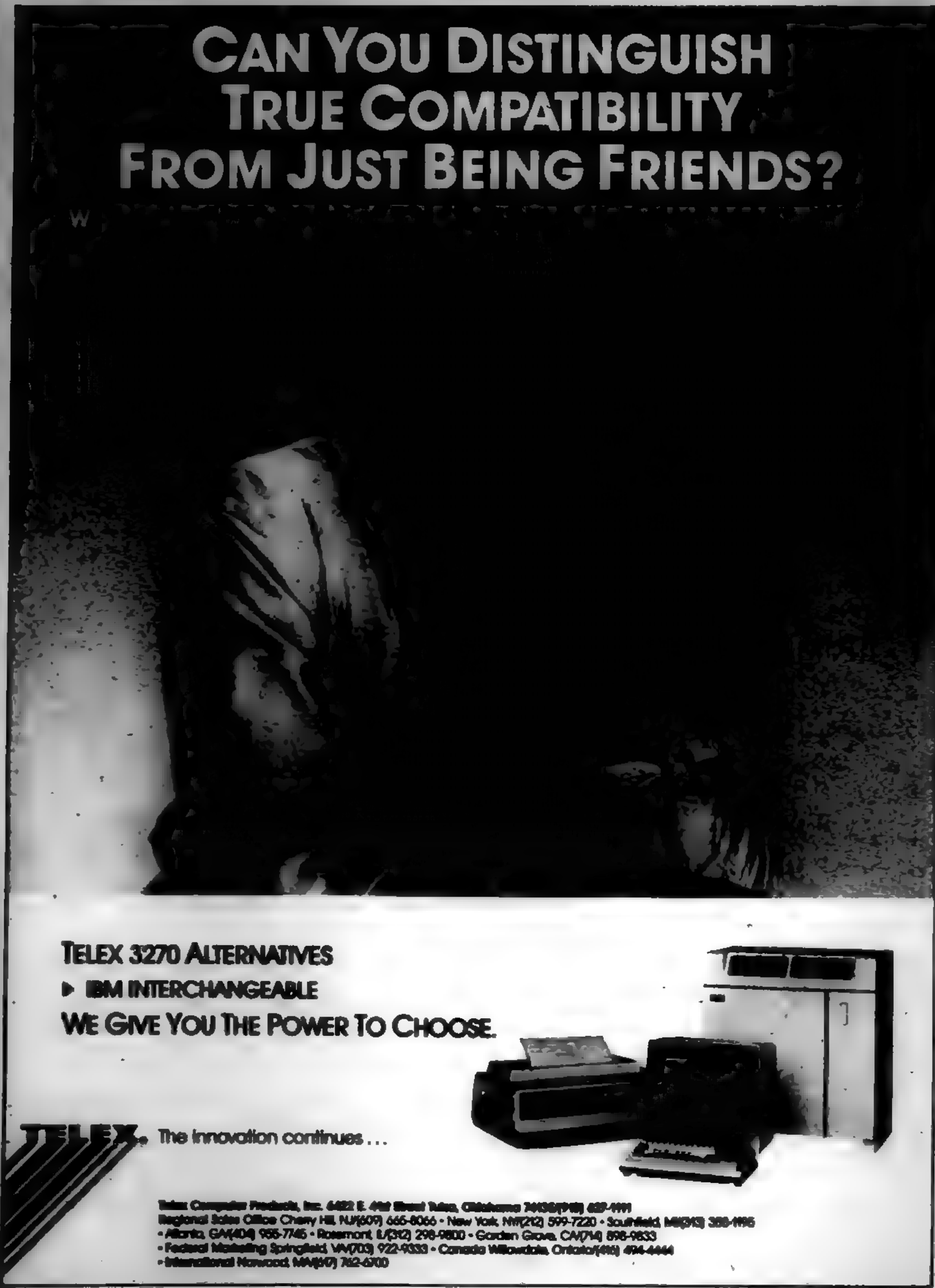
The company said installation can be handled by a maintenance department or telephone installation crew. It connects through ordinary telephone lines and connectors using a variety of methods, such as telephone punch blocks, telephone jacks, 50-pin connectors and RS-232 distribution panels.

A supervisory control board in the central unit provides menu-driven software for step-by-step instructions on routing terminal lines to designated computers, according to Emulex. A terminal reportedly can select any of 45 types of destinations by using eight-character symbolic names or specific line numbers.

The unit is said to support speeds up to 9.6K bit/sec on all lines.

The company said a typical unit, with redundant power supplies and board sets, costs $15,000.

Emulex, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.



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DOUBLERS

from page 53

The Gang Task Force's recent case history is by no means unique, according to Fibronics product manager Dave Sonderegger. He said that in hundreds of large businesses and other organizations throughout the U.S., dual-port coaxial multiplexers are providing users with a quick-fix alternative to the often costly and time-consuming practice of installing additional cable.

The motivation for installing the communications accessories varies widely.

Some users — the San Francisco Police Department's Gang Task Force, for example — opt for the devices to avoid lengthy delays in pulling coaxial cable. Other users, including the I Magnin department store chain, see the multiplexers as a means of minimizing their hardware overhead.

Installation of a single coaxial cable frequently costs $1,000 to $1,200, according to Roy Dodd, the chain's operating vice-president for MIS. Two doublers, by contrast, sell for less than $500.

INTELSAT

from page 53

lite circuit demand and that he won't be surprised if they reduce their figures yet again.

While demand is waning, the customer's cost for satellite transmissions also will come down, which could inspire new business applications, according to Ringling and other observers. Ringling noted that the price of earth stations, particularly receive-only stations, is plummeting.

Jerry Lucas, president of the Telestrategies, Inc. consulting group in McLean, Va., predicted that opening up more transponder space, in particular transponders on the underutilized Ku Band, will lead to large companies developing new applications for their satellite links. He said one such application would be downloading software updates to multiple locations around the world.

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12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other ______________

3. **COMPUTER INVOLVEMENT (Circle all that apply)**
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-182

IN DEPTH

WARNING

To anyone moving Cobol applications to micros

RESPONSE

The In Depth article "Running your Cobol on micros" by Anthony Fedanzo Jr. [CW, Nov. 19] presented arguments for converting existing mainframe or mini applications to micros. Here are some caveats from a reader who has run Cobol on micros for the last four years.

By Dick Burkhalter

I am not one of the "Cobol haters" who think that Cobol and Cobol programmers should be banished from the planet. Nor am I of the opposite persuasion, praising Cobol above all other languages. I simply view Cobol as another computer language with its own strengths and weaknesses.

My experience with Cobol on micros is limited to a single product, Ryan-McFarland Corp.'s Cobol compiler. It may be that some of the problems I mention are specific to that particular implementation, and I think it would be valuable to readers to hear from users of other Cobol compilers, such as those from Micro Focus, Inc., Microsoft Corp., Realia, Inc. and others.

I found Fedanzo's article interesting and informative. I do, however, think that he missed some key points (or glossed over them) in relation to the difficulties that might be encountered in moving a Cobol application from a large computer to a micro. I am concerned that readers without extensive personal computer experience may be misled by the article, which portrays the conversion as a relatively simple one.

The problems that may occur in moving Cobol applications fall into four general categories:

1. Problems associated with the incompatibilities in the various implementations of Cobol.
2. Problems caused by the quality of the original Cobol code or efforts to clean it up.
3. Problems resulting from the limitations of microcomputers.
4. Problems in transferring data between mainframes and micros.

Unless you already use Ryan-McFarland's Cobol or Information Processing, Inc.'s Blis/Cobol on your large machine, you cannot get a truly compatible Cobol compiler for your micro, as far as I know. Even with these two products, there may be some differences in implementation that will necessitate rewrites of part

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of your original source code. This is the best case. In the worst case, you may have to rewrite so much of the code that you might as well start from scratch.

Those of you in IBM mainframe environments have a real bear of a problem, because no matter which personal computer Cobol you pick, you may have to rewrite significant portions of the code in transporting it to a personal computer. Yes, I know, all the microcomputer Cobol vendors claim conformance to the Ansi '74 standard, and as far as I can tell, they aren't lying.

However, the standard has a lot of levels, and only in the fine print do you find out what each vendor supports at each level. And, of course, IBM is well known for its own extensions to Cobol, such as Sort and Report Writer. You don't use those? Lucky for you. Maybe.

Fedanzo stated that the most likely candidates for migration to microcomputers are those older batch programs that are used for data entry. Fine. But micros, by definition, are on-line, interactive machines, getting their input from the screen rather than from cards, tapes or whatever. Most old data entry programs I have seen read cards or card images, and the coding necessary to change to screen input is not as trivial as you might first believe, especially if you are going to edit interactively and prompt the operator.

Screen handling

Even if the programs you are converting use screen input, you need to consider the differences in screen handling between your mainframe compiler and whatever product you choose for the micro. If you have an IBM system and use CICS, you can probably expect to throw away about 60% of the code right off the bat. Similar, though perhaps less burdensome, differences will hold true for other mainframe and minicomputer users.

If your mainframe or mini uses a later version of Cobol that supports such nice features as SEARCH, SEARCH ALL, STRING, UNSTRING and other newer verbs, you are going to have to spend a significant amount of time developing subroutines to replace those features, none of which are present in current personal computer Cobol compilers.

Fedanzo recommended making program changes on the mainframe rather than on the personal computer, supposedly to take advantage of the higher speed of processing and better editing facilities inherent in large computers. I dispute that assumption, especially in a large shop with a heavily loaded system.

Using Micropro International Corp.'s Wordstar or any other word processor, a dedicated personal computer can run circles around most mainframe editors, considering the poor response time usually found on large systems during peak hours. Not only that, but the programs must be compiled on the personal computer anyway, so time gained, if any, by editing on the mainframe may be lost in downloading to the personal computer for compilation.

Speaking of compilation, one should be aware of the slowness of compile times on personal computers relative to mainframes. A typical Cobol program on a mainframe might average 2,000 to 3,000 lines of code and compile in less than a minute. In contrast, the compile time on a micro would be measured in portions of an hour or even more. A program this large is truly huge by personal computer standards.

I have a system written in Cobol for a Tandy Corp. TRS-80 Model III. It contains about 40 programs, the smallest of which is less than 200 lines of code and the largest about 1,800 lines, with an average program size of 500 to 600 lines. The small programs compile in three to five minutes, depending on whether I print the source listing during compilation. The larger ones seem to take time, which increases exponentially with the size of the program; that one real biggie takes more than 45 minutes!

Granted, substantial speed improvements will be experienced with 16-bit machines as opposed to the TRS-80's 8-bit processor, but you will still encounter long compile times as the programs increase in size. You cannot compile programs on the mainframe and move only the object code to the personal computer, because the instruction sets and form of the object code are machine-dependent.

Which brings me to yet another trap for the unwary, namely that of the differences in those supposedly "compatible" personal computers. If you have a mix of personal computer brands, which you intend to use as target machines, be absolutely sure that a single copy of the compiler will create usable object code for all of them. It's possible, but be sure to find that out via actual testing before you embark on a large project, or you may find yourself facing

> *Those of you in IBM mainframe environments have a real bear of a problem, because no matter which personal computer Cobol you pick, you may have to rewrite significant portions of the code in transporting it to a personal computer.*

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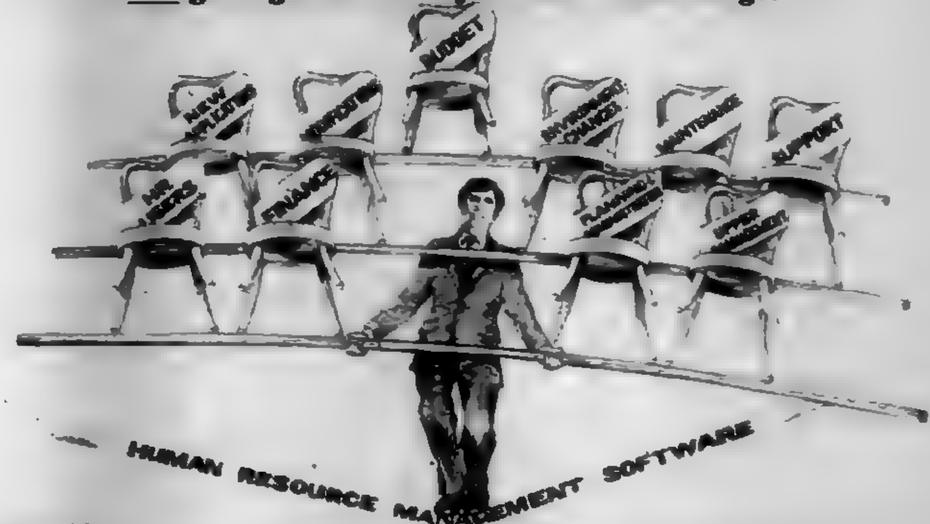

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In the case of the TRS-80 system, separate compilations are required for the Model III and Model I versions, even though the two computers are from the same manufacturer and use the same Zilog, Inc. Z80 CPU. Fortunately, the Cobol compiler package from Tandy (RM Cobol) includes disks for both the Model I and Model III.

If, however, I wish to upgrade my system to run on the Tandy Model 16 or 2000, I will have to purchase a different Cobol compiler for each of these two machines, because they are not compatible with the Model III or with each other.

Quality of Cobol code

One of the most significant issues to be considered is the quality of the programs to be converted. Given that most of the ideal candidates for conversion are likely to be older batch programs written at the Cobol-74 level, it is highly unlikely that these programs were written in structured code.

Moving unstructured code from a mainframe to a personal computer will only move the maintenance headaches from one environment to another, and the latter may be less efficient in terms of maintenance facilities.

If modifying the transported code is to be considered in order to bring about conformance to current structured programming standards, significant delays may be expected. Missing or misleading documentation is common with older programs, and making modifications without totally "gut-ripping" the programs can be difficult. We all know the feelings of frustration that come from wanting to scrap an old program but being forced to make the best of it because of time and cost considerations.

Either way, it is an expensive game to play.

Limitations of micros

Fedanzo mentioned the limitation of 64K bytes of data stack space, which relates to the length of the longest program you may have in memory at a time. This is by far the least restrictive limitation you need be concerned with, because it is often possible to divide a large program into segments or modules that can be called from one another. In some cases, even this technique does not work, however, as portions of the data division that are passed from module to module remain in memory, and eventually you run out of memory, just as in Basic or any other language.

Because you find out about this at development time, during testing, it's not as crucial as finding out after you have put the program into production mode, but the amount of time you have to spend fixing up programs to run in less memory is something to be anticipated.

Another problem here is that you have no way of knowing in advance how much memory a mainframe program will take on a personal computer, because there is no direct correspondence between the size of the program as it runs on your large system and the amount of space it will take when moved over to your micro. You just have to use common sense and try it. (Obviously, you aren't going to try fitting that 20,000-line payroll program into your micro, are you?)

If fitting programs in memory and waiting for compilers to finish are small problems, then fitting all that code onto floppy disks can be a real nightmare. The average personal computer has about 350K to 400K bytes of storage per double-sided, double-density floppy disk. That's not very much storage from the point of view of most mainframe applications. Cobol programs are notoriously verbose and, even at the object-code level, can require more space than is available on a single floppy drive.

Remember, you not only need to have all your programs on a single disk, but that disk must also contain the Cobol runtime modules and the operating system as well. Consideration must be given to this limitation, lest you find yourself in a situation in which the operator is forced to swap program disks in order to run the application — definitely not a user-friendly situation!

Similarly, data files on large systems tend to occupy a lot of space (in personal computer terms). Even if you can segment these files for downloading, you must be aware of your total disk space needs. I can't think of anything much worse than having an "out of disk space" message occur in the middle of a hectic day. Don't laugh, I've had it happen, and so may you, as Murphy's Law reigns supreme in this business.

As far as I'm concerned, hard disk is the only way to go, and the more the better in the corporate environment. This is true regardless of the language being used. The declining cost of hard-disk storage makes this point even more valid. And while you're at it, factor in the cost of a streaming tape backup, because we all know that if the operator has to back up the hard drive to floppies, sitting there feeding backup disks into the personal computer, one by one, backups will be skipped with regularity. (They usually will be taken only on the day after a power failure wipes out all the data captured since the last backup, which may have been weeks earlier.)

Add the price of at least 10M bytes of hard disk and a compatible tape backup device per target machine to your conversion cost.

Data format incompatibilities

Regardless of how easy or difficult it may be to convert program code, you must be aware that the data format incompatibilities between mainframes and micros present a bigger burden than Fedanzo suggested. Moving source code files presents no special problems, because these are simply Ascii text files.

However, there is currently no way to transfer random or indexed files directly (and what good is a Cobol program if it doesn't use Isam files?). Programs will have to be

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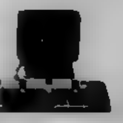

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written to extract sequential files on one side and read and load the indexed or random files sequentially on the other.

In the worst case, programs may be required to perform both operations on both sides. While the time to write these programs may be trivial, the time it takes to load indexed files on a micro can be agonizingly long if more than a few hundred records are involved.

This slowness will be magnified to alarming levels if the micro uses floppy disks rather than hard disk. It will take hours, not minutes, to load a reasonably sized Isam file from sequential input.

To summarize, then, while it is possible to convert programs from mainframe to personal computer using Cobol code, it is not at all as simple as it appears on the surface. Obviously, Fedanzo has done it successfully, and with the right mix of hardware, compiler and application software, so can you. But I would advise doing an in-depth study of all the factors mentioned here before proceeding.

In fact, it might be worthwhile to invest in a number of Cobol compilers for the target microcomputer and try your luck with all of them using some relatively small and noncritical system as a testing and learning tool before proceeding to bigger things. The cost of compilers is small compared with the total development effort likely to be involved.

Additional considerations

Given that the idea of moving some applications from a mainframe to a personal computer is valid in many cases, I would suggest that you consider using one of the personal computer data base management systems, such as Ashton-Tate's Dbase II or III or Microrim, Inc.'s R:Base, instead of Cobol to generate the micro application.

These products are easier to learn and use than Basic, Pascal, C or other languages which are so adored by the micro gurus. Any competent Cobol programmer should become proficient with any of them in less than a week. Not only that, but the resulting application may be cleaner and friendlier to the user than something hacked up out of old Cobol code.

It is highly likely that writing the application over using one of these micro products will require less time than converting the Cobol code, even allowing for programmer learning curves. Additional benefits may accrue from the ability to create additional reports or screens quickly using the facilities inherent in the personal computer product.

Using Dbase II, for instance, you can create a whole new report in just minutes, as opposed to hours using Cobol. The file transfer problem is no worse than for Cobol to Cobol, given the necessity to create sequential update files in either case. The above-mentioned products allow creation of files in "foreign" formats with little effort.

It is time to start training some of our Cobol programmers to use micros effectively, which means giving them some modern tools to work with and allowing them the time to learn how to use them. While moving Cobol code directly to micros may produce some short-term gains, training experienced Cobol programmers in the use of personal computer tools appears to be a much better long-term investment in talents and resources.

If DP professionals are going to retain control over corporate data processing policy, they must learn how to use micros effectively, as many of their users already do. It's time to stop using the broad base of Cobol programming skills out there as an excuse to justify keeping ancient and inefficient systems alive through yet another generation.

About the author

Dick Burkhalter is a business systems consultant for Diverse Developments, a Canoga Park, Calif., consulting and programming firm serving business users of micros.

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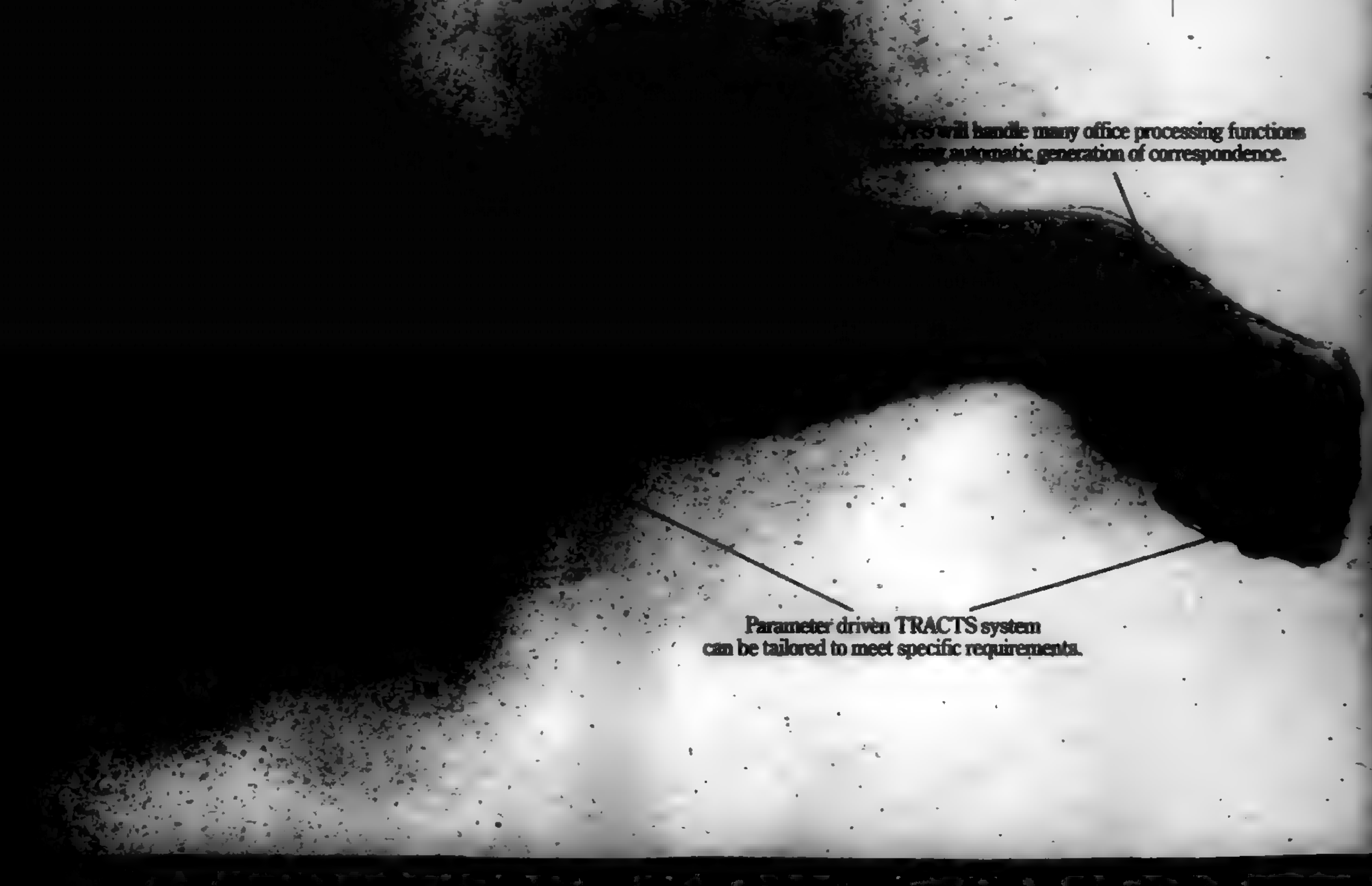
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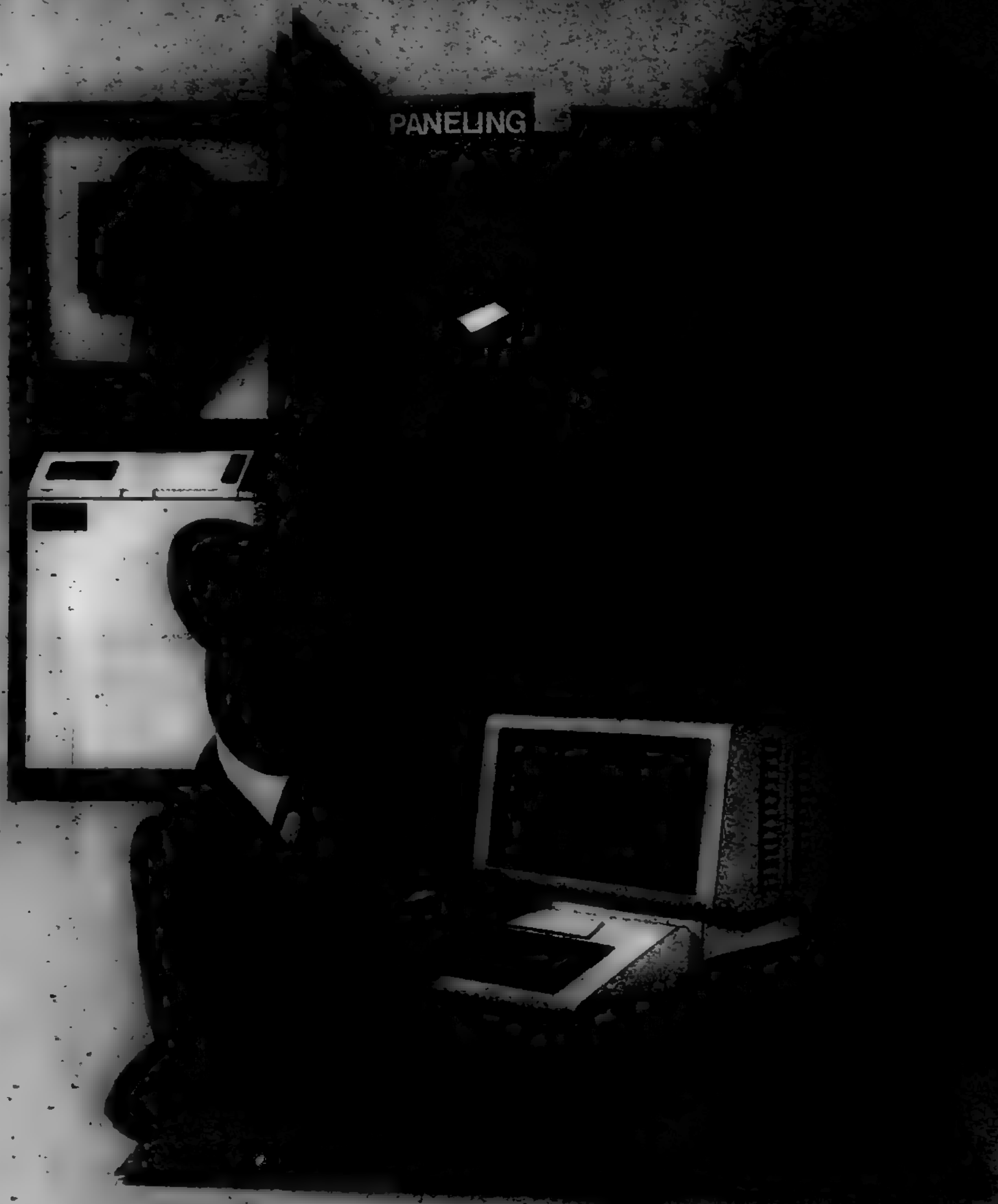

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Don't rely on the law to stop computer crime

By Nancy Finn and Peter Finn

It is estimated that by the end of next year, more than 10 million personal computers will sit beneath the fingertips of American workers. These tools open up new opportunities for their owners, but they also open the door to infiltration into company business records and the deliberate distortion of information by unauthorized individuals. Losses resulting from computer-related crimes now range between $100 million and $300 million annually in the U.S.

There is no agreement among legal experts as to what constitutes a computer crime. Consequently, a generally accepted definition of a computer crime is notably absent from current legal opinion. Some experts dismiss the concept entirely, referring to "computer abuse" or "computer-assisted crime."

Computer abuse, broadly defined, is any incident associated with computer technology in which a victim suffered, or could have suffered, loss and a perpetrator, by intention, profited or could have profited.

Computer abuse can fall into one of five categories of currently recognized crime: financial crime, information crime, theft of property, theft of services and vandalism.

In view of the legal system, which often leaves the victim of computer abuse without recourse, it is essential users install preventive security measures as the first line of defense.

- Financial crime is the taking of funds via computer, for example, executing the theft of a payroll through a computer system or just shifting monies from one account to another.
- Information crime involves the acquisition of valuable information via computer, such as a company's mailing list, a list of solicitations or other contributions. It is one of the least detected and most costly of computer crimes.
- Theft of property is simply the taking of computer hardware for personal sale or use. It is the easiest crime to categorize and prosecute.

- Theft of services is the unauthorized use of a computer, for example, use of a company's computer for personal, nonofficial use.
- Vandalism is intentional damage to a computer or computer system, either physical destruction or alteration.

Some computer abuse fits more easily into the traditional criminal statutory scheme, such as theft of physical computer property and vandalism. Other types of abuse, such as the taking of information or services, are more difficult to analyze in traditional terms.

Notwithstanding the difficulty involved, it is essential that there be a recognition of the type and magnitude of harm caused by the computer crime so that there is proper analysis of the computer abuse problem. What the courts and the legislatures have to recognize is that computer abuse can occur in unobtrusive ways such as through fraudulent access or bugging of software. Unauthorized users are often so familiar and comfortable with the computer system that detection is particularly difficult.

It appears on the surface that computer abuse might easily be prosecuted under the law of theft. However, traditional criminal statutes such as larceny have been inadequate and ineffective in prosecuting computer abuses. Inherent in the law of theft is the notion that property capable of being stolen must be tangible and that such property must physically change possession. Thus, it is extremely difficult to prove the law of theft in the instance of computer theft without the abuser having physically removed a tangible item.

Tangibility issue

The tangibility issue was addressed in the case *Ward v. Superior Court* (California, 1972). The court found that the defendant had not stolen an "article" within the meaning of the penal code because implicit in the definition of the article is that it must be something tangible. The court found that electronic impulses are not tangible.

A further complication arises in determining the valuation of an item that, in the case of a computer crime, might not be tangible. Is the valuation of the stolen property based upon the price of the paper on which the program was written, or is it the value of the bit of information to the company or the owner of the program? The valuation is necessary in order to distinguish between an offense punishable as a felony and an offense punishable as a misdemeanor. Assessing damages in this instance is a speculative issue, and statutes have not been developed to address the issue.

One case that illustrates the problem of inadequate criminal statutes is *U.S. v. Siedlitz*. An individual used a telephone to gain access to a former employer's computer and thereby obtained a valuable and confidential program. The U.S. attorney in Maryland and Virginia attempted to prosecute the theft but encountered difficulty in using the federal statute prohibiting interstate transportation of stolen property.

Not only was the statute unclear about whether the electronic impulses were property within the requirements of the statute, but furthermore, the movement of magnetic impulses from the victim's computer to the defendant's computer did not satisfy the traditional interpretation of "stealing" or "taking" of property as required by the statute. This ambiguity clearly demonstrates the complications that exist both in determining whether or not there was a theft under the law and whether or not the object of the theft can be classified as property.

Many federal and state criminal statutes, including embezzlement, invasion of privacy, trade secret, copyright and even mail fraud laws, have been used to prosecute computer crimes. It is often erroneous, however, to apply these criminal statutes to computer crimes, because the intent of the specific law often represents different issues from those in the computer crime instance.

For example, in cases of embezzlement, if no property or money is converted, the criminal charge cannot be maintained. In the event of a trade-secret theft charge, there is the issue of "unprotected disclosure," whereby, if the computer trade secret owner failed to take reason-

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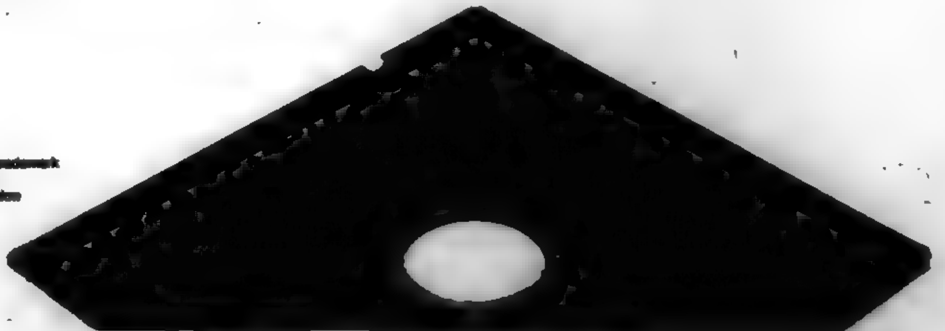

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The most innovative approach to the computer abuse problem is the Florida Computer Crimes Act of 1981. It created two new classifications of computer offenses: an offense against intellectual property and an offense against the authorized computer user.

able precautions to protect the secrecy of the thing allegedly stolen, the law does not apply.

The case of *New York v. Weg* (New York Superior Court, 1982) illustrates how difficult computer crime statutes can be to uphold. The judge dismissed the theft of services charge against a computer systems manager employed by the New York Board of Education who used school computers to trace the genealogy of horses and create a handicapping system for betting.

The court found that Theodore Weg had not stolen time because his supervisor had given him general access to the computer. If Weg had plugged into a public computer without permission and was trying to avoid payment, his acts may have been considered criminal.

Legislative efforts

The most innovative approach to the computer abuse problem is the Florida Computer Crimes Act of 1981. It creates two new classifications of computer offenses: an offense against intellectual property and an offense against the authorized computer user. The first classification provides that whoever willfully, knowingly and without authorization modifies or destroys data, programs or supporting documentation, internal or external to a computer, is guilty of a felony against intellectual property. The second offense holds an individual liable for a felony if he, without authorization, denies an authorized user access to computer system services.

This statute distinguishes between misdemeanor and felony crimes on the basis of whether the offense results in damage, destruction or fraud or results in the interruption of government operation of public services and whether the amount of damage to the computer or computer system falls within a specific range described in the statute.

Another unique aspect of the Florida statute is that it recognizes computer abuse as a separate criminal activity within a range of degrees and penalties. By penalizing many types of computer abuse such as unauthorized access, the statute shifts the focus away from the harm, the tangibility of the item or the possession characteristics inherent to conventional theft laws.

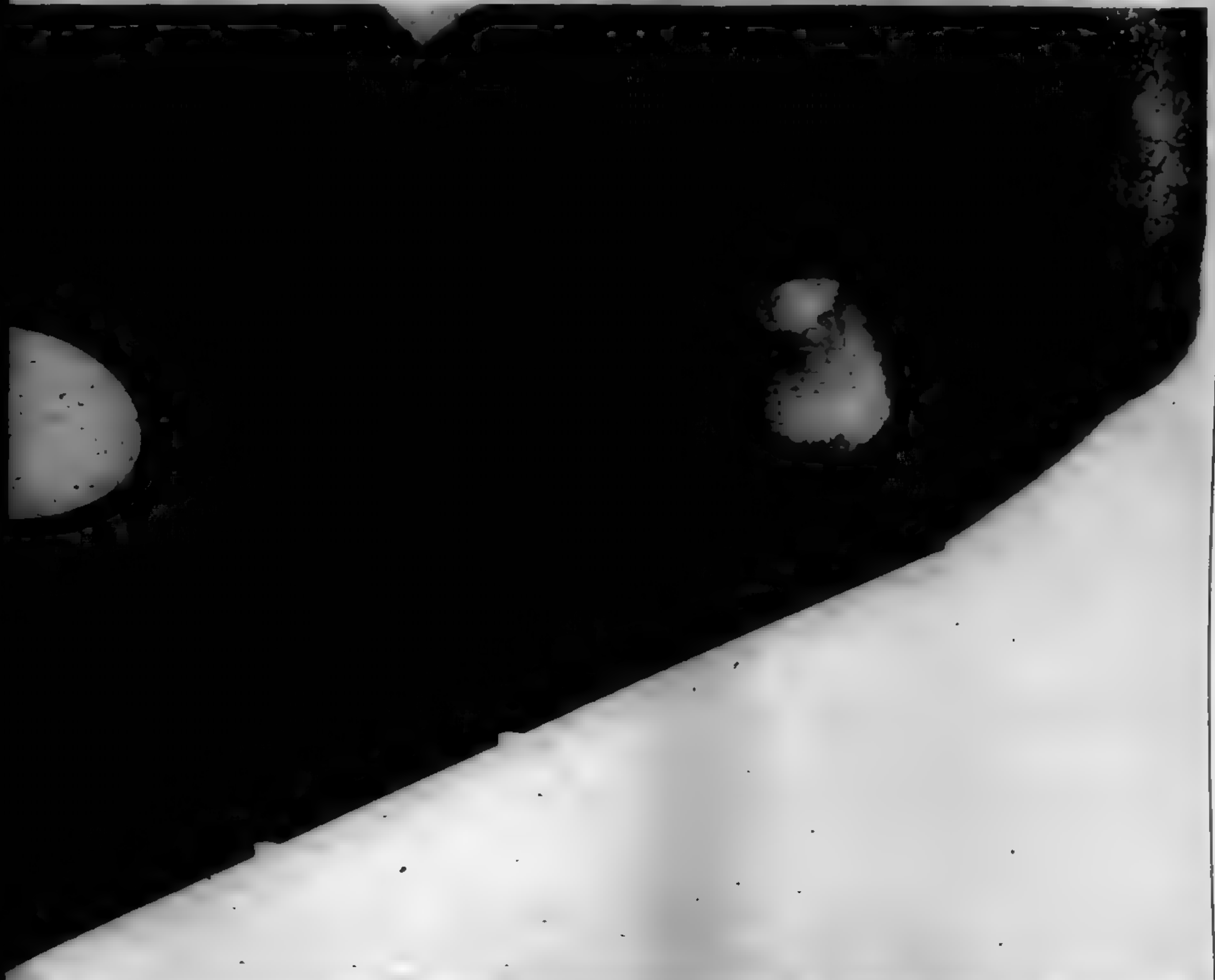
Twenty-one states have passed specific computer crime laws directed toward the special needs of prosecuting computer abuse and misuse.

Legislation on the federal level has been limited.

This past year, Congress enacted two pieces of computer crime legislation. The Small Business Computer Crime Prevention Act sets up a private and public task force to investigate the problem of computer crime in small business and recommend preventive measures.

Just before adjourning in October, Congress hastily passed computer crime amendments attached to the continuing budget resolution. The amendments make it a federal crime to gain unauthorized access to data stored in computers used by the federal government or to financial data protected by federal privacy statutes. The legislation (a compromise version of H.R. 5616) does not address illegal entry into other private-sector computers.

Most recent federal legislative efforts have been unsuccessful. The Federal Computer Systems Protection Act (H.R. 1092) spent five years in subcommittee and was bypassed this year by H.R. 5616.



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At issue is whether the existing body of law is fully adequate for both the crime and the punishment. At issue also are potential conflicts over jurisdiction between the states and the federal government.

There were concerns about the adequacy of H.R. 1092, which failed to define such key terms as "computer." Some observers feared that such imprecision might lead to misapplication or abuse of the legislation itself, for example, in prosecuting offenses committed by minors.

It was also argued that the proposed legislation focused upon the instrument rather than the object of the crime: the computer rather than the information, its tangible and intellectual properties and individual rights. While there is a certain truth to this argument, the body of law regarding information, its sensitivity and value as well as its intellectual property, is even less well defined.

A number of bills languished in Congress during 1984 and, specifically, in subcommittee. In 1984, four bills awaited action in the House Judiciary Subcommittee.

H.R. 4301, introduced by Rep. Larry Coughlin (R-Pa.), was unique in that it was only three paragraphs long. The bill would make the use of a computer in a manner not authorized by the owner a federal crime punishable by a fine of up to $100,000 and up to 10 years' imprisonment.

In February 1984, Sen. William Cohen (R-Maine) introduced in the Senate the Computer Crime Prevention Act of 1984. The bill, which died in October, contained provisions and penalties for buying, procuring or selling the passwords to the computers covered in the legislation in order to obtain money or services illegally. The penalties for this offense would be $50,000, or three times the amount obtained, and/or a maximum prison sentence of five years.

To deter computer hackers, penalties for any unauthorized access not involving fraud or damage would be up to $5,000 and one year in jail.

Civil law

While most attention is currently being given to the criminal aspects of computer abuses, it is likely that civil action will have an equally important effect on long-term security problems. The issue of computer crime draws attention to the civil or liability aspects in computing environments.

In the future, we can expect to see many more individual and/or class-action suits. For example, a stockholder might sue a corporation that had to devalue its assets and stock because of computer fraud-related losses. Another scenario might involve stockholders filing suit because the loss of highly sensitive trade secrets seriously affects the corporate balance sheet. Liability of the corporation and its officers to protect its assets and resources, such as imposed by the Foreign Corrupt Practices Act, will also be tested.

Civil damage suits will test the concepts and limits of legal responsibility and culpability. It will be interesting to see how the courts, state and federal government attempt to determine responsibility and assign liability for damages. Who will be at fault? The user, for not providing better security for the system? The equipment manufacturer, because of alleged flaws in the security design?

Even today, the liability battle lines are being drawn. Vendor advertisements in major national magazines proclaim that "privacy begins at home," and "computers don't steal, people do."

In the future, we can expect to see many more individual and class-action suits.

In equipment lease agreements, many vendors very clearly spell out that the lessee bears full responsibility for all aspects of system security. Clearly, as liability issues are tested in the courts, all parties — the end users, corporations providing computer-based services and the manufacturers of computers and related systems — will be forced to look more clearly at their own areas of responsibility and act accordingly.

Nonlegal remedies

In view of the legislative weaknesses, which often leave the victim of computer abuse without any legal recourse, it is essential that computer users look to preventive security measures rather than to legal measures as the first line of defense. Among the commonsense rules for safeguarding data are the following:

- Regularly change the password for access to the system.
- In addition to the password, require such personal information as an employee's name, birthday or identification number. It is far more difficult for someone to come up with two correct identifications.
- Limit the number of attempts that anyone can make to log on to a system.
- Keep a record of all user activity in a system and monitor this log to detect any unusual activity such as repeated failures by someone to enter a correct password, unusual amounts of data retrieval and attempts to enter confidential files.
- Follow through at a top management level by allocating the money and staff necessary to carry out these steps. Prosecute any security violations, whether employees or outsiders, even if it means adverse publicity.

There is software available that will improve security. These programs typically limit the number of

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tries a user gets to type in a correct password and will prevent intruders from repetitively guessing until they hit a valid password. This type of software ranges in price from $9,000 per year for an annual rental to about $30,000 if purchased.

A dial-back system is also available that screens out the thief trying to forge a password. When a user calls into a computer, a black box intercepts the call and asks for a password. The unit then disconnects the phone call, looks up the password in a directory and calls the user back at the phone number listed in the directory.

Corporate personal computers also need protection. With proper precautions, there is a far greater opportunity for legal action in the event of computer abuse than there would be if no precautions were taken. The same issues that arise if fire protection is ignored and there is a question of insurance coverage hold true for computer security; it is also questionable when proper computer security is not undertaken.

Poor controls

Even today, most organizations do not recognize that their information is sensitive or critical. They basically do not adequately analyze the potential impact of an unauthorized entry. Lacking this understanding, companies fail to apply currently available physical and logical security controls to their sensitive and critical data. Where controls are applied, they are often incompletely implemented, poorly monitored or improperly managed.

The issue is further broadened by the wild proliferation of personal computers in organizations and the increasing ease with which computers can be tapped into via telephone lines. If a corporate executive stopped to figure out how much business could be lost if computer files were damaged or how much it would cost in man-hours to replace of reconstruct files that had been tampered with, they would realize the importance of computer security.

The ability of technology to build high-integrity software and certify that it possesses the necessary security and control attributes is extremely limited. Furthermore, office automation applications are creating important new privacy policy issues for management that go unrecognized.

A large majority of organizations are so busy with the hardware and software aspects of office automation that they have not begun to take these policy problems seriously. It has become apparent that professional and executive applications in the office environment can lead to data handling that can violate organizational and legal standards of data privacy.

In the 1970s, federal or state statutes covered confidentiality regarding federal agency practices, credit reporting, employment and insurance investigations, law enforcement and medical records as these various endeavors were plugged into computer systems. The trend toward office automation calls for extending those privacy standards from data processing into the office.

However, office automation, unlike data processing, does not store large volumes of information in centralized, organizational systems. Information in the office environment is scattered among many individuals and on many personal computers and other computer systems where there is an inherent lack of sensitivity to the principles of information security. The danger is even greater than it has been in the data processing environment since information that is kept in office files is often more finished and refined than the raw statistics found in the corporate mainframe.

As electronic messaging systems begin to proliferate and data is accessible and available to a number of people, confidentiality breaches will inevitably happen.

This risk has created a whole new compendium of issues around privacy concerns that have not been addressed either through the law or in common practices within the business community.

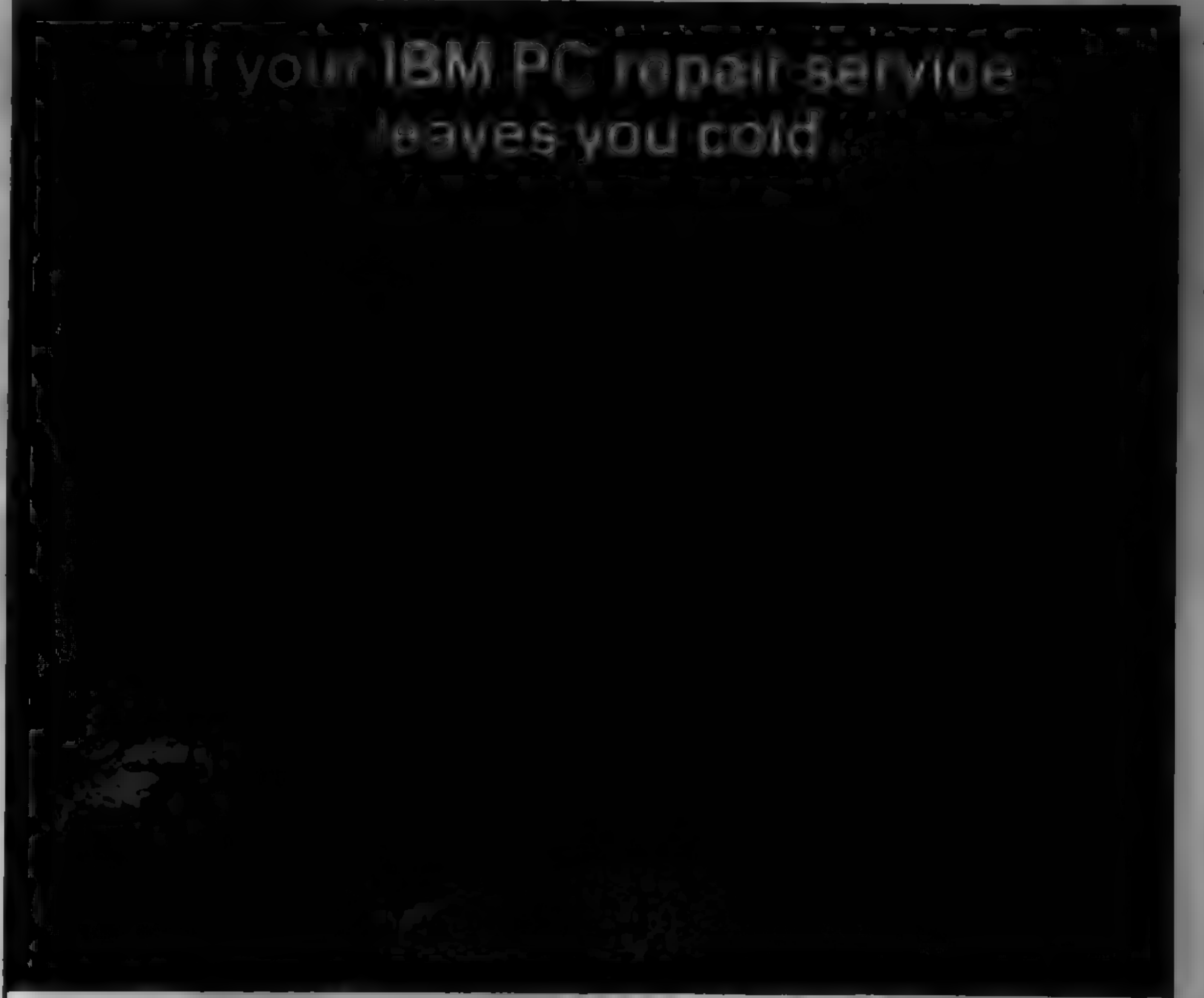
As the number of systems increases, crime problems will increase. The potential for this increase was set forth in the testimony of John C. Keeney, acting U.S. Assistant Attorney General for the Criminal Division before the Senate Subcommittee on Criminal Laws and Procedures. Keeney said:

"Our political, economic and social institutions have grown increasingly dependent upon computers to the point that their illicit manipulation or malicious destruction can potentially wreak havoc on society. Consider in this regard the consequences resulting from the willful destruction of the computer-generated Social Security checks flowing to the elderly or disabled, the destruction of a bank's computer records of its demand deposits or the malicious destruction of irreplaceable medical research data stored in a computer bank.

"Computers have become a part of everyone's life and are being integrated into virtually every facet of human activity at an ever-increasing rate. The very existence at the present time of a broad base of computer usage and computer knowledge and its projected increase in the years to come suggest that we will experience an increase in the opportunities for computer-related abuses in the years ahead."

About the authors

Nancy Finn is an office automation consultant for Communication Resources, Needham, Mass. Peter Finn is an attorney with the Boston law firm of Guterman, Horvitz, Rubin and Rudman.



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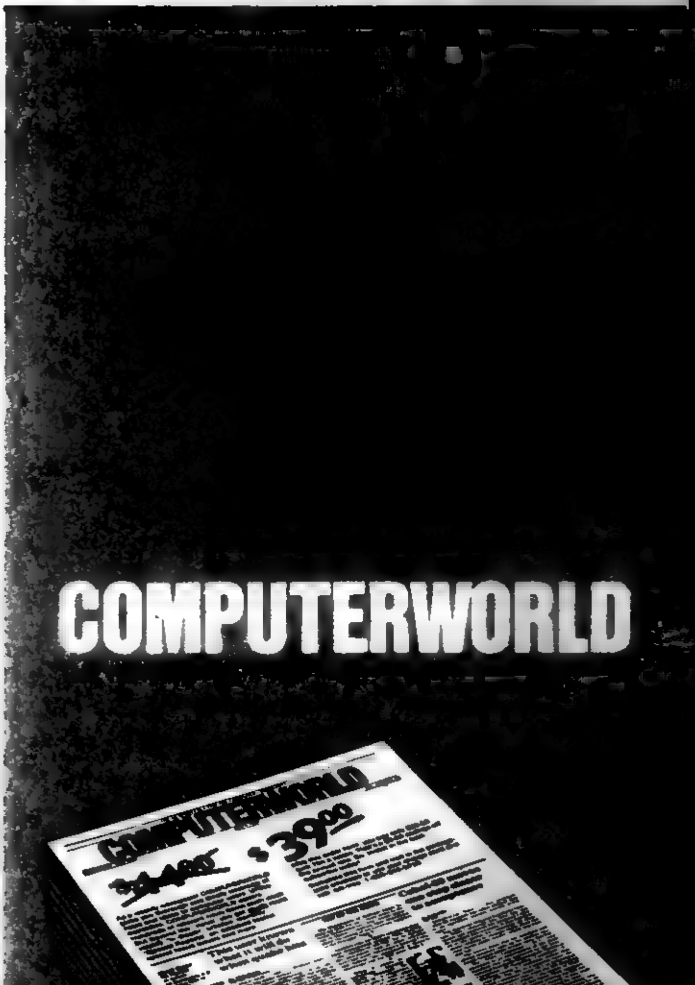
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SYSTEMS & PERIPHERALS

Panel weighs supercomputer potential

By John Desmond
CW Staff

TARPON SPRINGS, Fla. — Experts at a Gartner Group, Inc. conference panel on supercomputing held here recently could not agree on a precise definition of a supercomputer or on the machine's commercial potential, but they did agree that demand for the fast-processing machines exists and that engineering applications are practical now.

The five-member panel at the IBM Large Computer Market Conference was led by David L.R. Stein, a general partner in the Julian, Cole and Stein venture capital firm and a cofounder of the Gartner Group. Other panel members were Carl Claunch, director of marketing technology planning with National Advanced Systems, Inc. (NAS); Arthur Leiz of Grumman Data Systems Corp.; Robert Wayne McIntyre, director of special-purpose systems for Amdahl Corp.; and Gregory P. Williams, a vice-president of the Gartner Group.

Explaining why a discussion of supercomputing was being conducted at a conference for users of IBM 370-compatible mainframes, Stein said the 370 architecture is not incompatible with supercomputing, a term he said was coined by Control Data Corp. in the early 1960s. That is a change from the thinking of 20 years ago, when IBM 360 architecture (the 370's predecessor) was considered incompatible with supercomputing.

Although many early innovations in computing were the results of efforts to develop supercomputers, "For whatever reason, supercomputers seemed to fall on hard times" in the past 10 years, Stein said. But he said recent achievements by Japanese manufacturers in supercomputing, on machines that have a "significant relationship" to 370 architecture, have helped spur a renewed interest in supercomputing. "I don't know whether it's a Japanese challenge or the fact that we've outgrown our mainframes for some applications, but I have seen a resurgence in interest in supercomputers in the last several years," Stein said.

Claunch of NAS defined supercomputing as processing that exceeds the capacity of the largest general-purpose mainframe. Supercomputing is accomplished by restricting processing to that which can be executed more quickly under a special set of instructions, sometimes called vector processing, he said. Certain work that can be accomplished within the limited instructions can make use of the supercomputer, he said. Ten years from now, NAS is projecting that 10% to 15% of all large mainframes will include vector processing capability.

Leiz of Grumman suggested Claunch's definition of supercomputing is not adequate because as mainframe processing rates go up, more processing can be accomplished with general-purpose mainframes. Claunch said the definition could be that a supercomputer executes 10 times faster than general-purpose mainframes.

"I don't know if I have a good definition for a supercomputer other than to say that they run real fast when they have floating-point arithmetic," Amdahl's McIntyre said. The potential speed of a supercom-

See PANEL page 59

IBM 3081 seen as path to Sierra

Analyst says CPUs will attract Model K users

TARPON SPRINGS, Fla. — At a recent conference on "Strategies in an Era of IBM Strength," Michael A. Chuba of the consulting firm Gartner Group, Inc., predicted that IBM's 3081 Model K will be the "exit machine" used to shuttle users into initial models of IBM's Sierra series of mainframes, which the Gartner Group claims will be announced in the spring of 1985.

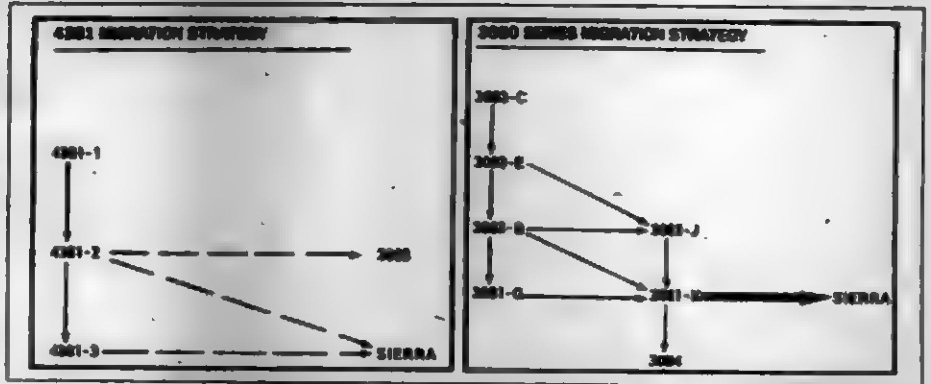
IBM is trying to have 50% of the installed base of 3080 Model X processors on the 3081 Model K when the Sierra is announced, Chuba said. The Sierra announcement will compare its performance to the 3081 Model K, and not all the Sierra's features will be announced in the initial product, predicted Chuba, who is program director for Gartner's IBM Large Computer Market service.

To make projections of likely features of the Sierra series and options for users of IBM's 3080 and 4300 series, Chuba employed the Gartner Group's Residual Asset Value for IBM Systems software model for describing the IBM market. Gartner Group justifies using only IBM in the model on the basis of the company's dominant position in the industry.

In describing IBM's dominance, Chuba said that 60% of IBM's revenues are derived from the 370 hardware and software still employed in most of its current line CPUs. Since IBM accounts for 40% of worldwide data processing revenues for U.S. manufacturers, the 370 accounts for 25% of worldwide DP revenue from U.S. manufacturers, Chuba said. The 370 hardware and software products comprise "the single largest segment of the data processing industry," Chuba said.

Moreover, Chuba said IBM has 25,000 mainframes and 100,000 disk drives installed in the U.S. today. IBM has been steadily increasing market share at the expense of the firms that make up the Bunch

See CHUBA page 56



Expected migration to anticipated IBM Sierra series

GARTNER GROUP, INC. CHART

INSIDE
Auxiliary Equipment/[illegible]

Hitachi experimenting with Cmos chip

SAN JOSE, Calif. — Hitachi Ltd. said it has developed an experimental 32-bit Cmos microprocessor chip called the Micro 32.

According to Hitachi, the unit was fabricated on a 1.3 micron Cmos substrate using a two-layer metal process technology.

The chip is said to contain more than 300,000 transistors.

Internal throughput

Micro 32 reportedly offers internal throughput of roughly 5 millions of instructions per second.

Hitachi said the unit incorporates a 200K-bit read-only memory with a 50-nsec cycle time. The chip measures 6.5mm by 9mm, but no definite packaging configuration has been established.

Hitachi said the product will not be commercially available until late 1986.

According to the vendor, volume shipments are slated to begin in mid-1987.

For more information, Hitachi is headquartered at 2210 O'Toole Ave., San Jose, Calif. 95131.

Modcomp CPU controller supports 32 I/O options

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. (Modcomp) has announced the APC/5 Advanced Programmable Controller for use on the company's Classic CPU in industrial automation markets for support of 32 process I/O options and up to 2,048 I/Os.

The product is said to support a range of data types in digital I/O and analog I/O and to simplify programming. The programming device is said to enable engineers to define the logic with standard Instrument Society of America (ISA) symbols.

The APC/5 combines the Modcomp Modacs V hardware with software designed by Thesaurus, Inc. The controller can be used for applications with 250 to 1,024 processing I/O points. The APC/5E provides for systems as large as 2,048 process I/O data points. The controller has the capability to display seven inputs and one output on each line of a ladder diagram on the color terminal, the vendor said.

Use of ISA standard graphics character symbols and colors allows quick recognition of elements and powerflow states. Up to 16 lines may be included in one network with a possibility of up to 999 networks, each operating in specified time segments of 50 msec, seconds or minutes. The user can create or edit one control algorithm while displaying another, the company said.

The APC/5 Programmable Controller is said to be capable of testing the validity of programs before they are run on actual equipment, the company said.

The price for a typical system configuration consisting of an APC/5 Programmable Controller unit with color graphics programming device and 256 process I/O points, is $50,000. An optional documentation device is available for another $7,000, the vendor said.

Modcomp can be reached at P.O. Box 6099, 1650 W. McNab Road, Fort Lauderdale, Fla. 33310.

CHUBA

from page 57

companies (Burroughs Corp., Univac [Sperry Corp.], NCR Corp. Control Data Corp. and Honeywell, Inc.), so that IBM controls some 76% of the market today, according to the Gartner Group figures.

Chuba said IBM's large-systems marketing strategy includes announcing top-of-the-line models before low-end models to minimize the impact on sales of existing series, cutting prices to stimulate sales of existing lines when new lines are announced and offering customers the option of field-upgradability to realize the benefits of improved price/performance. "The field upgrade strategy serves as a type of competitive lockout," because it is often easier for users to upgrade than buy a plug-compatible product, he said.

As to frequent user inquiries about whether IBM will cut off upgrades of other models to force users to Sierra, Chuba said, "We think that's highly unlikely." IBM will be more likely to stabilize the price of upgrades, so that in years to come upgrades will not be as attractive as buying the new machines, he said.

Better price/performance

The Gartner Group expects that the Sierra will not be field-upgradable, but IBM will offer superior price/performance to entice users to Sierra, Chuba suggested. He predicted that Sierra will offer approximately $200,000/one millions of instruction per second (Mips) price/performance in a minimum configuration.

The Gartner Group also predicted that succeeding the Sierra, perhaps in 1988, will be the Summit series, with price/performance closer to $100,000/one Mips, Chuba said.

IBM has shipped 4,000 to 5,000 3080 series processors in the last three years and should ship 7,000 to 8,000 Sierra CPUs during its product life, Chuba said. Demand will fuel the increase, and IBM will be able to produce more Sierras than 3080 Model X series CPUs without adding manufacturing capacity, because Sierra will have fewer components, Chuba said.

An integrated array processor is possible in the Sierra, perhaps as an option, to appeal to science and engineering markets, Chuba said. The Gartner Group also predicted that the Sierra will feature main memory of up to 256M bytes and higher channel speeds.

"The important thing to realize about these features is that they probably will not all be there at the outset," Chuba said. IBM will try to downplay the differences between Sierra and the 3080 Model X series initially, to preserve the market value of the Model X series. Gartner Group does not expect a low-end Sierra until 1986, Chuba said.

All these incentives will make Sierra attractive to users, "If not for what it offers now, then for what it offers potentially in the future," Chuba said.

Users of 4381s, in the absence of a low-end Sierra, will have the option of moving to the 3033s, Chuba suggested. Citing confusion in the marketplace about how the air-cooled 4381s and liquid-cooled 3033s compare, Chuba pointed to the advantages of the 4381's lower price per Mips and the fact it requires less space in a data center. "From a price/performance standpoint — from many standpoints — the 4381 today is a much better buy than the 3083," he said.

When 4381 users "run out of gas," the Gartner Group predicted that IBM will, in 1986, announce performance improvements for the line or announce new models. But, "We don't see the 4381 family getting bigger in any significant way," such as with a quad-processor, Chuba said. Perhaps in 1987 or 1988, IBM will announce a follow-up air-cooled CPU to the 4381 family, he suggested.

For the approximately 8,000 4341 users in the U.S. market, the 4381 or 3083 is the upgrade path, Chuba said, adding that the Gartner Group expects that 90% of 4341 users will go to the 4381.

The decision for those users should be based on growth factors, he advised. Firms with over a 50% compound annual growth rate should migrate to the 3083, and firms with less than a 50% rate should consider the 4381, the Gartner Group advises. IBM may sell 8,000 to 10,000 4381s in the product's life, to make it one of their most successful CPUs, he suggested.

PANEL from page 57

puter is 50 times faster than a general-purpose mainframe, he said.

Original intent

Stein suggested the original intent of the supercomputer designation was to distinguish the processors as a class of CPUs at the high end of the spectrum, positioned above mainframes. Supercomputing implies "maximum computing at minimum cost," he suggested, acknowledging that any definition is likely to change in coming years.

Commenting on applications for supercomputers, Leiz said his company uses a Cray Research, Inc. supercomputer for structural and flow analysis, such as for air flow over an aircraft wing. Using a supercomputer, a wing structure can be modeled at one-fifth the cost of building a wing, he said.

McIntyre said that in engineering analysis applications, more accurate models can be run with supercomputers. Models that run on 370 architecture may be too simplistic for certain uses, he said.

Stein summarized that applications for supercomputers today are those too large for existing mainframes.

Lower costs, better designs

Claunch said research and engineering costs can be lowered and designs can be improved as a result of supercomputer use. He said one aircraft manufacturer achieved a 20% lower aircraft operating cost as a result of using a supercomputer to help model performance.

Automakers may be able to achieve similar operating improvements, he suggested.

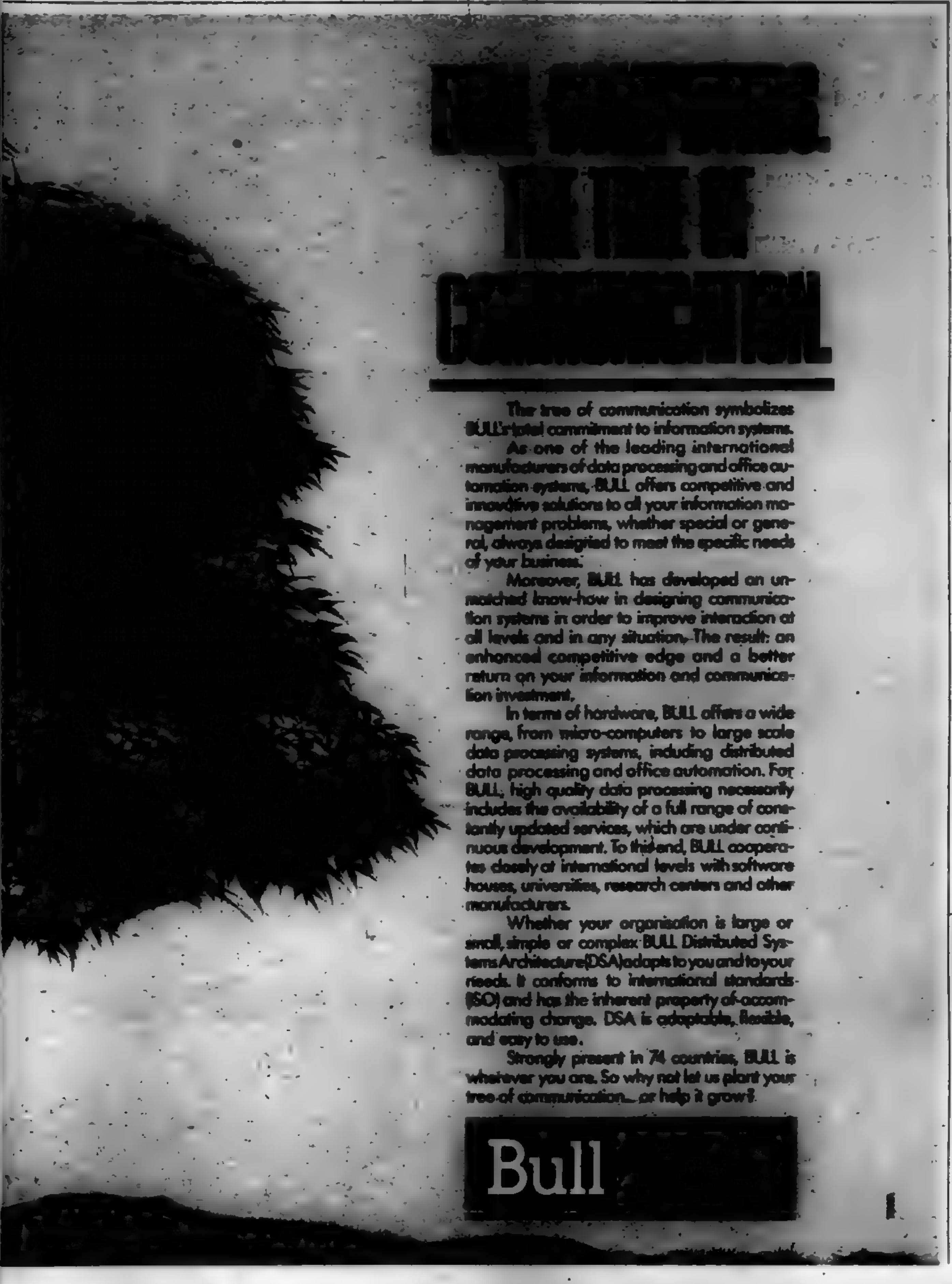
Supercomputers could be used for high-speed transaction processing and possibly for artificial intelligence applications, Stein suggested. The Japanese may be motivated to develop supercomputers by a desire to develop AI applications that U.S. companies are not pursuing, he theorized.

Software wars'

"They [Japan] may perceive that as their secret weapon in the software wars," he said. "If the Japanese were successful in doing that, they could well be in a dominant position in the computing industry in as little as 20 years' time."

On the software issue, McIntyre said, "The machine is only as good as the software you have to exploit it." Scientific applications involving multiple CPUs linked in a parallel series are "fun to fantasize about" but not very useful in the practical world, he suggested. Getting jobs to run is what concerns users, he said.

With the exception of NAS and Amdahl hardware, most applications of supercomputers and array processors up to now have been for non-370 architecture for noncommercial purposes, according to Stein.



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AUXILIARY EQUIPMENT

DATAGRAPHIX, INC.

COM for Sperry Corp. 1100/60-90

Datagraphix, Inc. has announced an on-line computer output microfilm (COM) capability for Sperry Corp. 1100/60-90 mainframes.

Users can choose from either of two cut-fiche on-line systems: the Autocom II recorder with self-contained chemical processing or the Aris II dry recorder, the company said.

Datagraphix on-line COM systems attach directly to all current Sperry Series 1100/60, 70, 80 or 90 CPUs.

The price for an on-line Model 2275 Autocom II is $112,800, according to the vendor.

Datagraphix, P.O. Box 82449, San Diego, Calif. 92138.

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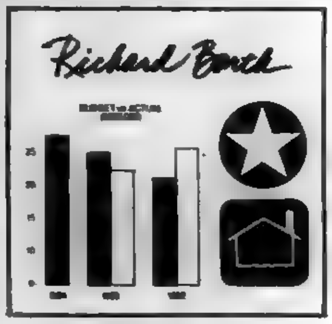

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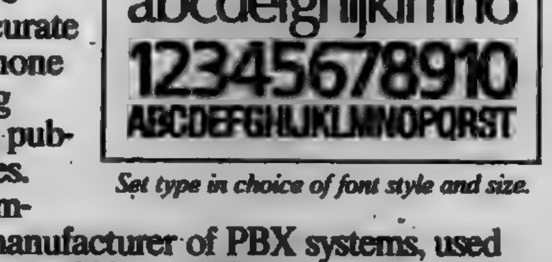

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MICROCOMPUTERS

IBM launches micro version of RS/1 package

File transfer, graphics packages for 3270 Personal Computers also debut

INSIDE
Software/64
Systems/66
Communications/68

WHITE PLAINS, N.Y. — IBM introduced a Personal Computer version of Bolt, Beranek and Newman, Inc.'s RS/1 analytical package along with 3270 Personal Computer application software earlier this month.

RS/1 provides technical professionals with a variety of analytical tools, IBM said. Functions are said to include data entry and retrieval, data transformation and analysis, graphics, curve fitting, statistical analysis and analytical models. RS/1 also provides the Research Programming Language, which permits users to extend and tailor the system's capabilities and to interface with other programs.

RS/1 runs under PC-DOS 2.0 or higher versions on an IBM Personal Computer with 512K bytes of random-access memory and a dual-sided disk drive and a 10M-byte hard disk drive. The software also runs on similar configurations of the Personal Computer XT, Personal Computer AT, Personal Computer XT/370 and 3270 Personal Computer.

The $2,000 package is scheduled for sale by Jan. 25.

IBM also launched the IBM 3270-PC File Transfer Express program, which runs on the 3270 Personal Computer and is said to permit transfer of any type of file between that machine and a host system. The host system may be supported by standard Distributed Processing Control Executive/Distributed Office Support Facility or Distributed Processing Programming Executive/SP2 in an IBM 8100 or by appropriately coded customer-supplied System/370 software. Available this month, the program will cost $75.

In addition, IBM noted that it has shipped the 3270 Personal Computer/G and 3270 Personal Computer/GX and introduced the 3270-PC Color Graphics Applications program for those two machines.

The program consists of Graphics Editor and Picture Plotting components. The Graphics Editor reportedly enables users to create, modify, file and retrieve pictures and to display, edit and file pictures generated in the Picture Interface Format (PIF). The Picture Plotting software is said to give users the ability to plot Graphics Editor output or other PIF files. The software is scheduled for April shipment and is priced at $395.

Finally, IBM said its 7371, 7372, 7374 and 7375 color plotters now support the Models AT and XT, Portable Personal Computer and Personal Computers equipped with the General Purpose Interface Bus, except for the PCjr.

IBM National Accounts Division is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

SMALL TALK
Eric Bender
CW Senior Editor

IBM AT shipped before its time, many users say

Offhand, there's little resemblance between the Osborne Computer Corp. Osborne I and the IBM Personal Computer AT.

Introduced in 1981, the Osborne I was based on the then-ubiquitous Zilog, Inc. Z80 microprocessor and featured an oscilloscope-like 5-in. screen and ultralow-density floppy disk drives in a transportable package. The AT, built around Intel Corp.'s hotshot 80286 chip, comes with high-density floppy and hard disk drives and stoutly resists the trend toward taking a smaller footprint on a desk.

But there are curious parallels in the early customer histories of the two machines:

Both generated tremendous excitement when announced, both immediately began to carve out new territory for personal computers, and both also soon showed that they had shipped before they were ready.

"Any seasoned manufacturing executive would have deemed the Osborne I, when first shipped, to be in its preproduction stage," Osborne founder Adam Osborne later acknowledged in *Hypergrowth*, his book detailing the company's rise and fall. While other factors crippled the company, manufacturing difficulties plagued Osborne right up to the moment the firm filed for Chapter 11 protection under the Federal Bankruptcy Act.

IBM now has tens of thousands of Personal Computer ATs out in the field, and many reports have a curious ring of familiarity. Once again, the machines sound like beta versions. This time, how-

See AT page 69

Lattice unveils debugging tool

GLEN ELLYN, Ill. — Lattice, Inc. recently introduced C-Sprite, a debugging tool for software programs written in Lattice C or assembly language.

C-Sprite, which runs under IBM's PC-DOS or Microsoft Corp.'s MS-DOS Version 2 or 3, reportedly features Help screens, macros, command files, conditional commands and debugging through a communications port.

The software operates on COM or EXE files made up of object modules produced by the Lattice C compiler or Microsoft assembler, Lattice said. C-Sprite is said to provide a high-level view of C programs via function names, line numbers, variable names and C data types. It also reportedly gives a low-level view of machine addresses and instructions for testing assembly language functions or for microscopic examination of compiler-generated code.

Program behavior is monitored by planting break points, examining registers and variables and single-stepping if necessary, according to the vendor. Variables, registers and program instructions can be changed at any time, Lattice said.

C-Sprite will be available next month for $1,175. Lattice can be reached through P.O. Box 3072, Glen Ellyn, Ill. 60138.

In-house tech writers guide novice users

By S.L. Dean
Special to CW

Most personal computer hardware and software manufacturers make a real effort to provide sufficient information to use their products. However, many of them don't seem to realize that the secretary, accountant, vice-president or maintenance chief expected to use this new tool has never run a computer, is unfamiliar with the equipment and, quite possibly, did not wish for a computer at all.

To begin with, the new users are presented with the computer, peripherals, chosen software and a number of manuals.

The manuals theoretically contain sufficient information to allow the new user to learn whatever is needed. In some cases, this may be true. However, in the case of the truly novice computer user, even the words "peripherals" and "software" probably are unintelligible. Such a person is completely lost trying to cope with the intricacies of computers.

Some companies are perfectly willing to provide opportunities for staff to learn programs. Particularly in the case of the more complex programs, such as Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar, the company may be willing to send

See WRITERS page 72

Conetic Systems adds desktop package

SAN LEANDRO, Calif. — Higgins, an "administrative assistant" software package for managers and knowledge workers, was introduced here this month by Conetic Systems, Inc. Designed for the IBM Personal Computer XT and compatible machines, the program is available in single-user and local-area network versions.

Unlike other microcomputer desktop organizing packages, Higgins offers expense reporting, multiuser local-area network support, phone message and electronic memo functions and the ability to track each item's relationship to everything else in the system, Conetic Systems said.

The package reportedly offers nine fully integrated modules built around a common data base: time manager, telephone directory (with autodialing and related capabilities), things-to-do list, personal filing, calculator, expense report, scratch pad, clock and tickler reminder. Higgins also is said to feature global information retrieval, note writer, keyword links to external programs, macros, customized reports and context-sensitive on-line Help.

The multiuser version of Higgins currently supports up to seven users on personal computer networks supplied by 3Com Corp. of Mountain View, Calif., and No-

See HIGGINS page 69

SOFTWARE

SOFTWARE STUDIOS, INC.
PC-Desk

Software Studios, Inc. has announced PC-Desk, a desk management system that runs on an IBM Personal Computer with IBM's PC-DOS operating system.

The program is said to include an integrated address and telephone file, a calendar, a calculator and an automatic telephone dialer. PC-Desk will merge letters with addresses and print labels, stickers, an alphabetized phone directory and a log of system use, the vendor said.

The text of a letter reportedly may contain four variable fields including a person's name, company name, expiration date and a free-form field that the user designs.

PC-Desk costs $49.95 plus $2 for shipping.

Software Studios, 8516 Sugarbush Court, Annadale, Va. 22003.

QUALITAS, INC.
Tall Screen

Qualitas, Inc. has announced Tall Screen, a utility for IBM's PC-DOS operating system that stores up to 1,090 lines of PC-DOS output for review and editing.

With Tall Screen, a user can recall any previous command or string of commands with a single keystroke, the vendor said. The utility reportedly allows a block of text to be written to a file, printed or frozen on a screen. A user reportedly can edit any text on a screen and use custom keystroke sequences.

Tall Screen requires IBM PC-DOS 2.0 or higher, and an 80-col. screen is recommended. It is priced at $49.95.

Qualitas, P.O. Box 3AK/UPB, Las Cruces, N.M. 88003.

RATIONAL SYSTEMS, INC.
Instant-C

Rational Systems, Inc. has announced Instant-C, a C language interpreter available for microcomputers running IBM's PC-DOS, Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M 86 operating systems.

Instant-C is said to implement standard C features so programs developed with Instant-C can be moved to other systems. A built-in screen editor displays source code errors and provides diagnostic messages, the vendor said.

The product reportedly includes break points, single-stepping by line of source code or function call and evaluating expressions.

Instant-C costs $500.

Rational Systems, P.O. Box 480, Natick, Mass. 01760.

'Your flexible screen mount doesn't seem to be working.'

MICRO SOLUTIONS, INC.
Uniform-PC

Micro Solutions, Inc. has introduced Uniform-PC, a utility that transforms diskettes created under Digital Research, Inc.'s CP/M operating system so they can be used with IBM's PC-DOS operating system.

The product transforms one IBM drive into a CP/M drive capable of reading, writing, formatting and copying diskettes, the vendor said. Standard Ascii files and other files reportedly can be moved between operating systems without altering the integrity of the file.

Menu-driven commands reportedly help the first-time user work with Uniform-PC. When the user is familiar with the product, all commands can be entered with a single-line entry from a PC-DOS prompt, Micro Solutions said.

Uniform-PC costs $69.95.

Micro Solutions, 125 S. Fourth St., DeKalb, Ill. 60115.

LAYERED, INC.
Front Desk

Layered, Inc. has introduced Front Desk, a time and resource manager that runs on Apple Computer, Inc.'s Macintosh microcomputer.

The product reportedly integrates scheduling for personnel and resources and analyzes project productivity and revenues, the vendor said. Front Desk is said to provide scheduling for up to 15 people or other resources.

The software provides reports on assignments for any or all people for a single day, week or day of the week or month. Front Desk keeps a history of the previous three months and schedules appointments for up to 10 months in advance, Layered said.

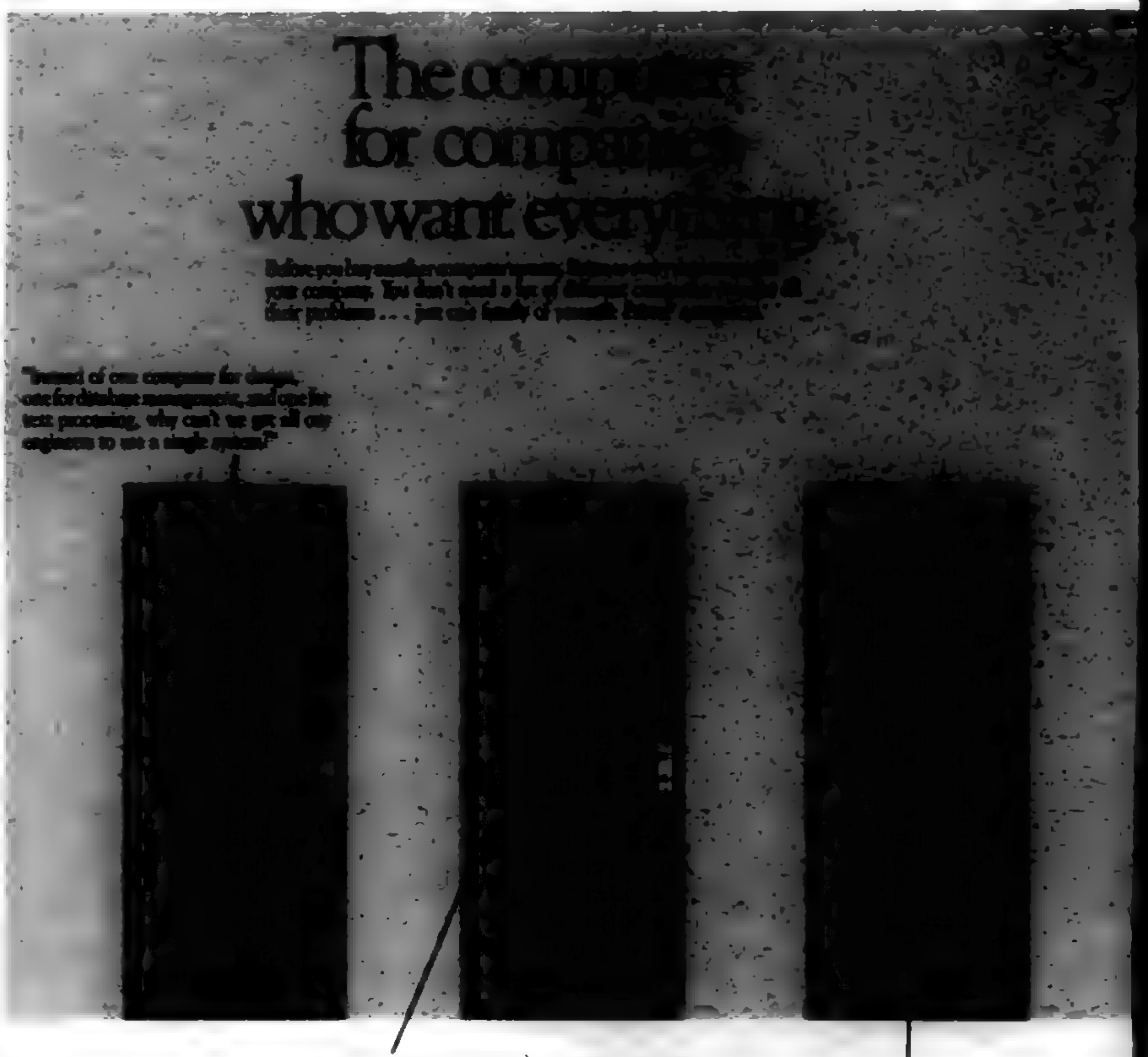
Front Desk costs $149.95.

Layered, 85 Merrimac St., Boston, Mass. 02114.

STOK SOFTWARE, INC.
Backrest enhancements

Stok Software, Inc. has enhanced Backrest, a utility for backing up hard disks on microcomputers running Microsoft Corp.'s MS-DOS, IBM's PC-DOS, Digital Reseach, Inc.'s CP/M and Musys Corp.'s Turbodos operating systems.

The enhancements include the ability to interrupt a backup at any time to perform another task or to format a floppy disk, the vendor said. Other additions include the ability to lock out bad sectors on hard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"Instead of one computer for design, one for database management, and one for text processing, why can't we get all our engineers to use a single system?"

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"This company's marketing decisions are too big for one little spreadsheet. I need total decision support if I'm going to meet my revenue goals. And I need it now. Or after lunch, at the latest."

disk, optional restoration to an alternate drive and support of file-oriented tape backup devices, according to the vendor.

The program includes a menu-driven installation program.

Backrest costs $180.

Stok Software, 17 W. 17th St., New York, N.Y. 10011

WORDTECH SYSTEMS, INC.
Db/Index, Db/Debugger

Wordtech Systems, Inc. has introduced two utilities for users of Ashton-Tate's Dbase II data base management software.

Db/Index is a library of routines said to provide faster indexing, sorting and packing of Dbase II data files. It also includes a program that can repair some damaged data bases, the vendor said.

The Db/Index routines can be operated as stand-alone modules, or they can be called from Dbase II programs. The utilities reportedly can be used on microcomputers utilizing Microsoft, Inc.'s MS-DOS, IBM's PC-DOS or Digital Research, Inc.'s CP/M 80 and CP/M 86 operating systems. It is priced at $120.

Db/Debugger is a symbolic debugger for programs written in the Dbase II programming language. It is said to eliminate the need for Dbase II in program development and testing and to complement the vendor's Db/Compiler product.

Db/Debugger is said to enable programmers to set execution break points by file and line, automatically enter debugging mode after a run-time error, list and modify memory variables and data base items, list Dbase source code from any file and any number of lines and invoke an on-line help menu.

The utility, which runs on the same machines as Db/Index, is priced at $240.

Wordtech Systems, P.O. Box 1747, Orinda, Calif. 94563.

LANTECH SYSTEMS, INC.
Integrated/Office Series

Lantech Systems, Inc. has announced the Integrated/Office (I/O) Series, a collection of microcomputer applications for use under Unetix 2.0, the latest version of Lantech's AT&T Unix-compatible operating system.

According to a spokesman, the I/O Series provides a multitasking, windowed environment for Lantech's office automation application packages. The packages include Powerlink 100, an asynchronous communications program; IF, an integration facility; and PC-DOS Emulator, which allows the system to support most IBM PC-DOS applications.

The product reportedly combines a window-to-window transfer mechanism that can learn a long series of keystrokes or commands to automate repetitive tasks, such as entering spreadsheet data. The Powerlink 100 package is said to link IBM Personal Computers or compatibles to any host computer that can support a standard Digital Equipment Corp. VT100 terminal. With IF, Powerlink allows a user to transfer data from an application running on a minicomputer or mainframe directly into a local application.

The Unetix operating system with windowing costs $249. Powerlink 100 and PC-DOS Emulator are priced at $50 each, and IF is priced at $100.

Lantech Systems, 9635 Wendell Road, Dallas, Texas 75243.

POC-IT MANAGEMENT SERVICES, INC.
Microman

POC-IT Management Services, Inc. has introduced a microcomputer-based project management system for information services departments and software development groups.

Microman is designed to run on an IBM Personal Computer or compatible under IBM's PC-DOS or Microsoft, Inc.'s MS-DOS Version 2.0 or later operating systems. Features include work load control, project planning, management reporting and monthly financial report functions.

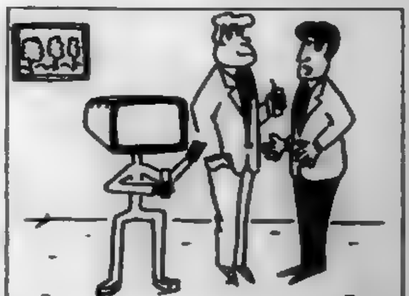
The price of Microman is $5,000.

POC-IT Management Services, Suite 606, 606 Wilshire Blvd., Santa Monica, Calif. 90401.

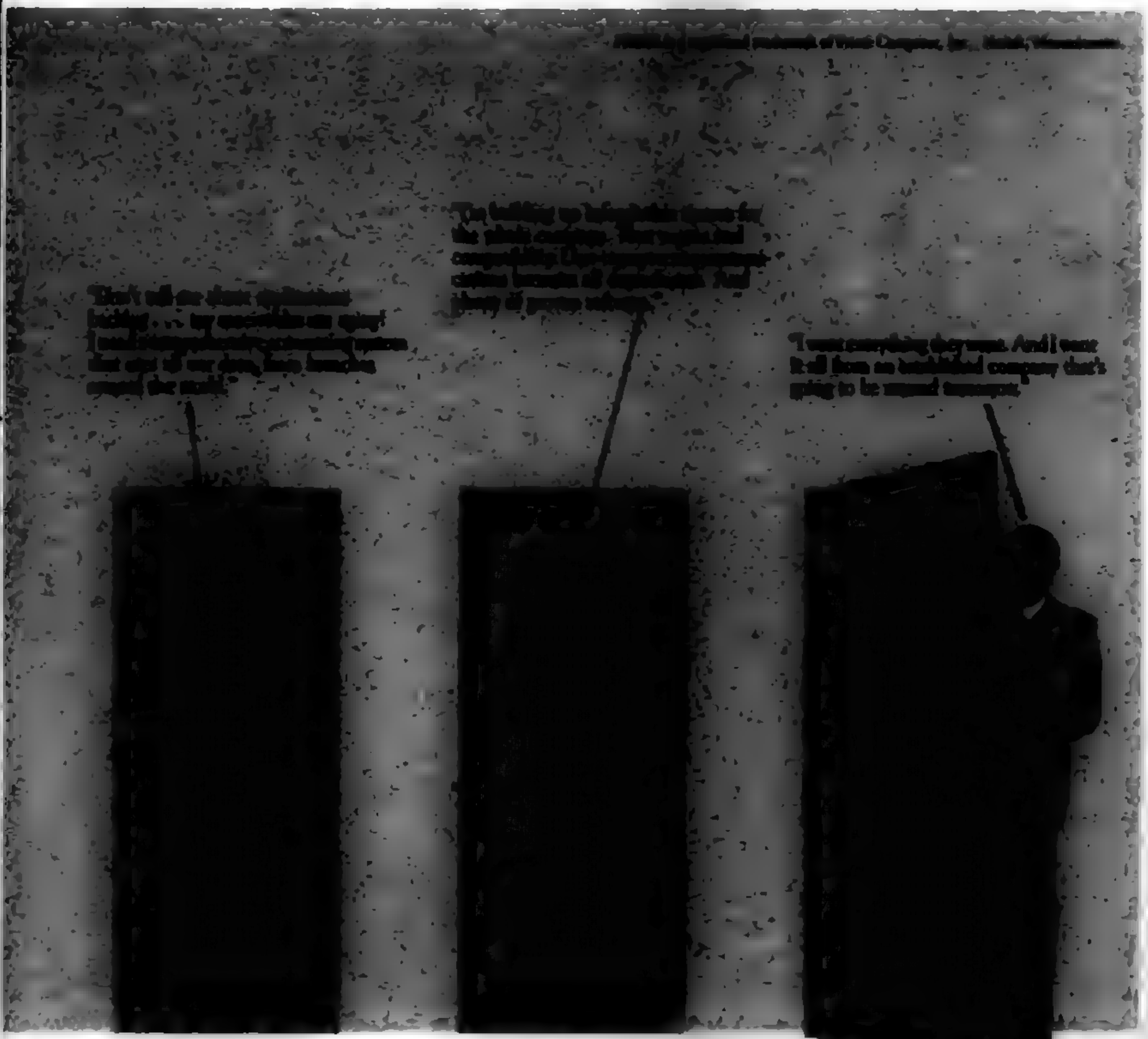
PARLAY SOFTWARE CORP.
Quota:100

Parlay Software Corp. has announced an integrated sales organization management system for IBM Personal Computers and compatibles running under Microsoft, Inc.'s MS-DOS operating system.

Continued on page 66



'Pretty clever bringing in a host computer.'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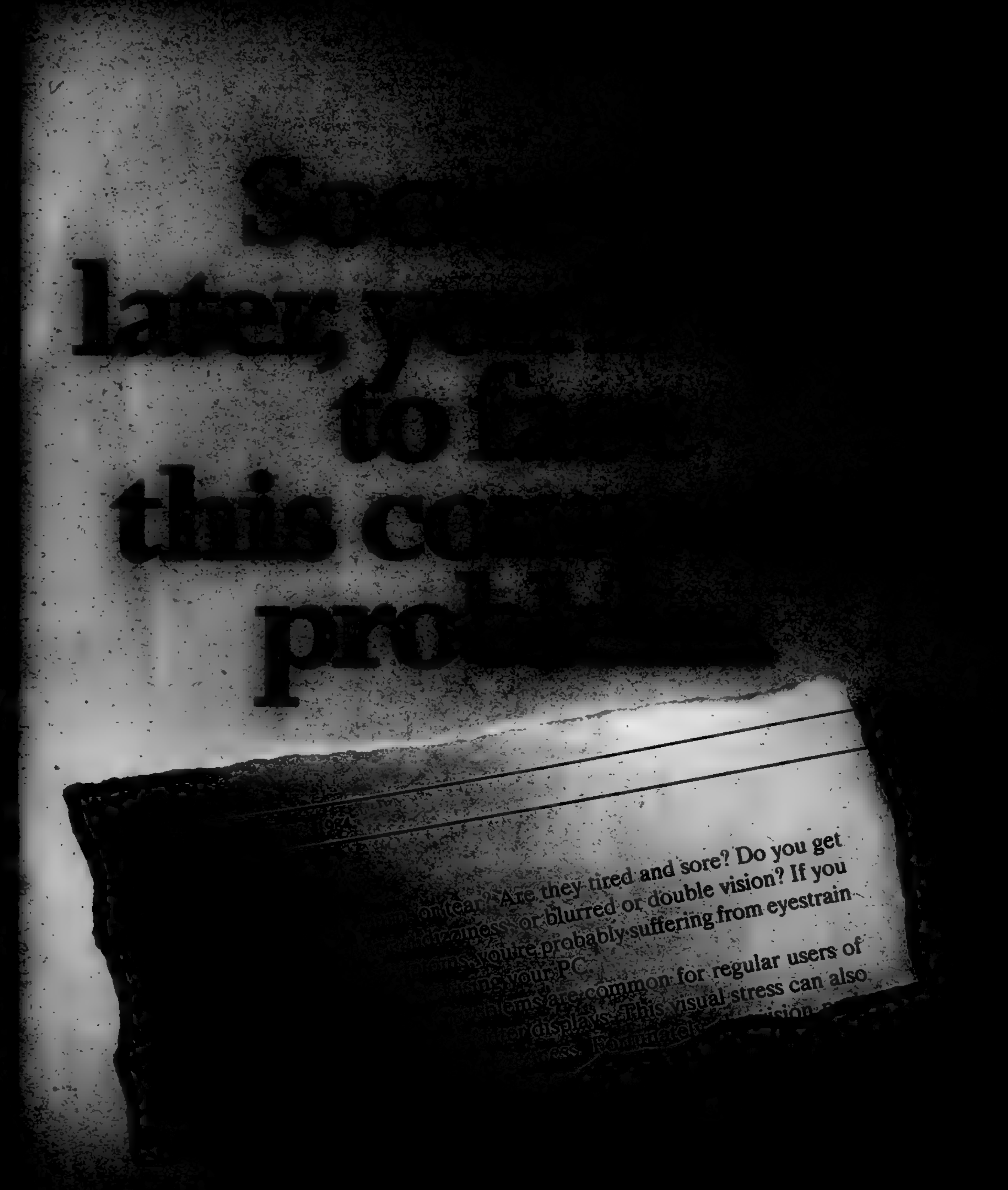

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on tear? Are they tired and sore? Do you get
dizziness, or blurred or double vision? If you
you're probably suffering from eyestrain
using your PC.
blems are common for regular users of
displays. This visual stress can also
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Fortunately

Better Sooner.

Computers don't ever get headaches.

But the people who use computers do.

Quite clearly, as PC Magazine spells out, that's not the only trouble they're having.

In case you're tempted to dismiss this as trivial, there are two things you should be aware of:

First, more than twenty states are already preparing legislation to force some improvements.

Second, if computer users suffer, so does business.

Because computers are only as fast and accurate as the people who operate them.

You are not a machine.

Computers are designed by engineers.

They usually know a lot about technology but very little about people.

Which is why so many computers are technically impressive but strangely unnatural to use.

[illegible]	
Eye strain	55%
Back pain	43%
Headaches	30%
Shoulder	29%
Hand/wrist	18%
Neck pain	15%

(Source: "Ergonomic Principles in Office Automation" Pub. 1983 by E.I.S. AB, Sweden.)

Ericsson, in its very Swedish way, has always believed that excellent ergonomic design isn't a privilege.

It's a right.

That it isn't a noble gesture but demonstrably good for business.

It's an attitude that has made Ericsson No. 1 in Europe twice over:

First, as the giant of European telecommunications.

Then again as Europe's biggest workstation company by far.

(You couldn't ask for a better marriage of technology for the future.)

Here is one example of how they got there.

It's the first of a whole range of computers to be introduced in the U.S.A.

IBM is a trademark of International Business Machines Corp.

The Ericsson PC. It's Ergo-Intelligent.™

Ericsson has spent $300 million finding ways to make people and computers work better together.

Here are some of the results.

Ergo-Screen.™

Aspirin gets rid of a headache.

Ergonomics gets rid of the cause.

The Ericsson PC monitor has a non-glare screen.

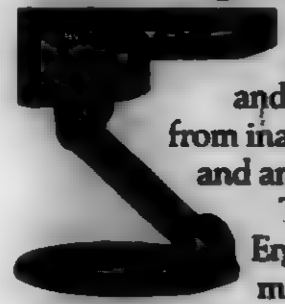
With restful amber characters on a specially developed, low-fatigue background color.

Even the shape of the actual characters was specially developed to allow easier recognition of difficult to distinguish letters like O and Q.

On the monochrome monitor, the resolution is double that of IBM's, so clarity is remarkable.

You can even have characters and graphics on the same screen.

Ergo-Arm.™



Thousands of people get neck and muscle pain from inadequate height and angle adjustment.

The Ericsson Ergo-Arm lets you move your screen exactly where you want it.

Better than back pain, wouldn't you agree?

Ergo-Touch.™

The keys are full-size and the layout is ergonomically planned for greater accuracy and speed.

Yet the keyboard is 20% more compact and less than half the weight of IBM's.

Even the cord is adjustable to suit left- or right-handers.

Ergo-Color.™

Even the color of the case is ergonomically selected to be restful to the eye over many hours.

Ergo-Space.™

The system unit is one-third smaller than IBM's.

It even fits under your desk in a vertical rack.

So your desktop is your own again.

IBM Compatible.

Many companies claim to be compatible.

Some are. Some are stretching the truth.

The Ericsson PC boasts the highest compatibility rating there is.

It's operationally compatible.

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ERICSSON

MICROCOMPUTERS

Continued from page 66

According to the vendor, the Quota:100 system includes modules for order processing, confirmation processing, commissions, receivables and sales analysis.

The price of Quota:100 including program diskettes, user manual, function-key template, tutorial and unlimited telephone support for the first month of use is $2,995.

Parlay Software, 4651 Westgrove Drive, Dallas, Texas 75248.

AMERICAN SOFTWARE, INC.
Forethought

American Software, Inc. has announced Forethought, a microcomputer version of its mainframe product group and item forecasting system.

Forethought is a forecasting package for plants and offices. The product provides monthly and yearly forecasts, multiforecasting and item forecasting with up to two item groupings and statistical forecasts with management overrides and simulation capability, the vendor said.

The package runs on an IBM Personal Computer with IBM's PC-DOS operating system.

Forethought costs $9,500.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

SYSTEMS

ALPHA MICROSYSTEMS, INC.
AM-1100E

Alpha Microsystems, Inc. has announced AM-1100E, a desktop microcomputer that runs Alpha's Unimos, a multiuser operating system capable of supporting 11 users.

Unimos is a version of AT&T's Unix System V and supports Unix versions of programming languages such as C, Cobol, Fortran and Basic, according to the vendor.

The microcomputer features a Motorola, Inc. 68010 microprocessor, 1M byte of random-access memory, a 30M-byte hard disk drive, three serial ports (expandable to 11 ports) and a 40M-byte streaming tape backup, the vendor said.

AM-1100E costs $15,585.

Alpha Microsystems, 17332 Von Karman Ave., Irvine, Calif. 92714.

COMMUNICATIONS

TECMAR, INC.
Powerlink

Tecmar, Inc. has announced Powerlink, a microcomputer-to-mainframe communications board for the IBM Personal Computer.

According to a spokesman, Powerlink is designed to emulate IBM 3278 and 3279 terminals that access an IBM mainframe system. The emulations allows a user to access IBM 3270 applications on the mainframe while concurrently running Personal Computer applications. File transfer software enables the micro to access and move large mainframe data bases to the micro. The files can be viewed and manipulated and then transferred to the mainframe or stored on the micro, the vendor said.

The interface board features direct memory access for rapid screen updating, and file transfer is enhanced with batch file support capability, according to Tecmar. Powerlink also features a windowing capability that allows the user to view one host session containing information from a mainframe, one IBM PC-DOS session from the micro and two electronic notepads, the vendor said.

Powerlink is priced at $1,090.

Tecmar, 6225 Cochran Road, Solon, Ohio 44139.

The Software Store
Mastercom

The Software Store has announced Mastercom, a smart terminal and file transfer utility designed for microcomputers running Digital Research, Inc.'s CP/M 80 or Microsoft Corp.'s MS-DOS operating systems.

The product reportedly can connect a terminal to a host time-sharing system, capture data on disk or printer and transfer files with error-correcting protocols.

Mastercom is said to feature directory display, multiple file transmission, file erase, file rename, disk drive logging, automatic dialing, stored responses recalled with single keystroke and file viewing.

Mastercom costs $49.

The Software Store, 706 Chippewa Square, Marquette, Wis. 49855.

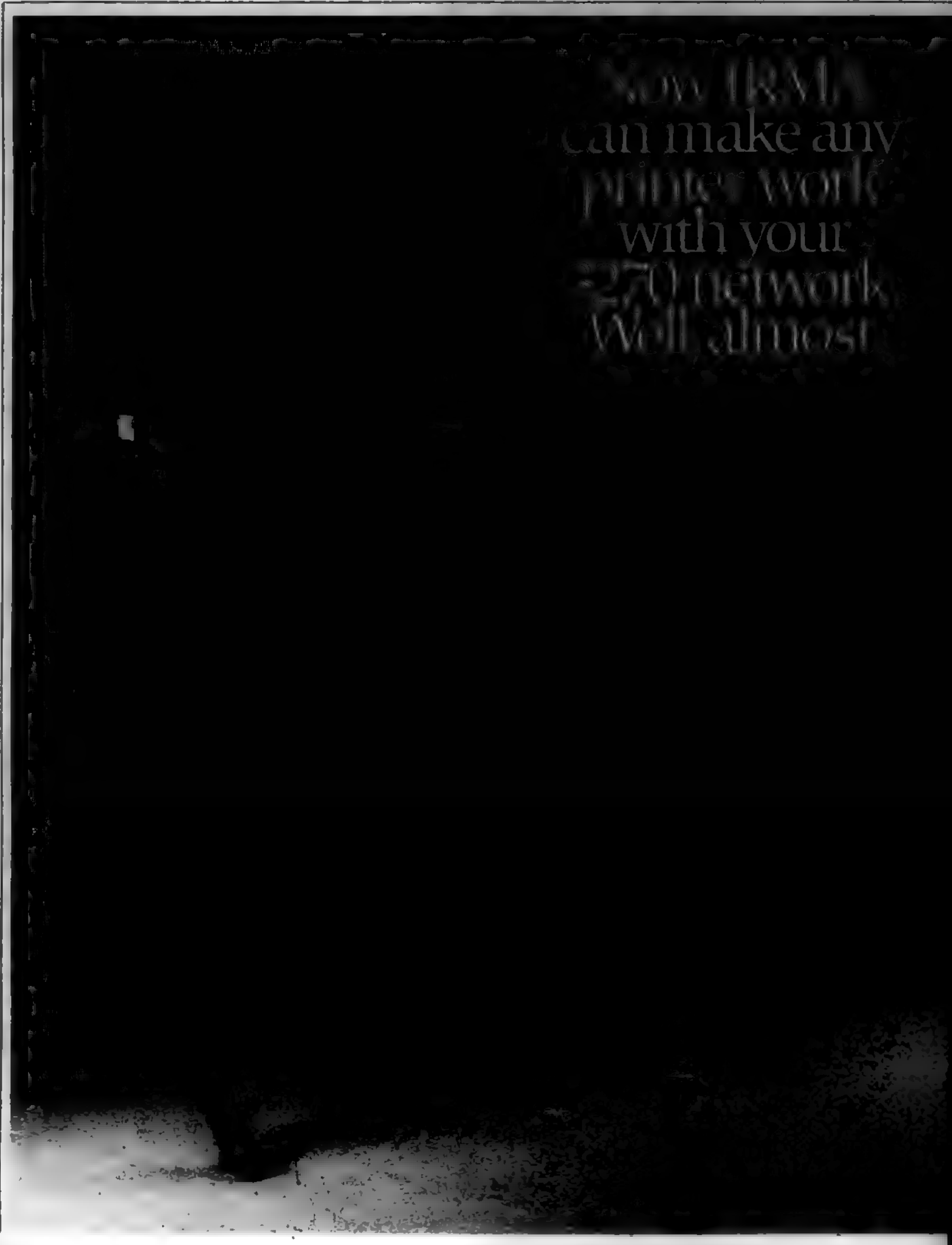
TRIPAS TECHNOLOGIES, INC.
PC Trilink

Tripas Technologies, Inc. has announced a personal computer integration board that reportedly links the IBM Personal Computer, Personal Computer XT or Personal Computer XT-compatible systems with asynchronous terminals and networks.

Trilink is said to give most asynchronous terminals, including Digital Equipment Corp. VT100 terminals, Personal Computer capability without disrupting any element of the existing data processing network. No changes are required to the terminal, host computer or Personal Computer, the vendor said.

The board, which is directly plugged into any expansion slot in the Personal Computer, Personal Computer XT or compatible, allows users to operate aynchronous terminals as monitors on the microcomputer or directly as network terminals, the vendor said.

Trilink is built around a Zilog, Inc. Z80 microprocessor design and operates from two RS-232 interface ports for host and terminal connections. It uses nonvolatile memory to store



configuration data, as well as up to 32K bytes of random-access memory, the vendor said. Up to 8K bytes of read-only memory are available for the firmware, the vendor said.

The board is priced at $495.

Tripas Technologies, 37053 Cherry St., No. 303, Newark, Calif. 94560.

NETWORK SOFTWARE ASSOCIATES, INC.

Communications emulators for IBM Personal Computer AT

Network Software Associates, Inc. has announced that its line of microcomputer-to-mainframe communications emulators is now available for the IBM Personal Computer AT.

Products now available for the Personal Computer AT include Adapt SNA 3270, Adapt SNA Printer and Adapt SNA RJE, all of which reportedly emulate IBM terminal products in an IBM Systems Network Architecture (SNA) environment. A fourth product, Adapt BSC 3270, is said to emulate an IBM 3270 terminal in a bisynchronous environment.

The vendor said a main feature of the Adapt series is that the emulators work in conjunction with IBM's existing Synchronous Data Link Control (SDLC) or Bisynchronous Adapter Card for the Personal Computer.

The emulators require IBM's PC-DOS 2.0 or a later version, 192K bytes of memory and an SDLC or Bisynchronous Adapter Card. Prices are $325 for the Adapt SNA RJE and $275 for Adapt BSC 3270. Adapt SNA 3270 and Adapt SNA Printer are sold together for $325.

Network Software Associates, 19491 Sierra Soto, Irvine, Calif. 92715.

HIGGINS

from page 61

well, Inc. of Orem, Utah. Releases are planned for other networks as well, said Marketing Vice-President Howard Case.

Keeping files private

The network version reportedly includes phone message and electronic mail functions and allows each user to keep any contents of Higgins' files private.

The initial release does not permit two users to view a record simultaneously "because we were not willing to commit to a record-locking technique until IBM announced its network," Case noted.

A second release will provide this feature, he added.

Selling at $395 for a single-user version, Higgins requires a Personal Computer XT or compatible system with 256K bytes of random-access memory and IBM's PC-DOS or Microsoft Corp.'s MS-DOS 2.0 or above. The package also runs on the Personal Computer AT.

Pricing for the network version is based on the number of users, with customers buying a single copy and distributing it over the network.

A version supporting up to seven users will cost under $1,500, Case said.

Conetic Systems is based in Portland, Ore. More information on the network is available from the company's Office Automation Group, which offers Higgins, at 1470 Doolittle Drive, San Leandro, Calif. 94577.

AT

from page 61

ever, not only individual users but vendors, DP staff and other computer professionals are complaining of flaws.

"We've got four in, and three are bad," noted one micro manager at a Fortune 1,000 firm. In addition to power supply malfunctions, "the disk drives are flaky," he said. "The half-heights [floppy drives] are very tempermental, even when they are working, and the hard disks have problems too." The hard disk drives are likely to be damaged in shipment because IBM neglected to fully emphasize the complete preshipment procedures, he said.

The manager also described the AT as a good machine overall and said that he expects IBM to quickly fix the product flaws, improve documentation, supply a full range of related equipment in quantity and boost support in general. His firm currently intends to buy more ATs for specialized applications such as computer-aided design.

Many other DP/MIS executives also gave lukewarm reviews to the AT in its current incarnation.

"For some applications, we like it, and we're beginning to buy it," said Ronald Jenks, director of information services at Touche Ross and Co. in New York.

But, like others, his firm is not yet buying the AT for general use. "We're holding off, waiting for some of the weaknesses to be fixed," he said.

Volkswagen of America, Inc. in Warren, Mich., which originally considered replacing Personal Computer XT orders with purchases of the new machine, is also postponing acquisitions, according to information center manager Warren Kress. "We're experimenting with two units, trying to identify the glitches."

Unlike the case with Osborne, everyone expects IBM to solve the AT's problems quickly and thoroughly. But until that happens, the next generation machine won't reach hyperspeed.

When you set up an IBM® 3270 network, you're faced with the fact that you can't just go out and buy any printer to work with it.

Your choices are, to say the least, limited. Even IBM only makes a few that are compatible.

But with new IRMAprint from DCA, the limits are off.

IRMAprint isn't a printer. It's a printer emulator. In technical terms, it hoodwinks the IBM mainframe into thinking that whatever printer attached to it is a 3287.

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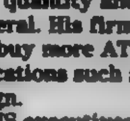

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The key word in that long, drawn-out headline is system.

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Yet the system is so flexible each part can stand alone. Or even team with an IBM PC.

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It all starts with two of our Hewlett-Packard personal computers.

We call one the HP Touchscreen and the other (because it can do even more) the HP Touchscreen MAX.

The first comes with two double-sided disc drives that give you 256K bytes of main memory, expandable to 640K bytes.

The HP Touchscreen MAX has even more capacity, with the added power of a 14.8M byte Winchester disc drive.

And both have DSN/Link, to let you set up a direct line of communication between them and your HP 3000 Department Computer.

As the names imply, you can actually change things on either screen just by touching the screen.

That makes the Touchscreen PCs easier to use. And a lot easier to learn.

The system also includes two printers many people think are simply the best around.

Our Hewlett-Packard LaserJet and ThinkJet printers are both breathtakingly fast and refreshingly quiet.

The ThinkJet printer runs at a rapid 150 characters per second.

Yet because the ThinkJet paints each character with a small jet of ink (instead of smashing the paper with keys), it's as quiet as a sigh.

At 300 characters per second, our LaserJet printer is even faster.

Ten times faster than the best daisy-wheel printers. Yet the image is as sharp as you'll get from a printing press. Amazing.

and when you get to your hotel, change everything.

Two different plotters are also part of the HP personal computer system.

Both create full-color graphics. One with two pens, the other with six for even more detail.

If you like, the system can be knitted together through a LAN.

It lets a number of HP personal computers link up, talk to each other, share printers, and exchange information.

By the way, there can be a lot of information to exchange. That's because there are more than 500 business software titles available. For word processing, accounting, spread sheets and graphics. You'll find the big names there, too.

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WRITERS

from page 61

staff to outside classes. Other companies will have one employee trained and then allow that employee to train others.

These methods will work, of course. Most people can learn to use a computer to perform the job in question if given sufficient incentive and training.

Unfortunately, because of the complexity of the programs, it can take many hours of unproductive attempts before a computer novice learns enough to be effective.

Still more time will be wasted if the person does not know a few basic rules of computer usage. For example, few novices know that a disk is magnetic, and that exposure to magnetic fields can destroy the disk's contents.

An in-house technical writer can help bridge this communications gap.

Businesses often employ a staff writer, whose job may be anything from creating brochures or newsletters to writing technical product descriptions. With training and experience, these writers can become technical writers, creating simple instructions that will ease the transition to computer methods. In particular, technical writers can be of invaluable assistance to novice users.

Getting started

To get started, the writer first must have access to the computer and the software and time to become familiar with both. If the writer previously has done no technical writing, he might enroll in a local technical writing course.

Once familiar with the hardware and software, the technical writer can begin creating simple sets of instructions.

A good technical writer, faced with educating a novice user about a computer, will not assume anything.

Computer installation

The writer first should know if the computer is completely installed and ready for use or if the user must perform this task. If the user is expected to install the computer, then the technical writer can take the manufacturer's installation instructions and simplify them into steps. For example:

- **Step 1.** Find the packing slip and check to be sure you have all the parts that are listed. If any are missing or seem different from the list, call vendor department, person and so on.
- **Step 2.** Be sure the desk (table) for the computer is near an electrical outlet. Carefully unpack the display screen, keyboard, disk drives and printer. You will also find two cables, labeled (A and B). Next, look at the display page in the owner's manual. Note that the screen is placed on top of the disk drives, the keyboard is in front of them and the printer is to the side. (You may place the printer on either side.)

Simple lists

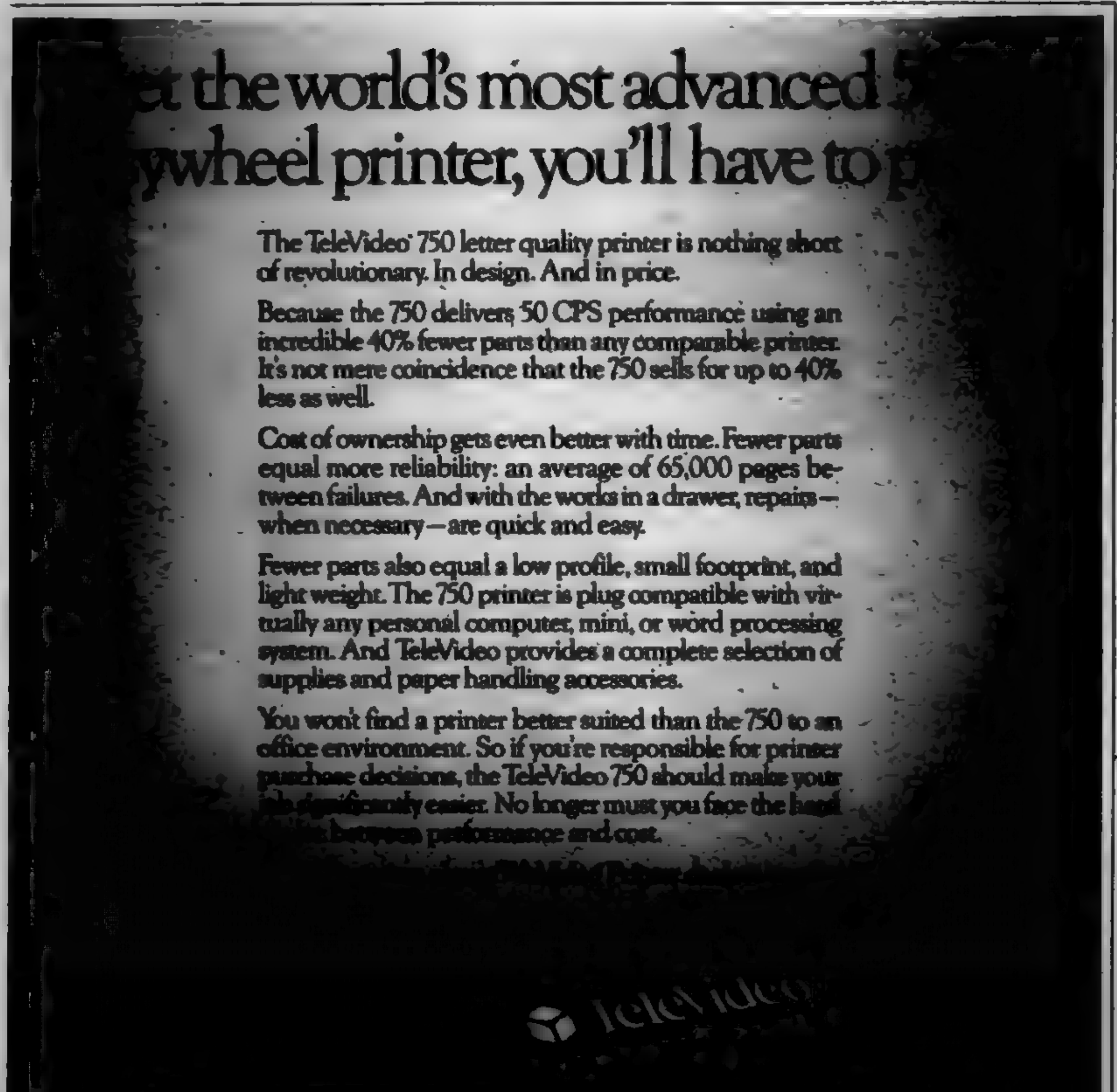
This example may seem too simple, but when a user unfamiliar with the electronic equipment needs to get it working, it is easier to follow such simple lists than to try to find the proper page in the manual and then interpret more intricate instructions. Also, novices are less intimidated by instructions from a person than from a manual.

Once the computer is hooked up, the technical writer can then instruct the new user to:

- **Step 1.** Find the disk labeled 'System Master.' (It should be in the back of your owner's manual.) Note the distinguishing characteristic such as a label or a tab. Insert this disk in Drive A of your disk drive (the left-side drive slot) with the tab or label up. Push gently until the disk is totally inserted; you will hear a soft click. Remember to handle your disks carefully.
- **Step 2.** Turn on the computer. The switch is located on the right underside of the keyboard. There will be a slight humming noise, and the small red light under the left disk will flash on and off. When the computer is ready to operate, your screen will display a message.

Again, this may seem simple, but the simpler the instructions, the faster the user will get over any initial uncertainty.

The technical writer can use the same skills to lead the user through the steps necessary to get a software program into the computer and ready to run. At that point, the user can be assisted with finding and interpreting the manual's instructions.



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COMPUTER INDUSTRY

Seagate gears to ride out shaky mart

COMPANY PROFILE
Kathleen Burton
CW West Coast Bureau

SCOTTS VALLEY, Calif. — Seagate Technology, Inc., the leader for five years in the booming single-user, hard-disk drive market with a 45% market share, faces an exceedingly difficult year ahead.

Caught in the crosscurrents of an industry reeling from shortened product life cycles, a soft microcomputer market, a trend to overseas manufacturing and the unpredictability of its major customer, IBM, Seagate's future is uncertain.

"The disk industry is in the midst of a shakeout," Seagate founder, Chairman and Chief Executive Officer Alan F. Shugart said in a recent interview. "Within two years, we'll only see six companies left in this business and maybe two leading suppliers."

To survive these troubled times, the company must compete with domestic vendors and the Japanese to gain market share in next-generation products built around sub-5¼-in. and half-height, high-capacity micro Winchester drives.

"Seagate faces a critical time window," said James Porter, editor of "Disk/Trend Report," an industry newsletter published in Mountain View, Calif. The company must ramp up new products to recoup recent capital expenditures and get those products into the market for systems designers, notably IBM, Porter said. "Seagate should have begun production on half-heights, 20M-bytes and 3½-in. drives six months ago," he asserted.

Other serious problems lie ahead for the company. Prices, already plummeting 30% annually, are predicted to drop even further, sparked by a cutthroat price war led by Tandon Corp., a new entrant in the hard-disk market, that is expected to undercut Seagate's mass-market 10M-byte product by $100. Seagate is also plagued by chronic production problems, Porter said, chiefly an inability to get product plans into production rapidly and a tendency to announce products, such as the ST206 half-height, that are never shipped.

Amid those market uncertainties, Seagate in mid-November undertook a major reorganization, which resulted in the resignations of several key sales and marketing executives. Shugart said the reorganization will provide customers and distributors with quicker access to the company by lessening the levels of in-house bureaucracy. The present reorganization followed an earlier management shake-up in July, which resulted in the abrupt departure of company cofounder and ex-vice-chairman Finis T. Conner. Shugart has become more involved in the company's day-to-day sales and marketing operations since then.

But industry analysts said Seagate is not without important strengths. The company has maintained excellent long-term relationships with more than 200 OEM customers, including heavyweights such as IBM, Digital Equipment Corp., Hewlett-Packard Co., Honeywell, Inc. and AT&T, and has acquired a reputation as a volume supplier with an annual production capability of two million units. To keep manufacturing costs low, Seagate also has a foreign source for every part except disks, which are purchased in the U.S.

See SEAGATE page 76

■ Datapoint Corp. took further steps to cut costs amid reports that the company has caught the eye of Asher Edelman of Management Assistance, Inc. and Mohawk Data Sciences Corp./79

■ Advanced Micro Devices, Inc. became the latest semiconductor manufacturer to halt shipments of military-destined components pending investigation of testing procedures/82

■ Texas Instruments, Inc. recently announced it is cutting 2,000 positions/84

Robots: Orders up, prices down

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Shipments of robots from U.S. suppliers to users in 1984 will amount to about $290 million, a 50% increase over the 1983 level, as unit prices dropped about 20%, according to officials of the Robotic Industries Association (RIA).

"The numbers reflect the fact that American industry now recognizes the need to modernize its manufacturing processes by the use of industrial robots," according to Walter K. Weisel, RIA president and president of Prab Robots, Inc., a manufacturer in Kalamazoo, Mich.

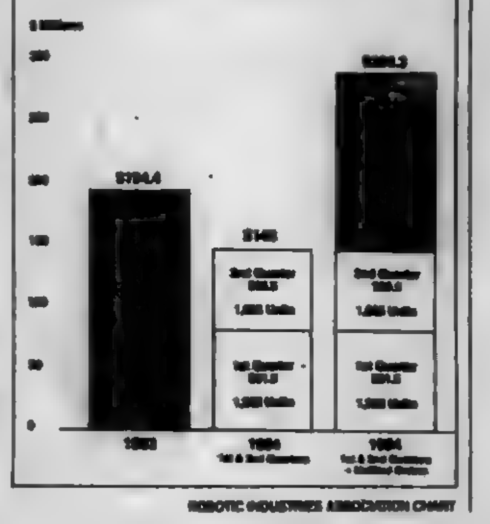
The RIA released its new figures — the first hard statistics ever generated by U.S. robot manufacturers — at a press conference here earlier this month. The U.S. trade association has an all-time high membership of 320 firms, including robot users such as the major automobile manufacturers as well as robot equipment manufacturers and researchers.

Weisel and Donald Vincent, RIA executive vice-president, said the new customer base for robots has expanded from automotive industries to encompass the textile, materials and product handling, aerospace, medical, furniture, electronics, construction and defense industries as well. Robots typically improve productivity by 20% to 30%, they said.

The RIA's statistical survey showed that $148 million worth of robots were shipped in the first half of 1984, with a backlog of unfilled orders amounting to $142.3 million. Combining the two figures,

See ROBOTS page 88

Shipments by U.S. Based Robot Suppliers



ROBOTIC INDUSTRIES ASSOCIATION CHART

INDUSTRY INSIGHT
David Olmos
CW Staff

Engineering teachers feared in short supply

As the U.S. computer industry struggles to remain king of the technology hill amid challenges from Japanese, European and other up-and-comers, a continuing dilemma is the education of electrical and computer science engineers. The question is often raised: Will there be enough engineers to meet the needs of the industry, and how well-trained will they be?

The American Electronics Association (AEA) and assorted forecasting groups are predicting

See AEA page 88

IBM, NCR Comten to meet in court

Copyright violation countered with antitrust charges

By Kathleen Burton
CW West Coast Bureau

LOS ANGELES — IBM and NCR Comten, Inc., a division of NCR Corp., will square off this month in a legal battle over the alleged disclosure of proprietary information by a computer consulting firm.

The charges, which will be heard in federal courts here and in Minneapolis, indicate the measures many computer companies, including IBM, will take to protect their computer secrets. The countercharges subsequently brought by St. Paul, Minn.-based NCR Comten against Evergreen Consulting, Inc., a consulting firm based here, also focus on the question of how much material from competing companies consultants may disclose to their clients.

A preliminary injunction hearing today in Los Angeles' 9th Circuit Court will determine whether NCR Comten will be prohibited from using a program it is alleged to have unlawfully copied from IBM. The dispute began in 1980 when IBM hired Evergreen to evaluate products that competed with IBM's 3705 communications processor, which is a gatekeeper for information entering mainframes.

In carrying out the evaluation, Evergreen discovered that segments of the software used with NCR Comten's communications processor were identical to IBM's Advanced Communications Function/Network Control Program. Evergreen procured a copy of the NCR Comten program and relayed the alleged copyright infringement information to IBM.

In 1981, IBM notified NCR Comten that the program infringed on IBM's copyright and demanded a $74,000 payback for the alleged misuse. NCR refused, and the legal sparring began in November 1982, when NCR Comten brought suit in a federal court here against Evergreen, charging that the company had disclosed proprietary information

See COURT page 84

ALAN F.
SHUGART

Alan F. Shugart, founder, chairman and chief executive officer of Seagate Technology, Inc., has nearly 30 years of experience designing computer peripherals and systems; he spent 18 years with IBM as a field engineer, was subsequently vice-president of product development at Memorex Corp. four years and, in 1973, founded Shugart Associates, a floppy disk drive company that Xerox Corp. later purchased. In a recent interview with Computerworld West Coast correspondent Kathleen Burton at Seagate's Scotts Valley, Calif., headquarters, Shugart discussed IBM, Seagate's biggest customer, and talked about the emerging markets that will drive the volatile rigid-media market in 1985.

Q ***What's going to happen in the rigid disk market over the next two quarters?***
The disk industry is in the midst of a shakeout. Within two years, we'll only see six companies left in this business and maybe two leading suppliers.

The other companies will go broke, get acquired or enter small, niche markets with low volumes. I don't see any improvement over the next two quarters either, because the same conditions will exist in the marketplace.

Q ***What's driving this shakeout?***
There's been a slowdown in user acceptance of desktop computers. This industry goes where the small-computer industry goes. I predict a resurgence in the small-computer systems market, however, driven by more computing power and lower costs. Seagate's low cost structure for large rotating memory devices will help fuel this revitalization.

Q ***How are Seagate's fortunes tied to IBM's?***
IBM is our largest customer, representing almost 60% of our business.

Obviously, we have a very good relationship with IBM.

Q ***Is this a frightening position for Seagate — to be this dependent on IBM?***
Absolutely, but the alternative is more frightening. The minute you're not scared in this business, you're doomed.

Q ***What do you think of IBM's ability to set standards in the industry? Is this good?***
If it weren't for IBM, we wouldn't have any standards, not even an 80-column card.

It's not the standard itself that's important, but the fact that IBM can dictate that a standard exists. I think that's a great thing. The industry is incapable of doing it itself.

Q ***What specific problems lie ahead in 1985?***
A price war will be sparked by the industry-wide move to [foreign] manufacturing and the entrance of Japan into the 3½-in. market. This will drive a lot of marginal suppliers out of business.

Q ***Are you worried about this Japanese competition?***
No. Floppy disk technology is now 11 years old, and the Japanese have won 80% of that market. This is because the technology leveled off, and the Japanese did what they do best — automate production.

The technology curve for rigid drives is still too steep for this to happen here though, and product life cycles are still too short. The Japanese can't beat us at competitive cost structures either, because they build [overseas] just like we do.

Another subtle deterrent to the Japanese is the complicated nature of the disk drive interface. It's a harder interface to duplicate than those on watches, cameras or printers.

The Japanese also face two major problems in selling products to U.S. systems manufacturers: the high levels of technical support required and Japan's historic inability to perceive why its "perfect products" don't always work in a customer's system.

Q ***What technical problems will Seagate address in the future?***
We'd like to participate in two emerging markets. As capacities increase, the hard-disk backup issue becomes more critical.

Most MIS directors at Fortune 1,000 companies are very worried about backing up their personal computers. The best solution now is [with streaming tape drives], which isn't very cost-effective.

Also, as products with a gigabyte of networked storage become common, it's impossible to archive using floppy disks. Maybe optical storage is the solution .

Vendors view IBM contracts as precarious blessings

COMPANY PROFILE
Kathleen Burton
CW West Coast Bureau

Industry observers say the sharp dip in Seagate Technology, Inc.'s sales is due to a slowdown in orders from IBM, which, as Seagate's largest and most influential customer, accounts for 59% of the company's sales.

"This is an OEM business, and all disk companies will rise and fall with their customers' whims, notably IBM's whims," said Dave Claridge, senior analyst at investment banking firm Hambrecht & Quist in San Francisco.

"IBM did a sloppy job of planning its future requirements and is whipsawing its vendors — including Seagate — all over the place now," said James Porter, publisher of "Disk/Trend Report," an industry newsletter published in Mountain View, Calif.

According to Porter, IBM plans to ramp up to produce internally 100% of the 3½-in. and high-capacity 5¼-in. products destined for the Personal Computer AT.

IBM is also shopping among domestic vendors for 10M-byte and half-height 20M-byte products for the Personal Computer XT, according to Porter.

Negotiations are also under way between IBM and two Japanese vendors, Alps and Toshiba Ltd., for 3½-in. floppy disk products reportedly scheduled for IBM's portable computer, Porter added.

Winchester contracts follow

"You can bet that where floppy contracts go, Winchester contracts will follow a year later," Porter said.

"Having IBM as a major customer is a mixed blessing," said Bill Frank, a senior analyst at Infocorp, a market research firm in Cupertino, Calif.

Companies that frenetically ramp up for IBM's 18-month contracts and neglect their other customers have no guarantee that IBM will stay around when the contract expires, he said, adding, "dealing with IBM is very precarious."

Seagate to tap Asian mart
Manufacturing strategies fuel sales drive

Vertical integration and automated offshore manufacturing are two trends sweeping the hard-disk industry.

Both are necessary steps to meet the aggressive pricing environment predicted for next-generation products, said Tom Finnegan, Seagate Technology Inc.'s director of international sales.

"Our intention is that all volume production will eventually be done offshore," Finnegan said, "but we're taking it one step at a time."

Untapped markets

Bob Toda, Seagate's director of Far East Marketing, said the company plans to push into the virtually untapped Japanese and Far Eastern markets during 1985.

To ramp up for this move, Seagate recently expanded its 41,000 sq-ft offshore operation in Singapore, which supplies printed-circuit boards, head assemblies and drives for shipment to Europe and the Far East.

This gives the company a foreign source for every part used in its products except disks, which are still manufactured in the U.S. Toda said Seagate also hopes the offshore distribution network will woo major U.S. customers that have recently moved production operations overseas.

Company Chairman Alan F. Shugart explained the company's interest in the Japanese market: "With the word processing and data base business applications developing rapidly in Japan and the massive storage requirements of the Kanji language, the Japanese will be major purchasers of 20M-byte-plus products. They'll skip the 10M-byte market completely. Japan has the second largest market potential for rigid media after the U.S., and we plan to be there."

Seagate began its marketing and selling thrust in Asia two months ago, Finnegan said, by establishing procurement offices in Tokyo and Taipei, signing distribution agreements in Korea, China, Hong Kong, Singapore and Malasia and negotiating with Japanese suppliers.

Seagate also began to accelerate its vertical integration strategy last year, he said, acquiring Grenex, a California company that develops sputtered thin-film magnetic media, an eventual means to increase disk storage.

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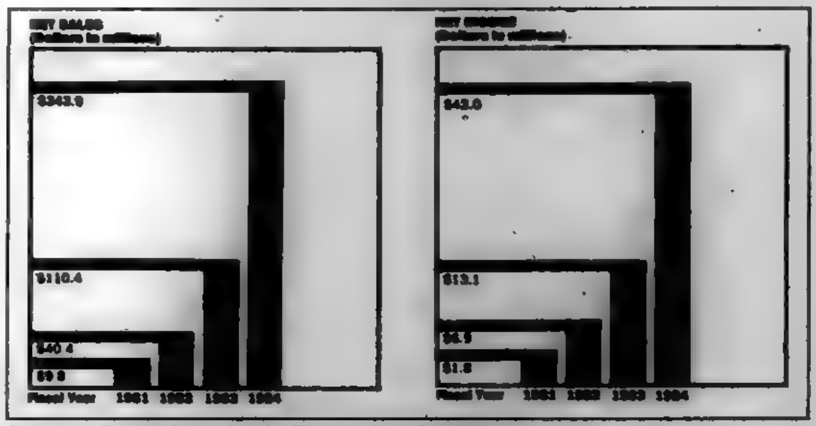

Seagate Technology, Inc.'s financial performance

SEAGATE

from page 73

Industry watchers also said the rigid media industry is basically healthy and will rebound, based on the market's acceptance of integrated software, AT&T Unix-based applications (requiring higher capacity products) and a revitalized personal computer workstation sector.

However, Seagate must contend with a hard-disk market that is branching in two different directions, according to David Claridge, a senior analyst at the venture capital investment firm of Hambrecht & Quist. The direction is toward smaller, lower cost drives for the transportable and single-user market and to full-size, higher performance drives destined for multiuser systems, he said.

Seagate is addressing both markets with recently announced products, claimed Doug Mahon, Seagate's senior vice-president and chief technical officer. Presently in the works are a drive for the IBM Personal Computer AT, a family of 3½-in. products (perhaps destined for IBM's portable computer), several intelligent disk drives that allow the drive's controller to communicate with the CPU and a high-capacity line of 5¼-in. voice coil products.

Rags-to-riches story

Seagate's corporate history is a classic Silicon Valley rags-to-riches story. In 1979, Connor approached Shugart, then president of a floppy disk drive company he had founded called Shugart Associates, predicting an exponentially growing market would emerge for hard disk drives among microcomputer users. Shugart, Connor, Mahon and Thomas Mitchell founded Seagate in November of that year and, in 1980, shipped $10 million worth of 5¼-in. rigid disk drives, offering six times as much storage and access times 1½ times faster than floppy disks.

The market took off and, by 1982, 8% of the microcomputers sold were equipped with hard disks. In 1983, the steep growth curve continued — Seagate shipped 200,000 drives and posted revenues of $110 million.

But by the second half of 1984, the boom ended. Seagate's sales plunged from $100 million to $50 million. The company remained profitable, however, raising cash-on-hand from $13.7 million to $29.7 million and boosting equity to $165 million.

To ride out the slowdown, Seagate is carefully guarding its resources. In October, recently appointed Seagate President and Chief Operating Officer David Mitchell said the company, which laid off 700 employees last July, has frozen hiring and will sell a never-used manufacturing facility in Watsonville, Calif.

"We definitely [have] no cash flow problems," he said, alluding to a $40 million multibank line of credit.

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New high-tech firms boast third-quarter growth in

OUTSIDE LINES
Bohdan Szuprowicz

Bankruptcies, layoffs and liquidations have intensified among high-technology firms in recent months, but at the same time more new firms than ever before showed a spectacular growth performance in earnings and revenues.

Storage Technology Corp. became the largest computer company ever to file for Chapter 11 of the Federal Bankruptcy Act, yet at least 30 rapidly growing, publicly owned firms have seen their revenues increasing by at least 100% during the third quarter of 1984, compared with the same period in 1983.

Twenty-two of those firms — over a third more than a year ago — also registered simultaneous increases in earnings per share (EPS) of more than 100%, which sets a record since 1983 when we began keeping track of such superperformance.

Absence of micro software

What is significant about those top performers this quarter, however, is the virtual absence of microcomputer software or even minicomputer disk drive manufacturers that often dominated this list in previous quarters. This time, the fast-growing firms are primarily in semiconductor-related and telecommunications-based industry segments, with just a spattering of firms from among peripherals and memory-media suppliers.

Micron Technology, a small start-up that took on the Japanese in cutthroat competition for a share of the 64K-byte random-access memory semiconductor market, made it to the top of our list this quarter with a spectacular performance, increasing its EPS by 2,900% and continuing similar growth levels during the second quarter of 1984, which earned the firm second place on our list three months ago.

The company went public in June 1984 at $14 per share and rose as high as $40 per share in the aftermarket, making it one of the year's best-performing initial public offerings.

Lam Research Corp., which also made our list for two quarters running, is perhaps not widely known, but the company represents a new crop of manufacturers in the critical plasma-etch equipment industry, which is vital for expanding very large-scale integration (VLSI) microchip production. The company is at the cutting edge of the VLSI revolution, which is now gathering momentum and will drastically change the semiconductor industry.

Advanced Micro Devices, Inc. and SEEQ Technology, Inc. are two other semiconductor manufacturers on our list, and Mentor Graphics Corp., Valid Logic Systems, Inc. and Daisy Systems Corp. are the big three suppliers of computer-aided engineering (CAE) workstations and design systems that are making custom and semicustom VLSI products an economic reality.

Among the top-performing firms in the general area of telecommunications, 3Com Corp. and Ungermann-Bass, Inc. are the first two public local-area network manufacturers whose appearance on this list underscores the rapid growth of local-area network markets that has been under way for the last two years. Optronics and Fibronics International, Inc., on the other hand, represent an even faster growing segment of electro-optical systems and components — many of which end up in fiber-optic local-area networks, robotic systems, artificial vision and factory automation, where specialized industrial local-area networks are among the fastest growing of all high-technology markets today.

VMX, which markets voice mailboxes used as electronic answering services, began shipping its systems to large corporate cli-

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revenues, earnings in period of increased casualties

ents and major telecommunications equipment and service suppliers. It was the first of the voice store-and-forward equipment and services suppliers to go public last year and appears to be growing rapidly in a new market segment. Equatorial Communications Co., which makes small earth stations for low-cost satellite communications networks, became an instant hit with institutions when it went public a year ago; now almost 50% of its stock is in institutional portfolios. COM Systems is a manufacturer of computerized telephones; Digital Communications Associates, Inc. is a leading independent supplier of large data communications networks; and Walker Telecommunications provides marketing, engineering and other services to the industry.

Of the remaining top performers, Apollo Computer, Inc. needs no introduction. It has already earned itself a place as one of the biggest successes ever since going public in early 1983. Apollo

Apollo is now clearly among the new leaders in 32-bit supermicrocomputer or workstations product categories and its future remains very bright, provided it moves fast enough to keep ahead of the VLSI-driven competition.

Quality Micro Systems, Inc., among the original independent laser printer suppliers in the U.S., has made our list because the nonimpact printer segment of the market is soaring, particularly with the strong growth in the laser printer niche.

Computer Memories, Inc.; Xidex Magnetics, a subsidiary of Xidex Corp.; and Wyse Technology, Inc. round off the list of top performers.

Szuprowicz is president of 21st Century Research of North Bergen, N.J., and publisher of Supergrowth Technology USA.

Datapoint consolidates to cut costs

SAN ANTONIO — Datapoint Corp. recently announced further moves to consolidate its operations, and it was further reported that the company's management faces intervention from an investor who was responsible for altering strategies substantially at two other computer vendors earlier this year.

The company, which experienced a 73% decline in profits to $1.5 million for the quarter ended Oct. 27, said it would combine the manufacturing activity from its Fort Worth, Texas, plant with its plant here and would close the Fort Worth plant effective Jan. 31.

A spokesman for the company also said it was lengthening by several days the traditional holiday season production shutdown.

The Fort Worth closing will enable the company to reduce overhead costs of manufacturing operations and to bring production and inventories in line with demand, according to a spokesman.

The holiday shutdown extension, from Dec. 17 to Jan. 4, lengthened from the normal shutdown of Dec. 21 through Jan. 2, will permit the company to balance the output of its work force with product demand pending the Fort Worth closing, the spokesman said.

Meanwhile, *The Wall Street Journal* reported last week that investor Asher B. Edleman was expected to file with the Securities and Exchange Commission notification that he holds shares and options totaling nearly 10% of Datapoint's stock.

The newspaper reported that anonymous sources said Edelman will attempt to influence management or take control of the company.

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IBM to face marketing, productivity challenges by

By John Desmond
CW Staff

TARPON SPRINGS, Fla. — Because IBM's manufacturing costs, as a percentage of revenue over a 13-year period from 1976 to 1989, will rise by 9%, selling expenses must be shaved by an equivalent amount to meet profit targets.

This scenario was outlined by Gartner Group, Inc. vice-president Stephen P. Cohen at a conference for IBM large-systems users here recently.

According to the Connecticut-based market research and consulting firm, costs increased from 36% of revenue in 1976 to an estimated 41% in 1984 and a projected 45% in 1989.

Will not cut R&D

IBM will not cut research and development budgets, since it must compete with such potential threats as the Japanese firms and AT&T.

Cuts will be made from selling and general administration expenses, a marketing and productivity challenge for IBM, said Cohen, Gartner's director of Industry Service and a former IBM strategic planner.

Gartner Group estimated that IBM plans to cut selling expenses from 18% of income this year to 15% in 1989 and to cut general administrative expenses from 9% to 7% in 1989, Cohen said. Expense as a percentage of revenue is targeted for a reduction from an estimated 35% this year to 30% in 1989, he added.

Staffing expenses to rise

The expense burden of the marketing staff, estimated to be $110,000 per person this year, is projected by the Gartner Group to rise to $140,000 per person in 1989 if the expense is held to the rate of inflation.

The estimated revenue generated per member of the marketing staff, $613,000 this year, would have to rise to $929,000 to meet IBM objectives, Cohen said. That rise would be equivalent to a 52% improvement in five years. "That's the challenge IBM is facing," Cohen said.

This challenge assumes that IBM will keep pace with a projected 18% annual industry revenue growth and can hold its sales expenses per man-year to inflation. If IBM fails in either objective, its sales force would have to generate even greater than 52% improvement, Cohen said.

"Either IBM's profitability will suffer and [it] will not achieve [its] objective, or IBM will not be able to price [itself] as competitively as [it] would like and [it] will not be able to achieve the market share [it] would like," Cohen said.

"All strategies IBM has embarked on in the area of selling, administration, service and manufacturing are oriented around achieving that productivity," he added.

Methods for strategies

Among methods to achieve the strategies, Cohen said, IBM will employ the following:

■ It will use its direct sales force only for big-ticket customers, promote long-term commitment through account plans (suggested long-range growth paths), presell products with more statements of direction and automate elements of the sales cycle.

■ It will use alternate marketing channels for smaller customers, trying to lower the cost of selling. "If you can't eliminate selling expense entirely, the next best thing is to do that selling with a lower paid person," Cohen said.

■ It will design products to minimize selling expense, with features including ease of use for end-user products and standard user interfaces to lower training and support expenses.

■ It will design products for improved reliability, availability and serviceability. Improved diagnostics and field-replaceable units will aid this goal, Cohen said.

Another way for IBM to reduce service expenses would be to absorb unneeded field engineers elsewhere in

trimming budget, 9% rise in expenses

the company, Cohen said. But, he added, IBM will go slowly in moving its field engineers out of fear the engineers might form a union.

In manufacturing strategy, IBM will turn to the OEM market more in order to spread costs over a bigger base, Cohen said, pointing to the recent agreement between IBM and Honeywell, Inc. to market older IBM mainframes as one example.

'IBM will get more aggressive'

The Gartner Group projected that IBM's long-term revenue growth rate will be 16% annually; thus, IBM will lose market share if industry revenue grows at an 18% annual rate. Meanwhile, the market share of the Japanese is increasing, Cohen said. As a result, "IBM will get more aggressive," he said.

The aggressiveness could result in products with little competition being priced higher, software prices increasing rapidly and software fees being based on usage rates, he suggested. IBM now has decision support software with a price based on the number of signed-on terminals users, he noted.

IBM will use financial muscle to block competition and penetrate new markets, he said. When competition emerges, IBM will drop prices to try to thwart it, he said, noting the experiences of Storage Technology Corp. and Control Data Corp. in the disk drive business.

AMD halts DOD chip shipments

By David [illegible]
CW Staff

SUNNYVALE, Calif. — Advanced Micro Devices, Inc. (AMD) recently suspended the shipment of certain integrated circuits to U.S. Department of Defense contractors after an internal audit discovered discrepancies between the company's testing procedures and those of its contractors.

Advanced Micro, a semiconductor manufacturer, said shipments will not resume until the company can determine that its testing procedures are meeting customer specifications. Deliveries of the chips were halted Dec. 1.

"The inconsistencies were discovered as part of a special audit of all customer special test specifications following discovery of similar situations at several other manufacturers of integrated circuits," said Jim Lynch, vice-president of quality assurance and reliability.

The Advanced Micro action is the latest in a series of testing irregularities at major manufacturers of military chips. Earlier this year, Texas Instruments, Inc. and Signetics Corp. reported testing problems, and Schlumberger Ltd.'s Fairchild division has notified the Department of Defense that some of the chips it supplied to contractors may have been improperly tested.

A spokesman for Advanced Micro said the company has not been informed of any disciplinary action by the Defense Logistics Agency, the Department of Defense's procurement unit.

The spokesman said the chip testing question "has brought about a complete review of everything. All these occurrences have prompted everyone to look a lot closer" at test procedures, he said.

Last March, National Semiconductor Corp. pleaded guilty to federal charges that it falsified test data for chips supplied to the military.

Advanced Micro said shipments of joint Army-Navy products and standard catalog products were not included in the suspension. The company said after its Dec. 4 announcement that it expects to complete a review of its testing procedures within 120 days. "We think we can do it by then," a company spokesman said.

A company spokesman said it will immediately resume shipments to customers where no inconsistencies are found.

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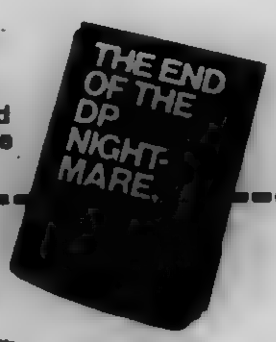

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Tandon files patent complaint

By David Gimes
CW Staff

CHATSWORTH, Calif. — Tandon Corp. has filed a complaint with the U.S. International Trade Commission charging three Japanese companies and their American subsidiaries with infringement of a patent covering floppy disk drive technology.

In its action, Tandon, a disk drive manufacturer based here, is seeking an investigation into the alleged infringements and an order barring future imports of the Japanese disk drives involved in the complaint.

The complaint names Mitsubishi Electronics Corp. and its U.S. subsidiary, Mitsubishi Electronics America, Inc.; Teac Corp. and its U.S. subsidiary, Teac Corp. of America; and Sony Corp. and its U.S. subsidiary, Sony Corp. of America.

'Imminent demise' of industry

Tandon's complaint, filed Dec. 6, warned of the "imminent demise" of the U.S. floppy disk drive industry as a result of the alleged Japanese infringements. U.S. disk drive manufacturers have been hurt by competition from Japanese imports. The suit cites the estimate of industry analyst James N. Porter, editor of the "Disk/Trend Report" newsletter, that the Japanese will be the world leader in floppy disk sales by 1985.

In a related action, Tandon filed a patent infringement suit in U.S. District Court in Los Angeles against the same Japanese parent firms and subsidiaries. The suit seeks to bar further sales of the Japanese disk drives. It also seeks unspecified damages and asks that the damages be trebled as a result of the alleged "willfull, deliberate and intentional" patent infringement.

Spokesmen for the Teac subsidiary in Montebello, Calif., the Mitsubishi subsidiary in Torrance, Calif., and the Sony subsidiary in Compton, Calif., said they have not yet received copies of the complaint and would not comment until they do so.

Complaint's allegations

The complaint alleges that Mitsubishi and Teac have imported double-sided floppy disk drives through their American subsidiaries that infringe upon patents held by Tandon. It further charges that Sony, through its subsidiary, has imported 3½-in. double-sided floppy disks that constitute an infringement of Tandon patents.

The Tandon complaint claims that the patent is "one of the most valuable in the floppy field," having enabled Tandon to manufacture double-sided floppy disks that could be mass-produced at a low cost. Tandon further claimed that the invention "has been a major factor in sustaining the explosive growth of the microcomputer industry."

Tandon said it has granted licenses for the patent to several U.S. manufacturers, including IBM; Hewlett-Packard Co.; Shugart Associates, Inc.; Magnetic Peripherals, Inc.; and Micro Peripherals, Inc. The suit claimed that, because of Japanese competition, Micro Peripherals has since gone out of business, and Shugart decided to close a large portion of its California disk drive facility in October.

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TI to lay off 2,000; continued chip sales decline cited

DALLAS — Texas Instruments, Inc. recently announced plans to begin cutting approximately 2,000 jobs from its work force next month. The company cited the "continued weakening of the worldwide semiconductor market."

The TI development, which followed by one week Honeywell, Inc.'s announcement that it plans to lay off 1,000 people at its Synertek, Inc. semiconductor unit and intends to sell the subsidiary, indicates that semiconductor orders, which have slumped over the past few months, may not rebound as quickly as industry participants had expected [CW, Oct. 29].

The layoffs at TI will primarily affect its Texas facilities, the company said. Additionally, reduced work schedules are being implemented in some plants, according to TI.

Reportedly, the job cuts will reduce by 5% the portion of TI's work force engaged in semiconductor manufacturing, the largest portion of the company's business.

TI said employees affected by the reductions will either receive severance pay or be placed on furlough. Those on furlough will receive compensation from TI to supplement unemployment compensation for up to 26 weeks and will continue to have benefits coverage during the period in which they receive the supplemental compensation.

Over the past few months, book-to-bill ratios, which compares new orders with shipments, reported by the Semiconductor Industry Association have plummeted to new lows. In September, the rate of new orders fell below shipments for the first time in two years and has slipped even lower since then.

Industry observers and participants told *Computerworld* in October that the decline was probably due to the tendency of systems developers to double-order from chip manufacturers during periods of high demand.

Those observers had expected the situation to level off by the end of the year. The recent developments, however, indicate that the situation has worsened and suggest that the industry may be poised on yet another of the cyclical slumps that it has traditionally suffered during a slowdown in economic activity.

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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SBS appoints IBM executive to presidency

MCLEAN, Va. — Satellite Business Systems (SBS) last week named Marvin L. Mann as its president and chief executive officer, replacing Steven B. Schwartz, who was appointed assistant group executive for IBM's Telecommunications Products organization in the Information Systems and Communications Group.

Mann was previously vice-president and general manager of IBM's Lexington Business Products unit in Lexington, Ky.

Schwartz has been assigned the role of overseeing the incorporation of the latest IBM acquisition — Rolm Corp. — into IBM's business operations. He will retain a role at SBS as a member of the executive committee.

IBM owns 60% of the SBS partnership, and Aetna Life & Casualty Co. of Hartford, Conn., owns 40%. IBM recently increased its ownership share of SBS, buying out one-third of the interest in the Communications Satellite Organization.

SBS is a nationwide telecommunications company serving more than 150,000 business and residential subscribers.

COURT

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about the NCR Comten program to IBM in violation of federal licensing and copyright laws.

Since then, the impending courtroom battle has widened to include assertions by NCR Comten that IBM violated federal antitrust laws and a request by Evergreen for damages against NCR Comten, based on the allegation that it called Evergreen "an IBM spy" and damaged the firm's future business.

Evergreen lawyer James Keir claimed "Evergreen just got caught in the middle." The company was doing a straightforward investigation, he said, asking several manufacturers, including NCR Comten, to provide technical manuals for devices competing with the IBM 3705 when the alleged violation was discovered.

NCR Comten attorney Raymond Fitzsimmons said no definite date has been set for the trial, which is expected to begin early next year.

Mark Steinberg, a spokesman for O'Melveny & Myers, the Los Angeles-based legal firm representing IBM in the case, said Evergreen "acted properly in reporting the apparent theft of IBM's property" by NCR Comten. Steinberg would not comment on IBM's strategy but claimed that NCR Comten's allegations are "without merit" and that "IBM plans to respond vigorously to [NCR Comten's] antitrust allegations."

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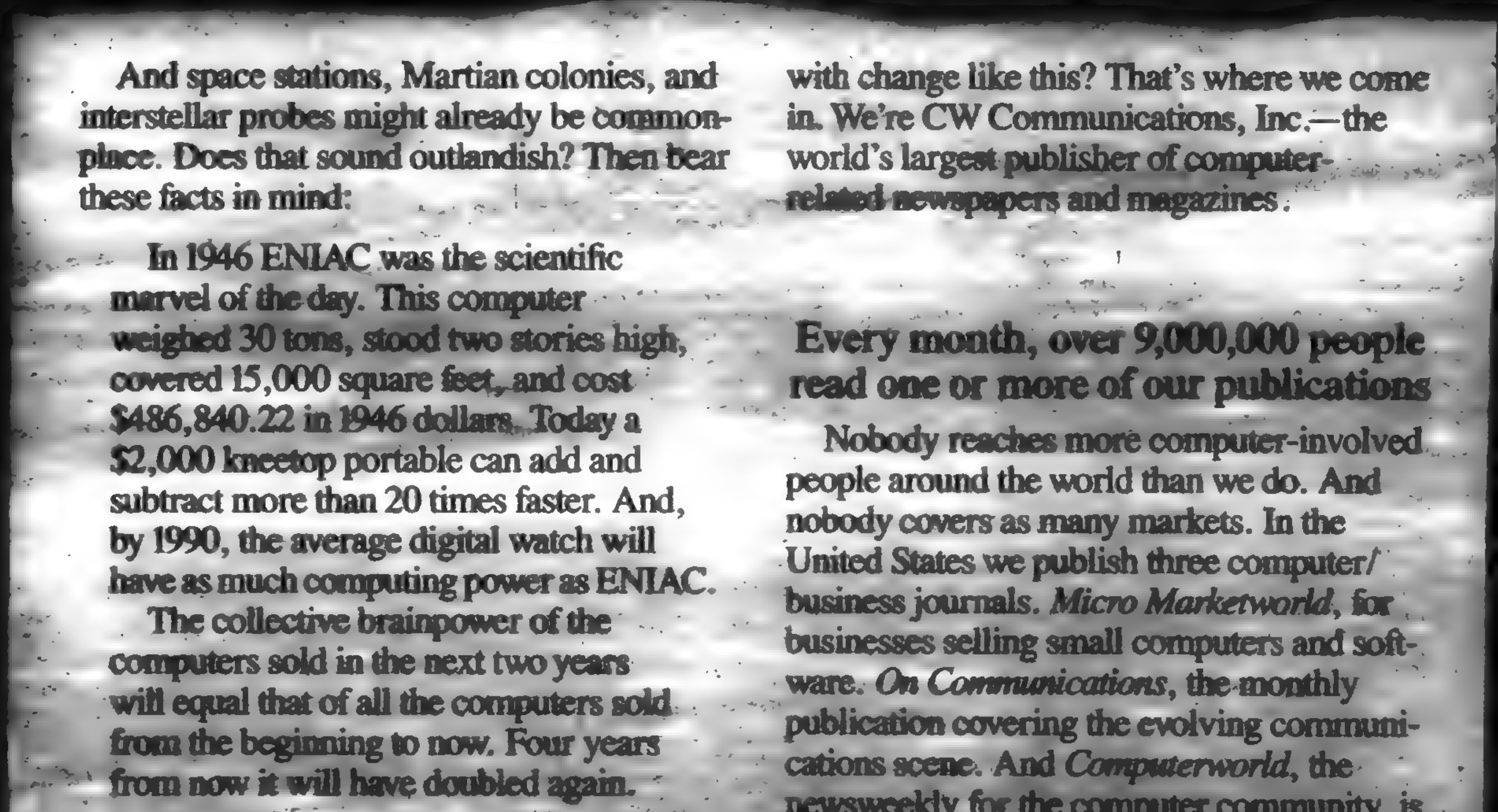

And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

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[illegible]

The other [illegible] monthly [illegible]

AEA

from page 73

that the answer to that question is basically no — though there are differences on how to get at a solution. In its latest report on the situation, the AEA warned that a shortage of engineering faculty at U.S. universities may lead to a decline in the quality of electrical and computer science engineers. With not enough engineering teachers to fill vacant teaching slots, some engineering schools have had to turn away qualified high school applicants, the AEA said.

The AEA has been troubled by the problem for some time. A 1981 study by the AEA projected a shortage of 129,000 electrical and computer science engineers by 1985. Yet another study, issued last year using data compiled during the recession months of early 1983, pegged the shortage at 113,000 by 1987.

The latest study noted that, in the past decade, enrollments of engineering students have doubled, while the number of engineering faculty has risen just 10%.

According to the study, this imbalance has meant more crowded classrooms, course cancellations, increased teaching loads, less time for faculty research and more dependence on part-time faculty and teaching assistants.

In the AEA's view, a resolution to the faculty and student shortages is essential if American computer companies are to stay economically competitive. "A sufficient faculty supply is essential both to the quality and quantity of these [engineering] graduates," concluded Pat Hill Hubbard, the AEA's vice-president of engineering and technical education, who prepared the report.

But is the engineering shortage really as big a problem as the AEA purports? Like the AEA, the National Science Foundation concluded in its own recent study that the demand for computer and electrical engineers and computer scientists will grow by 10% to 15% during the next several years, and that there will be a significant shortage of computer scientists. The science foundation, however, foresaw that the shortage of engineers will be met by people crossing over into the field from other occupations.

The AEA is not convinced that the shortage problem can or should be resolved in the way proposed by the science foundation. So the trade association has worked to tackle the problem by its own methods.

AEA member companies have contributed $7 million through the AEA's Electronics Education Foundation. This money goes mainly to fund loans and fellowships for doctoral students in electrical or computer engineering or computer science. More than 120 graduate students at more than 30 universities are now receiving these fellowships. The AEA believes that without an increasing number of U.S. citizens receiving Ph.D.'s in engineering, more faculty posts will continue to go to foreign-born Ph.D.'s.

In other efforts, the AEA has lobbied federal and state lawmakers to raise salaries of engineering faculty, to provide tax incentives for corporations donating computer equipment and to provide matching grants with state legislatures to fund a variety of higher education initiatives.

ROBOTS

from page 73

the RIA said, indicates that total 1984 shipments will reach $290.3 million or more, compared with total 1983 shipments of $194.4 million.

"More robots have been shipped in 1983 and 1984 [combined] than in the previous 20 years combined, dating back to the development of the technology," Weisel noted. RIA figures show that 3,060 robot units were shipped in 1983, and at least 3,951 will have been shipped in 1984.

Based on new orders, the RIA said, the average price of an industrial robot dropped from $74,100 in 1983 to $59,200 in mid-1984. Weisel attributed the price cuts mostly to stiff competition in the U.S. market and, to a lesser extent, economies of scale in robot manufacturing.

He added that while prices have dropped about 20%, there has been a concurrent 20% increase in robot capabilities, due to advances in software, computer interfacing and sensory abilities.

Weisel and Vincent said the number of industrial robots installed in the U.S. has risen from 9,400 in 1983 to about 13,000 today, a number still far below the 41,000 robots installed in Japan. Vincent asserted that the U.S. robots tend to be more sophisticated technically and have better applications software than the Japanese robots.

Because the Japanese government subsidizes its robot industry, Vincent said, the U.S. industry will ask Congress in 1985 for tax incentives to improve its competitive position.

Robert Smith, RIA's lobbyist here, expressed concern that the Department of the Treasury's recent proposal for business tax reform would sharply reduce the ability of manufacturing industries to invest in robot systems. He cited the proposals to eliminate the 10% investment tax credit and the accelerated depreciation schedule that was enacted in 1981 [CW, Dec. 10].

On another subject, the RIA officials said that robots will not cause substantial unemployment in the next few years because robots typically replace other equipment rather than human laborers, and employment in the robotics industry itself now outstrips any unemployment caused by the robots. However, the officials stressed that worker retraining programs are needed to prevent widespread job displacement in the next century if a robot boom develops.

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Develop and enhance real estate property ownership record-keeping and [illegible] systems, utilizing Relational DBMS engineering, INGRES V3.0 EQUEL/Fortran plus enhanced OS, languages, and INGRES Subsystems Forms Facilities, running VAX-11/780 VMS operating system. Convert and maintain multi-county Title Plant systems based on Record Management Services knowledge and relational methodology, and incorporate the ability to maintain taxing authorities, owners' property parcel data, digitized mapping coordinates and property appraisal data with VAX-11 Basic. Masters in Computer Science; 6 mos. exp. in job offered or 1 yr. exp. as Programmer; minimum 2 yrs. exp. with VAX-11, VAX Basic language, and knowledgeable in Relational Data Bases and Record Management Services. 40 hrs./wk., $23,751/yr. Apply at Texas Employment Commission, Houston, Texas or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778. Job Order #[illegible]. Ad paid for by an Equal Employment Opportunity Employer.

SOFTWARE DEVELOPMENT ENGINEER for development of software for analysis and computer solution of image processing problems such as machine part identification, quality control, tolerances, and robotic development. Must have a Master's of Science in Computer Science with academic background in image processing, with at least 6 credit hours. Salary $27,000 per year. 40 hours per week. Send resume to: MESC, Room 415, 7310 Woodward Avenue, Detroit, MI 48202. Reference #[illegible]. This is an employer paid ad.

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A leading producer of enamel papers for the printed communications industry has an excellent opportunity available in Central Wisconsin. This person reporting to the software support manager will design, modify, maintain and install operating systems, communication systems and vendor supplied software on an IBM 4381 machine. This person carries out the most complex, highly technical systems programming work; provides training to others; analyzes and corrects problems; provides complete documentation; participates in post audit analysis; and provides user support.

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Software Engineer

- Anal. users requ.; design & dev. customized software; participate in engineering of ind. control sys.; use PDP 11/44 & TI 990/12, FORTRAN, PASCAL. B. Deg. in E.E.; 18 mo. exp. doing above or as Prog./Anal. T.A. using above and/or UNIVAC 90/80 & Interdata 7/32. 40 hrs./wk. $34K/yr. Employer paid ad. Send resume: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Reference # 42884.

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Institute of Public Administration
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DIRECTOR OF COMPUTER SERVICES
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Directs the management and operation of computer services department. Manages personnel, budget and equipment. Coordinates campus computer operations with those of the IU network. Chairs campus computer committee and shares responsibility for planning with committee. Qualifications: masters degree (preferably in computer science or related area) or equivalent experience required. Knowledge and experience in application of computers to academic programs and administrative operations. Experience in software system and MIS required. On site equipment includes a Prime 750; network access to IBM Series 4300, CDC 855, DEC System 20, VAX and local microcomputers. Appointment on a 12 month basis beginning on or about July 1, 1985. Salary range $27-35,000. Medical, dental, life and liberal TIAA/CREF available. Send resume and names of three references to Dr. Greg Baur, Chair of Search Committee, Care of Dean of Faculties Office, Indiana University at South Bend, P.O. Box 7111, South Bend, IN 46634. Applications accepted through February 1, 1985 or until position is filled.

Indiana University at South Bend
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University of Houston-Victoria
Faculty Positions

University of Houston-Victoria is an upper-level component of the University of Houston System offering courses leading to baccalaureate and master's degrees in Arts and Sciences, Business Administration and Education. Located 120 miles southwest of Houston, UH-V serves a 15-county area and cooperates with three area community colleges. Applications are invited for the following positions beginning Fall, [illegible]:

Computer Information Sciences Positions

Assistant Professor, tenure-track positions (2). Minimum requirements: Master's Degree in Computer Science. Salary competitive.

Preference given to applicants with experience in program development, teaching experience, research, and doctoral coursework.

Computer facilities on Campus include a VAX 11/780, a Honeywell [illegible], remote processing to a Honeywell [illegible], and microcomputer laboratories.

Application deadline: February 15, [illegible]. Send credentials or letter of application, resume, list of graduate coursework, courses taught, and list of three references to: Dr. [illegible], Dean, Division of Arts and Sciences, University of Houston-Victoria, [illegible] Red River, Victoria, TX [illegible]. An Affirmative Action, Equal Opportunity Employer.

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[illegible], Personnel Department, University Of Medicine And Dentistry Of New Jersey, 100 Bergen Street, Newark, New Jersey 07103

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Seek person to direct the activities of the Technical Administrative Support Group and provide adequate, reliable and up-to-date technical support tools for the University of Nebraska Administrative Application Systems. Will evaluate, recommend and coordinate with vendors, faculty, personnel and users, the implementation of new software and/or hardware to meet the needs of administrative applications systems and NU data administration.

Requires Bachelor's degree minimum in Computer Science or related field plus six years experience in systems design and analysis. Should have three to five years managerial experience in technical data processing environment. Should be knowledgeable in COBOL and IBM Assembler languages. Apply by January 18 to: Ms. Nancy [illegible], Search Chair, [illegible] Nebraska Hall, University of Nebraska-Lincoln, Lincoln, Nebraska [illegible].

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Personnel Agency

Eastern Washington University has a one-year teaching position available in the Management Information Systems department for the 1985-1986 academic year. Teaching duties will consist of undergraduate courses in Administrative Office Management and Business Communications. Applicants must have a masters degree with emphasis in Administrative Office Management, Record Systems and Business Communications, or a doctorate/ABD in the Administrative Office Management area. Eastern has campuses in Spokane and in nearby Cheney, and its business programs are AACSB accredited. Applicant files will be reviewed beginning December 1984. Vita should be directed to: Dr. Frank [illegible], Chairman, Department of Management Information Systems, School of Business, Eastern Washington University, Cheney, WA 99004. An equal Opportunity Employer.

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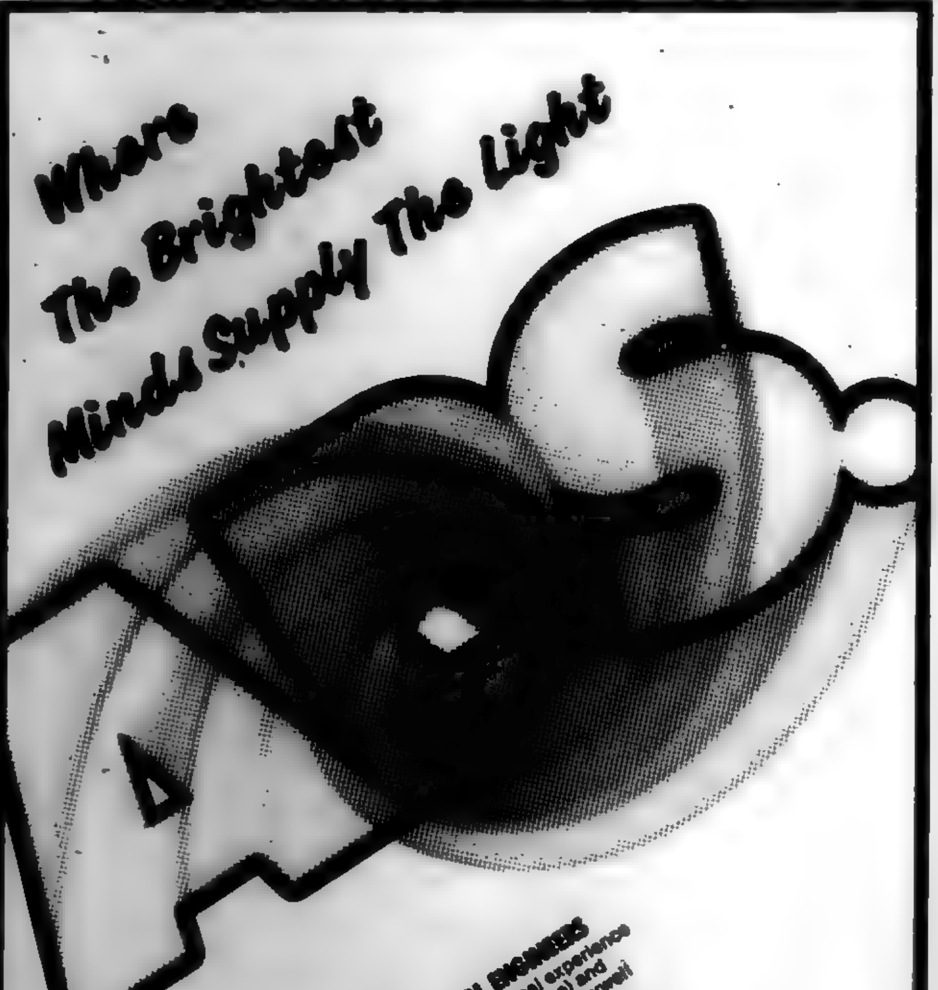

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We pioneered the installation and retining of scrubber pollution control on our coal-fired generating units. We've built one of the world's largest solar photovoltaic generation systems at Phoenix Sky Harbor Airport. We're continually researching new sources of energy, initiating sophisticated new computer applications, and developing innovative conservation-oriented marketing concepts.

Our brightest minds come in several categories. They are:

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Must possess IBM work experience, COBOL and PL/I plus a willingness to learn higher level languages such as Mark IV and SAS necessary in some positions. A background with IMS, OS/JCL, TSO/SPF preferred. Knowledge of PERT/CPM, PREMIS/PICOM helpful in some departments.

Our people stay with us because we challenge them, reward them, provide career direction, listen, assist and offer an open communications line to management. The light we supply is a reflection of the light you bring us. To be considered for employment at one of the finest and most advanced service companies in the U.S., send resume to: David Bentler, **ARIZONA PUBLIC SERVICE COMPANY**, Dept. CW01217, P.O. Box 21666, Phoenix, AZ 85036.

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For immediate consideration, mail your resume and salary history to Personnel Office, U.T. El Paso, El Paso, Texas 79968-0507. Closing date for applications is 1-31-85. The University is an EEO/AA employer.

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Salary: $2,667 - 3,373 per mo. + excellent benefits, including 7.5% retirement contribution paid by City.

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We also provide telecopier service at extensions 410 and 451.

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Eastern Washington University has two full-time positions available in the Management Information Systems department effective September 1, 1985. Teaching assignment includes undergraduate and graduate courses in management information systems and/or microcomputer business systems. Applicants should have a doctorate or be at ABD stage. Persons with a MBA, or Masters in MIS or Computer Science plus appropriate business experience, will also be considered. Eastern has campuses in Spokane and in nearby Cheney, and its business programs are AACSB accredited. Applicant files will be reviewed beginning December, 1984. Vita should be directed to: Dr. Frank Nelson, Chairman, Department of Management Information Systems, School of Business, Eastern Washington University, Cheney, WA 99004. An equal opportunity employer.

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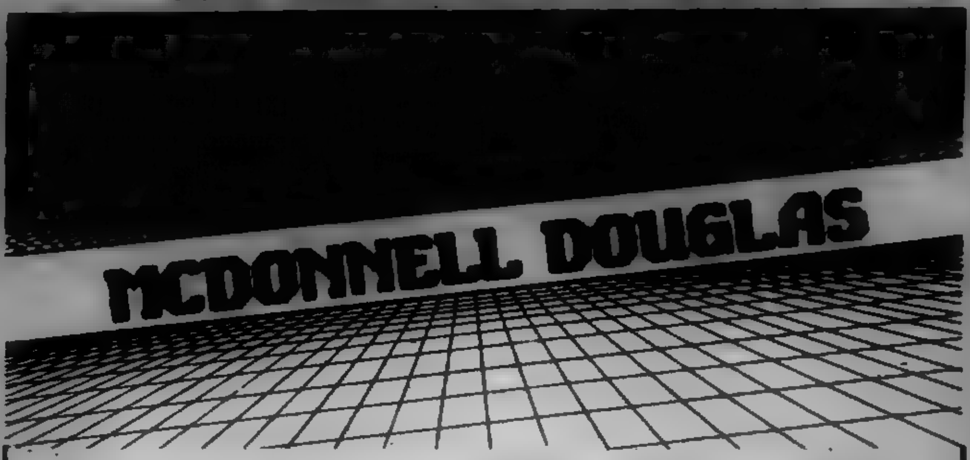

McDonnell Douglas Corporation has an immediate opening in St. Louis, Missouri for a Computer Security Specialist interested in career advancement. Candidate should have a BA degree in Computer Science or related field and knowledge of DoD security regulations. Above average oral and written communications skills required. Responsibilities would include administration of 35 major classified processing systems, design of new facilities, and application of TEMPEST standards and cryptographic techniques. Candidate should be eligible for a Top Secret clearance. Position offers competitive salary and outstanding fringe benefit package including stock savings plan. Send resume and salary requirements to:

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QUALIFICATIONS REQUIRED:

- Relevant baccalaureate degree
- 7 years information systems experience, at least three of which include supervising systems professionals.
- experience in general systems management including systems analysis and development and project management and methodology.
- solid knowledge of the technology including data base administration, teleprocessing and data communications, and DP center management.

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Location - Pittsburgh

Technical

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• SYSTEMS PROGRAMMERS

Develop and implement an extensive telecommunications network in a distributed processing environment with system 38's. Communicating in (SNA/SDLC) and (BSC) protocols over switched and non-switched lines using a variety of transmission speeds to a broad range of devices. Provide a full range of support to the interactive-/batch environments for applications development concurrent with normal production activities. Develop APPC programs for a peer relationship between multiple system 38's. Use performance measurement tools to identify potential operating improvements. The candidates for the above position will have a minimum of two years' experience on System 38 utilizing RPG II or III. IBM Series/1, Audio Response, and/or IBM PC experience a plus.

Applications

• SENIOR PROGRAMMER ANALYSTS
• PROGRAMMER ANALYSTS

Senior candidates will have systems design experience and 3-5 years of programming experience. Good communications skills are required because of the extensive user interaction that will take place while designing many new systems. No old systems currently exist that need to be interfaced to, enhanced, or maintained. A working knowledge of RPG III, Basic, or COBOL is required. System 38/36/34, or System/3 experience is a plus. We are seeking ambitious, self-starters who have a desire to use their developmental skills in multiple System 38's environment.

We are a new Pittsburgh based subsidiary of a billion dollar service corporation, the leader in our industry. This is a unique opportunity to get in on the start up of a high growth operation. We offer an excellent compensation and benefits program. Qualified candidates should send their resume and salary history, in confidence, to:

CW-84082
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- Software development team leader for automated radio telephone system
- Minimum 4 years experience in design and coding of real-time systems in a VAX/VMS environment
- Experienced with DECnet, FORTRAN, Pascal or "C" desired

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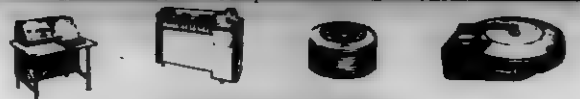

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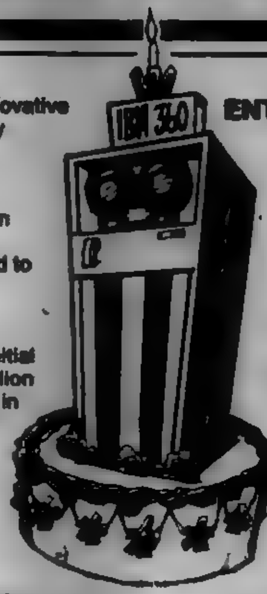

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The Classified section of the newspaper is laid out in an attractive format and is easy to read. It offers classifications to solve a variety of problems: Position Announcements, Positions Wanted, Buy - Sell - Swap, Software For Sale, Software Wanted, Time & Services, Real Estate, Publications, Bids & Proposals, Auctions, Seminars & Conferences and The Bulletin Board.

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- February 25 - Communication Networks
- March 25 - Graphic Systems
- April 29 - Micros in Big Business
- May 27 - Manufacturing Systems
- June 24 - DBMS
- July 8 - NCC Preview
- July 15 - NCC Show (early close July 3rd)
- July 22 - NCC Wrap-Up
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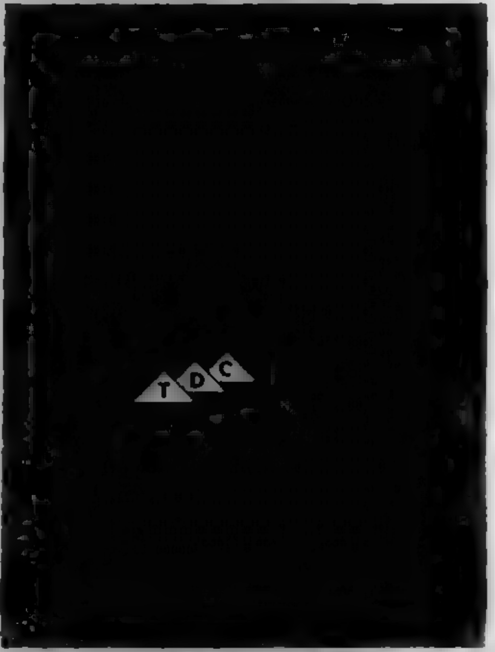

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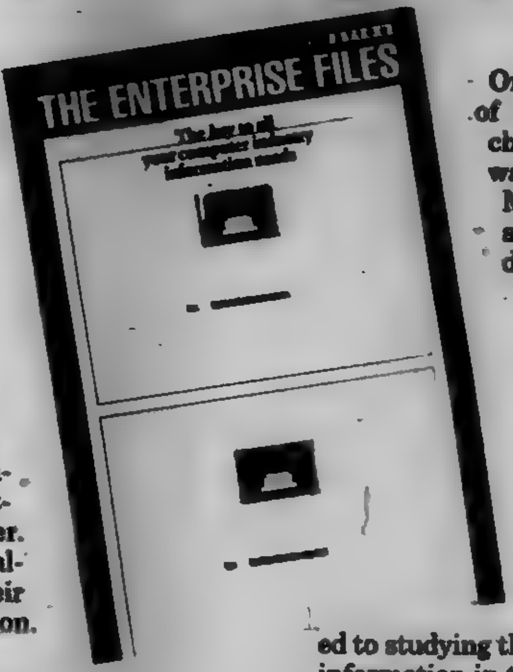

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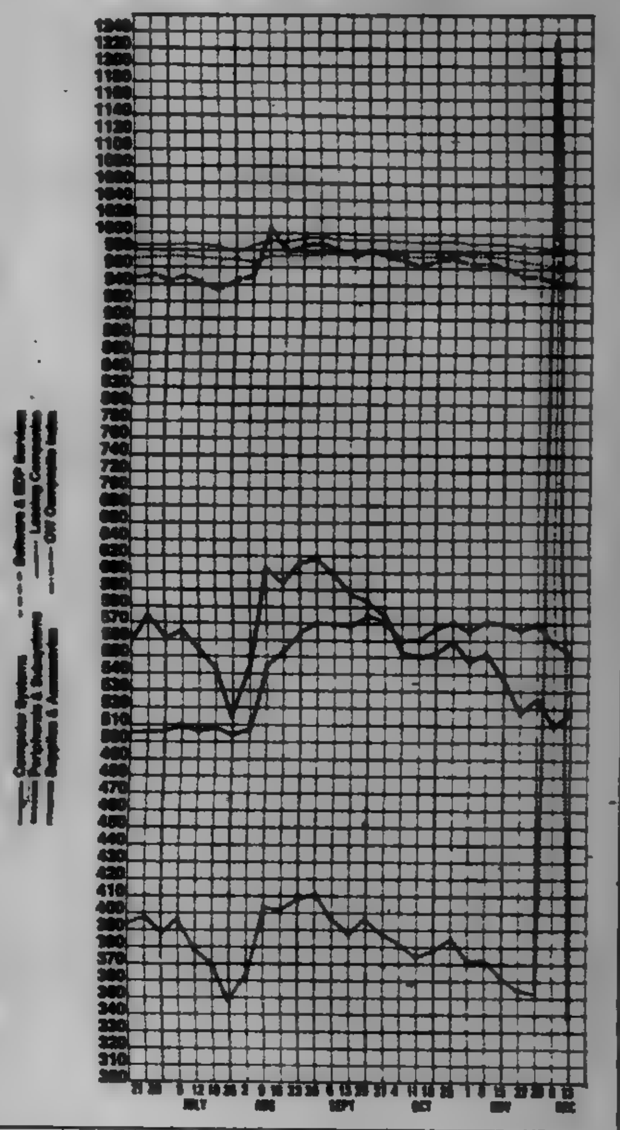
Computerworld Stock Trading Index



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CLOSING PRICES WEDNESDAY, DECEMBER 5, 1984

INVALID STOCK REPORT DUE TO MECHANICAL DIFFICULTIES

COMPUTER SYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	6- 20	9 3/4	-2 1/2	-20.7
O	ALTOS COMPUTER SYST	7- 21	7 1/8	-1 1/8	-13.6
A	AMDAHL CORP	14- 30	11 1/8	0	0.0
O	APPLE COMPUTER INC	18- 62	26 1/8	+ 1/8	+0.5
N	AT&T	15- 21	18 7/8	+ 1/8	+1.3
N	BURROUGHS CORP	44- 60	54 3/8	- 1/8	-0.4
O	COMPAQ COMPUTER CP	6- 13	6 3/4	- 3/8	-5.3
O	COMPUTER AUTOMATION	4- 17	6 3/8	- 1/8	-5.7
A	COMPUTER CONSOLES	4- 26	5 1/8	- 1/8	-2.3
N	CONTROL DATA CORP	28- 48	30	+ 3/8	+1.2
O	CONVERGENT TECHNOL	9- 41	6 3/4	-1 1/8	-14.1
N	CRAY RESEARCH INC	38- 70	60	-2 1/8	-3.4
O	DAISY SYSTEMS CORP	16- 38	26 3/4	-1 1/4	-4.4
N	DATA GENERAL CORP	37- 70	50 3/8	- 7/8	-1.6
N	DATAPOINT CORP	14- 30	17 1/2	+ 1/2	+2.9
N	DIGITAL EQUIPMENT	84-125	104 3/8	-4 1/2	-4.1
A	EECO INC	13- 16	14 5/8	+1	+7.3
N	ELECTRONIC ASSOC.	3- 15	3 1/4	- 1/8	-7.1
N	FLOATING POINT SYST	19- 46	26	+ 1/8	+1.5
N	FOXBORO	20- 47	28 3/4	- 3/8	-1.3
O	GENERAL AUTOMATION	4- 16	5 7/8	+ 3/8	+6.8
N	GOULD INC	20- 44	26 1/8	-1 3/8	-4.9
N	HARRIS CORP	23- 42	28 1/8	-1 1/4	-4.2
N	HEWLETT-PACKARD CO	31- 48	32 3/4	- 1/2	-1.5
N	HONEYWELL INC	46- 68	57	- 3/8	-0.6
N	IBM	100-134	117 7/8	-5 1/4	-4.3
O	IPL SYSTEMS INC	1- 14	1 3/8	- 1/4	-15.3
N	ITT CORP	21- 47	28 1/4	+3	+11.8
N	M/A-COM INC	13- 25	13 7/8	-2 1/8	-11.6
O	MANAGEMENT ASSIST	9- 20	17 1/2	- 1/8	-0.4
N	MATSUSHITA ELEC(ADR)	56- 68	56 3/8	-1 1/8	-1.9
O	MODULAR COMPUTER SYS	6- 14	6 1/8	- 1/8	-2.0
O	MOHAWK DATA SCI	9- 17	11 1/4	+ 1/2	+4.6
N	MOTOROLA INC	29- 48	33	+1 1/8	+3.5
N	NAT'L SEMICONDUCTOR	11- 28	11 3/8	+ 1/8	+1.0
N	NBI INC	19- 36	19 1/8	+ 1/4	+1.3
N	NCR	22- 34	23 5/8	- 1/8	-0.5
N	PERKIN-ELMER	18- 37	20 3/8	- 3/8	-1.7
N	PRIME COMPUTER INC	11- 26	15 1/4	-1	-6.1
N	SPERRY CORP	38- 50	37 1/4	- 1/8	-0.3
O	STRATUS COMPUTER INC	9- 17	9 1/8	- 1/4	-2.6
O	TANDEM COMPUTERS INC	15- 46	17 1/8	- 3/8	-2.1
N	TANDY CORP	24- 42	28 1/2	- 7/8	-2.9
O	TELEVIDEO SYSTEMS	2- 41	2 3/8	- 1/8	-5.0
O	TELXON CORP	8- 17	13	- 3/8	-2.7
N	TEXAS INSTRUMENTS	101-160	117 7/8	- 1/2	-0.4
A	ULTIMATE CORP	10- 30	16 3/8	- 3/4	-3.9
O	VECTOR GRAPHICS INC	0- 9	5/8	0	0.0
A	WANG LABS "B"	24- 40	26 1/2	- 7/8	[illegible]
A	WANG LABS "C"	24- 42	26 1/8	-1 1/8	[illegible]
N	XEROX CORP	35- 50	36 1/8	-1 7/8	[illegible]

LEASING COMPANIES

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	16- 38	[illegible]	- 3/8	-1.0
A	CHI CORP	6- [illegible]	[illegible]	- 1/8	-13.4
N	COMDISCO INC	[illegible]	[illegible]	+ 3/8	+7.0
O	CONTINENTAL INFO SYS	[illegible]	[illegible]	-1 3/8	-20.0
N	DPF INC	[illegible]	13 1/8	+ 1/8	+1.0
O	FINALCO GROUP INC	[illegible] 12	4	- 1/4	-5.9
O	PHOENIX [illegible]	6- 17	3 3/8	- 1/8	-3.6
O	SELECT[illegible]	8- 30	8 1/8	-1 3/4	-18.1
N	U.[illegible]	20- 44	24 1/8	- 3/4	-3.1

COMPONENTS

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	20- 41	28 1/8	+1 1/4	+4.6
O	ADV'D SEMICONDUCTOR	13- 30	16 3/4	- 3/8	-2.2
N	ANALOG DEVICES INC	20- 38	23 1/2	-1 1/8	-4.5
N	ANALOGIC CORP	10- 24	11 1/8	-1	-8.0
N	APPLIED MAGNETICS CP	9- 37	9	- 1/4	-2.7
O	[illegible] CORP	5- 13	5 1/4	-1 3/8	-20.6
O	MICRO MASK INC	10- 19	5 3/8	- 3/8	-6.0
N	TERADYNE	22- 40	31 7/8	-2 3/4	-11.1

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 8	2 1/8	+ 1/8	+6.0
O	ADVANCED SYSTEMS INC	13- 22	12 1/2	- 3/8	-2.9
O	AGS COMPUTERS INC	10- 20	10 3/4	+ 1/8	+1.1
O	AMERICAN SOFTWARE	18- 31	13 3/8	-1 1/8	-8.2
N	ANACOMP INC	3- 10	1 5/8	- 1/4	-13.3
O	ANALYSTS INTL CORP	3- 17	4 1/2	- 1/2	-10.0
N	APPLIED DATA RES	18- 37	23 3/8	-2 3/8	-9.4
O	ASHTON TATE	6- 13	6 1/4	- 1/2	-7.4
O	ASK COMPUTER SYSTEMS	15- 21	13 1/4	-1 3/4	-10.2
O	[illegible] COMP INC	1- 7	3 1/2	0	0.0
N	AUTOMATIC DATA PROC	30- 44	36 1/8	- 7/8	-2.4
O	COMPUTER ASSOC INT'L	15- 30	16 7/8	- 3/8	-2.1
O	COMPUTER HORIZONS	8- 20	6 1/4	+ 1/8	+2.0
O	COMPUTER NETWORK	5- 11	8 3/8	- 1/8	-1.6
N	COMPUTER SCIENCES	11- 22	19 1/8	+ 7/8	+5.0
O	COMPUTER TASK GROUP	13- 15	10 1/8	- 1/8	-1.7
O	COMPUTER USAGE	6- 10	6 3/8	- 3/8	-11.5
O	COMPUTONE SYSTEMS	6- 22	6	-1	-10.2
O	[illegible] CORP	1- 14	3 7/8	- 1/8	-3.0
O	COMSHARE	7- 14	6 1/8	0	0.0
N	CULLINET SOFTWARE	24- 50	30 3/8	-2 1/8	-7.1
O	CYCARE SYSTEMS INC	16- 25	19	- 1/4	-1.2
O	[illegible] SYSTEM INC	6- 27	7 3/8	-1 1/8	-13.8
N	GENERAL ELECTRIC CO	48- 59	54 3/8	-1 3/8	-2.1
N	GTE CORP	36- 46	38	- 3/8	[illegible]
N	INFORMATICS GENERAL	19- 32	13 7/8	+ 1/4	[illegible]
O	INFORMATION SCIENCE	6- 17	4 1/4	[illegible]	[illegible]
O	INFOTRON SYSTEMS CP	15- 43	13	[illegible]	[illegible]
O	KEANE ASSOCIATES	5- 13	8 1/2	[illegible]	[illegible]
A	LOGICON	15- 31	30	[illegible]	-4.9
O	LOTUS DEVELOPMENT CP	13- 40	22	[illegible]	-2.3
O	MCI COMMUNICATIONS	6- 30	[illegible]	- 1/8	-0.2
O	MGMT SCI AMER INC	[illegible]	[illegible]	- 1/8	-5.2
O	MATHEMATICAL APP GRP	[illegible]	[illegible]	- 1/2	-6.8
O	MICOM SYSTEMS INC	[illegible]	[illegible]	-4 3/4	-26.3
O	MICROPRO INT'L [illegible]	2- [illegible]	2 1/8	0	0.0
O	NATIONAL DAT[illegible]	[illegible] 35	9	+ 1/2	+5.0
O	ON-LINE [illegible]	9- 29	9	0	0.0
O	PANSOPH[illegible]	11- 30	13	0	0.0
N	PLA[illegible]	10- 31	11 7/8	+ 1/4	+2.1
O	[illegible] SYSTEM CP	22- 35	24 1/2	- 1/2	-2.0
O	[illegible] & SYS	4- 9	4 1/8	0	0.0
N	[illegible]OLDS & REYNOLDS	20- 33	28 1/2	-1 1/2	-4.6
N	[illegible] CORP	11- 24	12 1/4	- 3/4	-2.2
O	SHARED MEDICAL SYST	22- 42	28 7/8	- 5/8	-1.9
O	SCIENTIFIC COMPUTERS	5- 14	5 1/8	[illegible]	-2.6
O	SOFTWARE AG	8- 18	13 3/8	- 7/8	-6.1
N	[illegible] CORP	10- 20	12 1/4	- 1/8	-1.0
O	UCCEL	7- 17	11 1/2	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	2- 7	2 3/4	- 1/8	-4.3
A	ANDERSEN JACOBSON	4- 26	6	- 3/8	-13.5
O	AUTO-TROL TECHNOLOGY	6- 20	7 3/4	- 1/2	-6.0
O	AVANT-GARDE COMPUTING	15- 29	16	- 3/4	-4.4
O	BANCTEC INC	9- 22	6	- 1/2	-7.6
A	BEEHIVE INT'L	1- 11	3/8	0	0.0
O	BOLT, BERANEK & NEW	17- 30	20 7/8	+1 1/8	+5.6
O	CAMBEX CORP	1- 3	1 1/2	0	0.0
A	CENTRONICS DATA COMP	8- 28	8 3/4	- 1/2	-5.4
A	[illegible] CORP	7- 18	7	- 1/8	-1.7
A	[illegible]	6- 20	9 1/8	- 3/8	-3.6
O	COMPUGRAPHIC CORP	20- 40	26 3/8	- 3/8	[illegible]
O	COMPUTER TRANSCEIVER	1- 10	1/2	[illegible]	[illegible]
N	COMPUTERVISION CORP	28- 53	36 1/8	[illegible]	[illegible]
N	CONRAC CORP	13- 28	[illegible]	[illegible]	-0.9
A	DATAPRODUCTS CORP	16- 30	[illegible]	[illegible]	-4.3
A	DATARAM CORP	6- 13	[illegible]	- 3/8	-8.3
O	DATA SWITCH CORP	9- [illegible]	[illegible]	- 1/8	[illegible]
O	DATUM INC	[illegible]	[illegible]	- 3/4	-11.7
O	DECISION DATA COMPUT	[illegible]	[illegible]	- 1/8	-5.3
O	DOCUTEL-OLIVETTI	[illegible]	3 1/2	- 7/8	-20.0
N	ELECTRONIC M[illegible]	[illegible] 12	6 3/8	-1	-17.3
O	[illegible]	7- 16	7	- 1/4	-3.0
O	[illegible]	10- 30	12 1/8	- 3/8	-0.7
O	[illegible]	9- 18	10	-2 3/8	[illegible]
O	[illegible] IND	10- 30	13 3/8	- 1/8	-0.9
O	[illegible] CORP	10- 30	20 7/8	-1 1/8	-3.7
O	[illegible]	3- 9	4 1/4	+ 3/8	+9.1
O	INFORMATION INTL INC	10- 20	11 3/4	0	0.0
O	[illegible] INC	7- 21	8 3/4	0	0.0
O	[illegible] CORP	27- 40	28 1/4	0	0.0
A	LUNDY ELECTRONICS	7- 19	10 3/8	0	0.0
O	[illegible]DATA CORP	6- 15	11 1/8	- 3/8	-4.7
A	[illegible] DATA CORP	9- 25	12 3/8	+ 1/8	-2.5
O	[illegible] CORP	19- 30	30	+ 1/8	+0.4
O	NETWORK SYSTEMS CORP	14- 34	19 7/8	-3 3/8	-13.4
N	NO AMERICAN PHILIPS	30- 40	37 1/4	-2 3/4	-6.8
N	NORTHERN TELECOM LTD	30- 40	30 3/8	-2 1/4	-6.1
N	[illegible]	1- 5	1/8	0	0.0
N	PARADYNE CORP	11- 36	11 7/8	+ 3/8	-3.0
A	PENRIL CORP	9- 16	11	- 3/8	-3.3
N	PLESSEY CO (ADR)	24- 41	36 1/2	+ 3/8	+1.1
O	PRINTRONIX INC	12- 36	13 1/4	- 3/8	-1.3
O	RAMTEK CORP	4- 13	4 1/8	- 1/8	-3.0
N	RECOGNITION EQUIP	10- 17	11 1/4	0	0.0
N	SANDERS ASSOCIATES	30-100	37 3/8	-1	-1.3
O	SCAN DATA	1- 3	1/4	0	0.0
O	SCAN-TRON CORP	9- 19	13	+ 1/8	+1.1
N	SCIENTIFIC ATLANTA	9- 22	10 1/8	+ 3/4	+7.0
O	SEAGATE TECHNOLOGY	4- 30	4 1/2	+ 3/8	+9.0
N	STORAGE TECHNOLOGY	2- 30	2 3/4	+ 3/8	+12.0
O	SYKES DATATRONICS	1- 13	1 1/8	-1 1/8	-37.1
O	SYSTEMS & COMP TECH	16- 30	13 3/4	-4	-20.6
A	T BAR INC	7- 17	7 1/4	+ 3/4	+11.3
A	TAB PRODUCTS CO	13- 20	17 1/4	- 3/8	-2.1
O	TANDON CORP	6- 35	5 3/4	- 7/8	-13.3
A	TEC INC	6- 12	8 1/4	- 1/8	-1.8
N	TEKTRONIX INC	53- 67	58 3/8	-2 1/8	-4.1
N	TELEX	15- 35	60	- 1/4	-0.7
O	[illegible] SYSTEMS CP	2- 17	2 3/4	+ 1/4	+10.0
O	TIMEPLEX INC	13- 29	17 3/8	-1 3/8	-7.3
O	VISUAL TECHNOLOGY	2- 36	3 3/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1983-84 RANGE (1)	CLOSE DEC 5 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODUCTS	17- 28	20 7/8	- 1/8	-0.5
N	BARRY WRIGHT	22- 30	22 1/8	- 1/8	-0.5
A	DUPLEX PRODUCTS INC	22- 37	26 1/8	+ 1/2	+1.9
N	ENNIS BUS. FORMS	19- 28	23 7/8	+ 3/8	+1.3
N	3M COMPANY	69- 90	78 3/8	-2 7/8	-3.3
N	MOORE CORP LTD	26- 31	28 3/8	-1 7/8	-6.1
O	STANDARD REGISTER	27- 40	41	- 3/8	-0.7
N	WALLACE [illegible]	20- 30	30 1/8	- 3/8	-1.6

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And checking it twice

System upgrades, integration of micros, quality personnel top DP execs' wish lists

By John Gallant
CW Staff

'Twas the night before Christmas
And all through the shop,
The systems were whirring
Production couldn't stop.
The stockings were hung on the mainframe with care,
In hopes that St. Nicholas soon would be there.

Ho! Ho! Ho! You there, you look like a DP manager, climb up on jolly old Santa's knee. Have you been good this year? Have you kept downtime to a minimum? Did you address that applications backlog? Did you maintain data integrity in the face of growing microcomputer use? Good. Now, tell Santa what you would like for Christmas.

Well . . . how about a bigger and faster CPU, Santa? "For my Christmas present, I would like a machine that we could never outgrow," said Donald Sitter, director of information services for Lyons Transport Lines, Inc. in Erie, Pa. "It seems that every time I turn around, we need a bigger or faster piece of equipment. We always need something more. I would like to have a machine that has a little dial on it that I could turn to make it bigger or to make it run faster."

Me too, Santa. "I would love to climb up on Santa's knee and ask for an upgrade to my CPU," laughed George Reid, DP manager for Safeway Stores, Inc. in Salt Lake City. "I would like to upgrade from our [IBM] 4331 Model Group 2 to a 4361. We are bringing our system right down to its knees with our current applications. We have got to improve our response time, too."

See SANTA page 13

TOP OF THE NEWS

Few companies do in-depth cost justification for micros, but those that do, keep the task simple. **Page 2.**

■

They like it. An early user of Software Arts, Inc.'s Spotlight said the product beats the current best-selling desktop management software. **Page 6.**

■

GTE Telenet Communications Corp. will link its Telemail system to telex machines worldwide. The company will also push the X.400 standard for connection to foreign public electronic mail services. **Page 7.**

Judge Harold Greene has approved the regional holding companies' request to enter businesses outside their regulated phone services. **Page 15.**

■

Bustin' out bit by bit. An inmate at a Silicon Valley jail nearly flew the coop by altering his own release date on the prison's computer. **Page 16.**

■

Infotron Systems Corp. unveiled a voice/data multiplexer that integrates with the company's IS4000 Intelligent Switching System. **Page 39.**

■

Wang beefs up mid-range line with VS 65 mini

Firm targets 32-bit unit at IBM System/36 market

By John Desmond
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. last week added to its mid-range VS office system product line by announcing the VS 65 minicomputer system featuring a 32-bit data path, capable of supporting up to 30 users and field-upgradeable from the low-end, 16-bit VS 15.

The company also announced that it is no longer actively marketing the VS 25 and VS 45 16-bit minis, leaving the VS 65 positioned between the VS 15 and the VS 85 in Wang's VS series.

The VS 65 features a proprietary CPU using parallel architecture, a 16K-byte, high-speed cache memory and up to 4M bytes of main memory. The VS 65's 32-bit CPU features a 200-nsec maximum instruction cycle time, compared with a 600-nsec maximum cycle time on the VS 15 and a 160-nsec maximum cycle time on the VS 85, a Wang spokesman said. I/O processing is off-loaded to an Intel Corp. 80286 microprocessor and updated from an Intel 8086 I/O processor on the VS 15, VS 25 and VS 45, said John Deutsch, marketing manager for VS products at Wang.

The VS 65 runs the VS operating system and supports industry-standard protocols, including asynchronous, synchronous, binary synchronous, X.25 and IBM's Systems Network Architecture/Synchronous Data Link Control, the company said. The VS 65 can also be linked to other VS systems and to Wang Professional Computers. The product is compatible with other VS systems and hosts in a distribut-

See WANG page 12

FYI

DP at the top of the world

By Donna Raimondi
CW Staff

Santa Claus' seemingly miraculous one-day toy drop to children around the world would be impossible without superb communications, computer facilities and lots of helpers — and finding these things in the frozen North is not always easy.

The biggest communications problem in that icy region north of the Arctic Circle is access to equipment locations, according to Jim Chatleain, Anchorage, Alaska-based sales representative for Alaskanet — Alascom, Inc.'s packet-switching network. There are no telephone lines north of Fairbanks, Alaska, and equipment cannot be accessed by road, Chatleain said. Any construction or computer equipment repair in remote places means flying in a crew.

Alascom launched Aurora, its own communications satellite, in 1982 and uses more than 170 earth stations to provide telephone service and data communications for small villages, government agencies and the oil companies that work the oil fields of Northern Alaska, Chatleain said. Small portable earth stations sit on the decks of oil rigs anchored in the sea.

Storms and snow threaten the equipment, so the larger, heated stations are cleaned off regularly, Chatleain said.

Villagers are hired to maintain the generators of the unmanned earth stations.

Computers for the Arctic Circle — airfreighted to their destinations —

See ARCTIC page 16

Photo by [illegible]

Bowling 'em over

The Boston College Eagles, led by Doug Flutie, are among the college football powers using computers to get an edge on the opposition. See story page 4.

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NEWSPAPER

Firms warned on 'intuitive' micro purchase decisions

Difficulty of factoring benefits hampers efforts at cost justification despite rising costs

By Eric Bender
CW Staff

At the Bank of Boston, "one of the major factors in the success of the personal computer was that it was free of charge to users," systems officer Vic Tine commented recently at a meeting sponsored by the Ledgeway Group market research firm of Lexington, Mass. In the early days, the bank's systems people told users, " 'We'll help you to do everything, and it won't cost you a nickel,' " Tine said. "We didn't try to cost-justify any of these things."

Today, a corporate personal computer bill may easily run into tens of millions of dollars, and users get their chance to foot the bill, but cost justification typically remains an inexact and limited process.

"Most people are buying micros for applications they intuitively believe in," noted Stephen Caswell, analyst with the consulting firm of Trigon Systems Group in Toronto. "If you're using a spreadsheet and doing things you never did before, what's the way to figure the benefits? What's the value of better decisions?" Caswell also said that the price of cost justification itself is substantial.

"The benefits are intuitively obvious," agreed Warren Kress, micro manager of the information center at Volkswagen of America, Inc. in Warren, Mich. "When you get to the point of measuring the secretarial hours and the executive hours saved on each machine, it's just ridiculous."

However, Peter Keen, consultant with Informational Technology Services, a consulting firm in Newton, Mass., said that companies should try to get a handle on the benefits. "We've gone through the seeding of these things; now companies have to see what benefits we've gotten," he said.

While some benefits clearly cannot be pinpointed, it makes sense for companies to list them and to examine those for which estimates can be assigned, Keen said. He noted that one of his clients set up a benefit-tracking questionnaire with nine categories: work eliminated, costs avoided, return on time, improved decision making, improved services, competitive edge, quality of work life, spinoffs and other.

> ***Many firms do not bother to cost-justify additional micros, while those that do keep cost justification relatively simple.***

Keen disagreed with the common view that buying microcomputers should not require any more justification than buying a telephone, pointing out that the micro purchase quickly brings up system decisions. "It's more like buying a [private branch exchange] than a telephone," he said.

Despite these concerns, many firms do not bother to cost-justify additional micros, while others keep it relatively simple, DP managers said.

In one typical response, Glen Fund, manager of end-user computing at GCA Corp. in Burlington, Mass., said he takes a hard look at the user's initial request for a system, but there is no specific formula.

"I want to see that they've given it some thought, that they're not just getting one because their neighbor's getting a machine," Fund said. Once the system is approved, users are past the hurdle and can get software relatively easily, according to Fund.

"Some people have to do a lot [of justification], some do not," said Andrew Langlois, assistant controller at Moore McCormack Resources, Inc. of Stamford, Conn. "We ask people to bring their ideas to our MIS group, first to see if they can do it with existing tools, and second to see if they can work with existing micros and users to build a tiny prototype, analogous to the classical feasibility study.

"Once beyond that, the guy has to complete an economic justification case," Langlois said. "A typical configuration costs $4,200 to $4,500 with a printer, extra memory and so on. We have to look at savings enough to pay for that in a couple of years or [the potential for] a sufficient competitive edge in the business."

Ken Sullivan, product marketing manager at Wang Laboratories, Inc. in Lowell, Mass., pointed to the personal computer's role in reducing DP backlogs and said, "I don't think a lot of hard justification has been necessary." However, he acknowledged that the micro situation is unusual in corporate purchasing. "Sometimes it seems totally against what I call industrial purchasing policy, but in the case of new technology, a consumer mentality has seemed to pervade the organization," he commented.

Some firms have taken a hard line that requires demonstrable cost avoidance, noted George Colony, president of Forrester Research, a consulting firm in Cambridge, Mass. "In one company growing at 40% per year, to get a micro you had to sign a paper saying, 'I will hire less than 40% additional people,' " Colony said. "But that doesn't really work indefinitely."

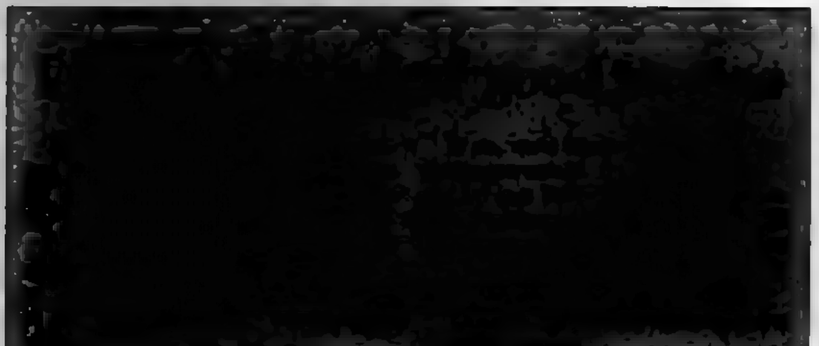
Court OKs STC finance plan

DENVER — Storage Technology Corp. (STC) received authorization last week from a bankruptcy court here to utilize up to $140 million in cash and receivables of its wholly owned subsidiary, Storage Technology Finance Corp. The plan will allow STC to tap a source of funds worth an estimated $80 million to continue operations while undergoing reorganization under Chapter 11 of the U.S. Bankruptcy Act.

A similar plan turned down a week earlier would have given superpriority creditor status to a consortium of banks that had loaned money to the subsidiary. That plan would have placed them ahead of all other unsecured creditors for claims to the parent company's assets.

According to a company spokesman, the approved plan provides "no real superpriority status." Many of the creditors of the subsidiary are also unsecured creditors of the parent company.

Following approval of the plan, Thomas F. Wands, STC's president and chief executive officer, said, "It will help overcome the concern of our customers and employees about the viability of [STC], and second, it will permit the company to move forward with its reorganization."



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CORRECTIONS

In the Nov. 19 industry spotlight report on the computer leasing industry, CMI Corp. was incorrectly identified as a Minnesota-based firm. CMI is based in Bloomfield Hills, Mich.

Fujitsu Ltd.'s FM-16 Beta personal computer is based on Intel Corp.'s 80186 microprocessor, not a Motorola, Inc. microprocessor as previously reported.

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Systems worth extra points to college football powers

By Paul Korzeniowski
CW Staff

The pot of gold at the end of a college football team's rainbow is a victory in a bowl game. During the holiday season, 34 teams will vie for gold in 17 contests.

Because these games feature the nation's best teams, the difference between victory and defeat is often miniscule. Last year, the national championship was decided when Florida's University of Miami defeated the University of Nebraska by one point in the Orange Bowl.

With the margin of victory so slight, teams' search for anything that will give them an advantage over their opponents. In some cases, computers help provide the desired edge. "Computers help a coach determine what an opponent will do in a certain situation," noted William Hemingway, a graduate-assistant football coach at Oklahoma State University. "That knowledge translates into a significant advantage in a game."

Computers have joined weight training facilities and practice fields as necessary tools for most collegiate football teams. "I would say that close to 90% of the collegiate football teams use computers in some way," said Wayne Hall, defensive line coach at Auburn University in Alabama.

Brian O'Connor, part-time scout for Boston College (BC), noted that computers provide two benefits: time savings and confidence in information. "With a computer, a coach doesn't have to sit, watch films and tabulate the number of times a team runs a certain play," the scout noted. "A report can produce that information."

Hemingway added, "Our computer saves our staff at least 24 hours each week. That additional time is a godsend."

More reliable than a coach's perception

In addition to saving time, a computer provides reliable information. A computer report that states that a team will pass 60% of the time in a certain situation is more reliable than a coach's perception of what the opponent will do, according to O'Connor, who helped design a package for BC's team that runs on the college's IBM 4341 mainframe.

Rather than designing its own package, Auburn is one of three bowl-bound teams running Sports Pac, a sports package from MDS Quantel Corp. in Hayward, Calif. Sports Pac runs on an MDS minicomputer and automates collegiate athletic department or professional sports team functions.

Hall's interest lies in Sport Pac's game preparation module, which was originally designed for the Tampa Bay Buccaneers in 1977. The first step in Auburn's use of that module requires two Auburn graduate-assistant coaches: One works a projector that shows film of the other team's games; a second enters data into the MDS system. "We enter data such as what yard line the team is on, what formation they line up in, where the hash mark is, what play they call and how many yards they gain or lose," the defensive coordinator said.

Once the information is entered, Hall can choose from approximately 250 reports the system produces. The reports tabulate what the opponent has done in previous games. "We are interested in learning the opposition's offensive tendencies," he noted. "For example, they may run to their left on third and two 80% of the time."

Then Hall and the other defensive coaches devise a plan to counter these tendencies. "If they consistently run to their left on third and two, we may decide to shift our defense that way," Hall explained.

While Hall uses the computer to monitor the other team's offense, the opponent can use a computer to mask its intentions. "A report may point to a tendency," said Ed Zaunbrecher, offense coordinator at Louisiana State University. "We then have two choices. If a play has proven to be successful, we can run it until a defense stops us. Or we may fake the play and try to fool the defense."

The guessing game progresses during the match. "We chart plays during a game and determine if the offense has made any adjustments," Hall said. "Sometimes there is more time to prepare for a game. There may be a week or two between games or before a bowl game. Then, teams are better able to mask tendencies, which makes my job more difficult."

Hall has worked with computer scouting systems since he was a graduate assistant at the University of Alabama 12 years ago. "Most systems are tied to a university mainframe," the coach said. "The team depends on someone else to run a program and produce a report. We do not share our system with any department. With 80,000 people sitting in the stands and a national television audience, it is obvious to a lot of people when we have prepared our team. We don't want to fail because the computer was down. In another department, employees may lose track of a few thousand dollars. But they will find it. Once we lose a football game, we can't get it back again."

Exec micro use on upswing

Survey finds young professionals leading the way in personal computer use

PARSIPPANY, N.J. — Executives are rapidly taking to the personal computer, and the younger the executive, the more likely he is to use a microcomputer in his office or at home.

A survey conducted by Trinet, Inc. — a subsidiary of Control Data Corp. — revealed that 35% of the 100 corporate executives surveyed use personal computers when making critical business decisions, up from 8% two years ago. About a quarter of the respondents use personal computers at home.

About half of the executives under 50 have adopted micros, compared with one-fifth of those over 50.

The survey was conducted among 100 corporate executives, each of whom is one of the top five officers in a Fortune 500 company.

Three-quarters of the respondents who use computers have done so for two years or less. About half of the executives under 50 years of age have adopted microcomputers, compared with one-fifth of those over 50. The younger group (under 50) comprised 47% of the sample.

Fifty-eight percent of each age group employs computers for financial analysis, the survey revealed, but there are differences in the way each age group uses microcomputers for other tasks.

Older respondents turn to microcomputers more often for support decisions. These include:

- Long-range planning — over 50, 45%; under 50, 21%.
- Personnel — over 50, 33%; under 50, 8%.
- Public affairs — over 50, 25%; under 50, 17%.

Younger microcomputer users focus their skills on:

- Budget planning — under 50, 54%; over 50, 47%.
- Market intelligence — under 50, 38%; over 50, 25%.

Personal computer users are far more likely than nonusers to take advantage of available information capabilities, the survey showed. Computer users more frequently access:

- On-line company data bases. These are accessed daily by 15% of users as opposed to 5% of nonusers and several times a week by 45% of users as opposed to 13% of nonusers.
- External data bases. These are accessed daily by 12% of users as opposed to 5% of nonusers and accessed several times a week by 33% of users as opposed to 11% of nonusers.
- Electronic mail. This is accessed daily by 23% of users as opposed to 3% of nonusers and accessed several times a week by 29% of users as opposed to 16% of nonusers.

The price of the survey is $295.

More information is available from Trinet, Marketing Department, 9 Campus Drive, Parsippany, N.J. 07054.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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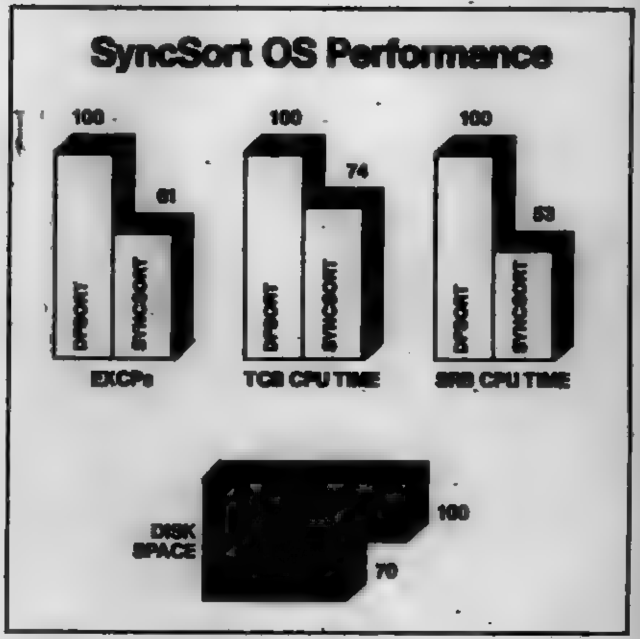

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Early user finds Spotlight outshines Sidekick

Software Arts desktop management package said to run easier than best-seller

By Paul Korzeniowski
CW Staff

DETROIT — The Pontiac Division of General Motors Corp., an early user of Software Arts, Inc.'s Spotlight, a desktop management package for the IBM Personal Computer, compared Spotlight with the best-selling desktop manager, Borland International, Inc.'s Sidekick, and decided that Spotlight was a better product.

"Some of our applications had trouble working with Sidekick," said Alan L. Fox, senior systems analyst at the Pontiac Division. "Programs would either not run, or error messages would appear. We could not determine why that occurred."

Spotlight, announced in October, offers five desktop management functions:

- Appointment book.
- On-screen calculator.
- Telephone listing.
- DOS filer.
- Notepad.

The package is not designed as a stand-alone application. Rather, it resides in a portion of random-access memory (RAM) that an application program does not use. This allows a user to work with a data base management or spreadsheet package.

While working with the application, users who require a Spotlight function can reportedly call Spotlight by pressing one key. After using that function, users can again press one key and return to the original application.

Although desktop management packages are relatively new, Fox said he believes they fill an important function. "Desktop managers are just as important as spreadsheets or word processors," Fox said. "Since they offer a number of facilities, they fill at least one need for every user. We think they are a vital part of the workstation."

Fox reported that users quickly understand how to operate Spotlight. "Before we give our users workstations, we hold tutorials for the various packages," he said. "Users can be working with Spotlight after only an hour of instruction."

However, the systems analyst listed a number of drawbacks to the desktop manager. "The user should be able to change the color scheme," he said. "For example, a user may set packages so they produce white letters on a blue screen. With Spotlight, he is unable to make this setting."

> *'Desktop managers are just as important as spreadsheets or word processors. Since they offer a number of facilities, they fill at least one need for every user. We think they are a vital part of the workstation.'*
>
> — Alan L. Fox, senior systems analyst, GM Pontiac Division

Another limitation was with the calculator that engineers require. "We would also like to use floating-point decimals with the calculator," Fox noted. "It is also difficult to work with the calculator because it takes up half a screen. Often, the user is unable to see the data he wants to calculate."

Software Arts has been responsive to the package's limitations. Lack of an automatic telephone dialer, for example, was rectified in the latest release of the program. "[Software Arts] has listened to our complaints and claims to be willing to solve them," he said.

Spotlight is part of a prototype engineering workstation that the Pontiac Division is designing. Currently, 12 workers are testing the workstation, which consists of an IBM Personal Computer XT with 640K bytes of RAM, an integrated operating environment that GM developed and a slew of software packages including the following:

- Lotus Development Corp.'s 1-2-3.
- Lifetree Software, Inc.'s Volkswriter Deluxe, a word processing package.
- A scientific version of Volkswriter Deluxe.
- Softcorp, Inc.'s Project Six.
- Funk Software, Inc.'s Sideways.
- Software Arts, Inc.'s TK Solver.
- Forte Co.'s 3279 terminal emulation package.
- IBM's Word Proof spelling checker.
- Rogue River Software, Inc.'s SPF PC.
- Ashton-Tate's dBase II.
- Hayes Microcomputer Products, Inc.'s Smartcom.

"We chose a number of packages so that the workstation could meet the wide range of our users' needs," Fox said.

The number of GM users who will work with Spotlight depends on the success of the prototype workstation. "There are 12 users in a pilot system right now," Fox said. "We soon plan to expand that to 40 users. If the expansion is successful, the number could grow to 200 or 300 in our division. We are just one division in GM; if other divisions adopt the workstation, there could be thousands of users."

Computer Fat is everywhere.

LOOK FOR IT JANUARY 14th.

IBM slows production of AT; unable to fill first-quarter orders

BOCA RATON, Fla. — IBM has slowed production of the enhanced version of its Personal Computer AT and rescheduled deliveries for that model, the company's Entry Systems Division acknowledged last week.

"IBM is unable to fill all of its orders through the first quarter of 1985," a spokesman said.

Major accounts placing new orders for the enhanced AT may have to wait up to nine months, he noted. IBM expected to announce an overall delivery schedule for final 1984 and early 1985 shipments last Friday.

The enhanced model adds a 20M-byte hard disk drive and more memory to the basic AT. The spokesman attributed the production slowdown to shortages of key components, including the hard disk drive. Despite some user reports of difficulties with that drive, he said that "there are no problems with the systems that we have shipped."

Strong demand for the enhanced AT, which "has far exceeded IBM's expectations," was the other factor that made rescheduling a necessity, he commented. ATs have been in short supply since shipments began [CW, Dec. 17].

Stand-alone systems

Both basic and enhanced ATs have been sold, so far, as stand-alone systems.

The hard disk drive is a prerequisite for the AT to act as a multiuser system (under IBM's PC Xenix) or as the file server for IBM's PC Network. PC Xenix and the PC Network Program will be available in the first quarter of 1985, according to IBM.

Overall AT production is on the upswing, as IBM is boosting production of the basic AT, the spokesman added.

Computer coordinators form group

EUGENE, Ore. — A Special Interest Group for Computer Coordinators (SIGCC) has been established as the first SIG of the International Council for Computers in Education (ICCE).

The SIGCC's membership will be composed of those coordinating use of personal computers in either a school building, school district or a county. The SIG, according to the ICCE, will be used to clarify the role of computer coordinators, promote cohesiveness among them and provide a forum for sharing information.

SIGCC membership is priced at $10 for ICCE members in the U.S. and $17 for non-ICCE members outside the U.S. The ICCE is located at the University of Oregon, 1787 Agate St., Eugene, Ore. 97403.

Telenet links Telemail worldwide, backs X.400 standard

WASHINGTON, D.C. — GTE Telenet Communications Corp. announced last week that subscribers to its Telemail electronic messaging services will be able to carry on two-way communications with the large installed base of telex users worldwide.

Telenet also announced that it will promote the recently adopted worldwide X.400 standard for establishing connections between private electronic message systems and its Telenet network, as well as to link Telenet to foreign public message systems.

Telenet President J. David Hann said that Telenet was seeking to position the company as a major supplier of complete electronic messaging systems.

Telenet said it would allow Telemail users, who, Telenet said, comprise an estimated 20% to 25% of electronic mail users in the U.S., to produce hard-copy letters with company letterheads, logos and signatures that will be delivered with the aid of the U.S. Postal Service on a next-day basis.

This service, called Telemail-Xpress, will have two options: high-quality business letters for same-day delivery and inexpensive next-day delivery. A Telemail-Xpress letter will cost an average $2 to $5, and the service will be available in the first quarter of 1985.

Telenet said that the Telemail-telex interconnection arrangement will permit 1.5 million telex machines worldwide to interface with the electronic mail system in a two-way communications mode. Hann predicted that while the telex market will continue to grow in the future, it will slowly convert to the use of electronic terminals. The international Telemail-telex communications link will be available in the first quarter of 1985.

Hann said that the principal marketing thrust Telenet will adopt for its Telemail subscribers will be interconnecting the Telenet network with foreign public electronic message systems to allow terminal-to-terminal communications. Hann said that Telenet currently has not reached agreements with any foreign postal telephone or telegraph authority.

GTE Corp. operates overseas telephone and data communications services as an international record carrier and currently has operating agreements with 10 foreign countries, mostly located in Europe.

However, Hann said that Telenet is not planning to solicit private intracompany electronic mail systems actively for connection to the Telemail system unless those systems adopt the international X.400 standard, which conforms to the sixth and seventh levels of the International Standards Organization's Open System Interconnect model.

In this connection, Joseph J. Porfeili, vice-president and general manager of Telenet network applications and terminals, said Telenet had signed with Telecom Canada to interconnect its Canadian Envoy 100 system with Telenet using the X.400 interface.

Until now, Telemail users in foreign countries have communicated via their own public packet-switched network to Telenet's Telemail system. The new capability, which will be available in the second quarter of 1985, will permit direct Telemail system access from one country to another, as though the user was making a local Telemail call in one country.

George Lieb, Telenet's director of electronic messaging services, said that Telenet has no immediate plans to pursue proprietary computer-to-computer applications, such as that recently announced by General Electric Information Services Co. [CW, Dec. 18]. "I believe that third-party manufacturers will develop interfaces from an IBM, a [Digital Equipment Corp.] or a [Wang Laboratories, Inc.] environment that implement the X.400 standard," Lieb said.

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AUDITOR'S REPORT

We have examined the Datasouth TX-5180 and found its features and characteristics exceed accepted expectations for IBM 34/36/38 printers. A partial list follows.

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☐ 180 cps bidirectional printing
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Presidential libraries induct minis in automation project

Systems to provide administrative support initially, to aid research efforts eventually

By John Desmond
CW Staff

WASHINGTON, D.C. — What do Herbert J. Hoover, Franklin D. Roosevelt, Harry S. Truman, Dwight D. Eisenhower, John F. Kennedy, Lyndon B. Johnson and Gerald R. Ford have in common besides having been U.S. presidents?

Each has a presidential library that is about to become automated.

Each presidential library is now installing a Datapoint Corp. 8645 minicomputer, which is based on the Intel Corp. 8086 microprocessor and which runs the RMS operating system. Libraries are also installing Datapoint 8220 terminals and printers, to be used for office automation initially and later for access to a data base to aid research.

At the outset, the Datapoint system will be used to handle administrative work, including word processing and spreadsheet analysis. Tom Soapes, archivist for programs and policy with the Office of the Presidential Libraries here, which is part of the National Archives office, said Datapoint was chosen because the National Archives head office uses Datapoint equipment and because the libraries' management teams were impressed with the company's Arc local-area network. Each library will start off with 512K bytes of main memory and 20M to 40M bytes of hard-disk storage, Soapes said.

Software

Software will include Datapoint's Vista package for word processing and Microsoft Corp.'s Multiplan for spreadsheets.

The libraries are spending $300,000 on hardware in the first phase of automation, after spending $140,000 for an initial study and $100,000 for a system design, according to a consultant for the automation project.

Consultant William Yoder of American Management Systems, Inc. of McLean, Va., described the presidential library automation as "the first top-down analysis and design ever done for a major archival institution." Previous attempts have involved trying to fit software developed for libraries to the needs of an archive, which has a different cataloging system and no circulation. "The main reason it hasn't been done before is because archives don't have much money," Yoder said.

CW photo by J. Desmond
Boston's JFK Library

The presidential library system houses more than 200 million pages, with from six million to 45 million pages in each library. The material includes 147 million pages of personal papers and 11 million pages of federal records.

In addition to the seven libraries, the Presidential Libraries office has the papers of former Presidents Richard M. Nixon and Jimmy Carter. Nixon has 48 million papers now being kept by the Nixon Material Project in Alexandria, Va., and the Carter library is under construction.

The libraries' primary clients are history scholars who research broad topics for doctoral dissertations, master's theses and books.

'Pivotal thrust'

Soapes said the arrival of Datapoint equipment "is just an initial shipment to get some sort of automation into the libraries."

In the second phase, the presidential libraries plan to bring up a data base management system for archival processing and references. "This is the pivotal thrust of our move into automation," Soapes said.

Material is now manually controlled at the "folder-title level," Soapes said.

After processing, the material is put into file folders that are stored in special boxes called Hollinger boxes. Lists are made of the folder titles. Manual control is the only control at present.

"We have a large search requirement, and all of our reference work is done manually by reading through these folders," Soapes said. He added that 25% to 30% of the staff's time is spent handling research requests.

"If we can automate it, we project important savings in productivity."

Yoder is now designing a nine-level hierarchical data base that will index the vast collections, many of which are quite detailed.

'Regarding Cuban situation'

For example, among collections at the Kennedy Library in Boston are files of the former president's doodles.

The doodles are filed in chronological order by number with a description of the setting.

In 1961, doodle descriptions included: "on envelope of letter from Robert Kennedy," "concerning faulty clock" and "regarding Cuban situation."

Robert Humphreys' papers

In another example, the Eisenhower Library has several files with the papers of Robert Humphreys, former Eisenhower public relations and Republican National Committee campaign officer. Titles include: "1956 Republican National Committee vote-producing decisions" and "1958 Republican National Committee campaign school — speeches."

"We're building a system that would allow this information to be put on-line and searched," Yoder said.

A vendor for the second phase has not yet been selected. Soapes said a decision will not be made until the data base software is more fully developed.

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Articles only [illegible] six typed, double-spaced pages.

Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include both a brief biography and a telephone number at which they can be reached.

If you have a story you would like to tell, an issue you would like to speak on or any questions, contact Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Info/Central set for Feb.20-22

LOS ANGELES — Candle Corp., a manufacturer of performance-monitoring software, has announced that its user conference is scheduled from Feb. 21 to 22 at the Sheraton Plaza [illegible] here.

The theme of the conference is "Managing the Changing Data Processing Environment." Terrence E. Deal, coauthor of "Corporate Cultures," plans to speak on the topic of data processing and corporate culture in the 1980s. Other scheduled topics include technology discussions, user experiences in problem solving and system tuning techniques and product overviews.

The prepaid registration fee is $290, and people registering at the door will be charged $350.

More information is available from Candle, headquartered at Suite 2404, 10880 Wilshire Blvd., Los Angeles, Calif. 90024.

JFK Library [illegible] set to transfer tasks from [illegible] to mini system

By John Desmond
CW Staff

BOSTON — Before the John F. Kennedy Library here had its Datapoint Corp. minicomputer and terminals delivered, two members of the library staff were making use of two personally owned micros.

Librarian [illegible] was using a Kaypro Corp. micro to do research statistics and monthly archive summaries, and supervisory archivist Megan Desnoyers was using an IBM Personal Computer for word processing.

The Kennedy library has 28 million pages in more than one million file folders. The library has processed 5,500 research requests since it opened in 1968. Each month, reports are made on the number of people who did research, the number of visits per person and the backgrounds of the researchers. The Kaypro has been helping with those reports. On her Personal Computer, Desnoyers put together a transcript of a recently released tape recording made by former President John F. Kennedy while in office.

Chief archivist William Johnson said he understands that [illegible] the Jimmy Carter and Gerald R. Ford libraries [illegible] personally owned [illegible]. "People get tired of waiting for a system when their own microcomputer can do the work," he said.

From her exposure to computer capabilities, Desnoyers has plenty of ideas for how to use the Datapoint system now being installed in all seven presidential libraries. The Kennedy library has 1,300 oral history interviews, 800 of which have been processed and can be used by researchers and 500 of which have been transcribed but not yet processed. In the past, an interview was transcribed into 35 to 40 pages of text. An editor read the text and made corrections while listening to the original. A copy was sent to the person interviewed for more corrections, and a final copy was typed by the library staff in an extremely tedious manual process.

Other potential applications include an index of photographs, which are now listed [illegible], and an index to the subject files, which is [illegible].

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[illegible]

Computerized kiosk offers gift suggestions to shoppers

By Edward Warner
CW Staff

DEARBORN, Mich. — Step aside Santa. A nine-foot, computerized kiosk at a shopping mall here has helped customers find the right present for each person on their Christmas shopping lists, all without regard to whether the recipient has been naughty or nice.

The Touch 'n' Choose kiosk, developed by AT&T Consumer Products group and installed in a pilot project at 19 U.S. shopping malls operated by the Taubman Co. of Troy, Mich., is based on an AT&T 6300 personal computer with a 19-in. touch-screen display. Customers press the appropriate responses on the screen to questions about their price range and the age, sex and lifestyle of the person for whom they are shopping. The black and chrome kiosk responds with from six to 40 gift suggestions, displayed on the monitor in color.

The Touch 'n' Choose monitor displays from six to 40 gift suggestions in color.

Using software developed for the application by AT&T, the kiosk at the Fairlane Town Center mall here evaluated the shoppers' responses against a list of 1,500 to 2,000 different potential gifts from the mall's 200 stores. Pictures of the gifts are stored on a videodisk player in the kiosk and are called up by Touch 'n' Choose during its presentation of gift suggestions.

Shoppers use the service for free; the kiosk's operating costs are defrayed by a continuous stream of 30- and 60-second commercials that run on a second color monitor located at the top of the kiosk. The commercials are supplied by national advertisers to promote products they have for sale in the mall.

Such a scene is likely to turn a few heads, and that is just what happens when shoppers pass by, according to William Winter, mall manager. Winter said that no more than six or seven people may be standing in line for the electronic Santa at its busiest time, but he added that as many as 20 people may be nearby watching Touch 'n' Choose at work.

The kiosk "has been a delight to the vast majority of customers both young and old," he said. However, it is not the first such kiosk the mall has had in use to help with Christmas buying. Last year, Winter said, the mall used a gift suggestion kiosk based on the Texas Instruments, Inc. Personal Computer. The machine's keyboard interface was "much less user-friendly" than the touch screen of this year's kiosk, he observed.

Other applications

Thomas Adams, marketing vice-president for Taubman, said it was still too early to tell whether the kiosks, in use in the malls since Thanksgiving, would be used again during next year's holiday season. An AT&T Consumer Products spokesman, meanwhile, said the kiosks could have other applications, such as electronic directories to large buildings. As a directory, the kiosk could display a route-specific map to lead the user to his destination, according to the spokesman.

At another of Taubman's Detroit-area malls, the Twelve Oaks Shopping Center in Novi, Mich., Sheila Armstrong, mall marketing director, reported that the Touch 'n' Choose kiosk in use there has drawn praise from some customers for its gift suggestions. Armstrong said customers have come to appreciate the kiosk because it is a timesaver and because it "merges the holiday well with what is happening technologically" in society.

Twelve Oaks is apparently no wallflower when it comes to merging computers with the holiday season. In the mall's main concourse, Santa himself sits enthroned in a holiday display featuring 16 Tandy Corp. personal computers.

Children can use the computers to write letters to Santa, which are printed out immediately, or play a seasonal version of ticktacktoe using Christmas trees and ornaments for markers.

Will Computer Fat strike you next?

LOOK FOR IT JANUARY 14th.

ARCTIC from page 1

are installed in climate-controlled modules at remote sites, said Dick Denton, regional facility engineer in charge of automation at Atlantic Richfield Co. (Arco).

The Modular Computer Systems, Inc. machines and Digital Equipment Corp. PDP-11/44s that keep track of operations and human resources information for the three oil fields that Arco operates north of the circle need special antistatic mats around them as protection against the dry air, he said.

A computer delivery must be timed just right. The modules that house computers are sometimes as large as football fields and one to three stories tall, Denton said. A module is constructed in the state of Washington, hauled by barge to the tip of Alaska in the summer when the ice moves out of Prudhoe Bay for a few weeks and loaded onto crawlers for the remainder of its slow journey, he said. This container holds equipment and also becomes the office for the DP staff.

DP personnel work a 12-hour day, seven days in a row. They then fly to wherever they live for seven days of rest. Some people can't take the schedule.

Microwave dishes

Arco uses microwave dishes mounted on towers in the Prudhoe Bay, Kuparuk and West Sak oil fields and at 18 drill sites for communications between computers and personnel, Denton said. The central communications tower is located at a base camp in the North Slope region of Alaska, site of a three-story module that is home to DP and other oil field staff, he said.

DP personnel work a 12-hour day, seven days in a row, Denton said. They then fly to Anchorage or wherever they live for seven days of rest, he said. "There is special incentive pay and lots of time off, but even with that, some people can't take it," he said.

A few weeks ago, the sun set for two months, said Lowell Humphrey of Setpoint Alaska Co. in Anchorage, which supplies contract programmers and develops large computer projects for Alaskan companies. "It is dark and cold all the time, and there's nothing to break the wind up there," he said.

Workers — about 2,000 in different facilities — spend all their time inside together while they are working the seven-day shift, Humphrey said, because the temperature outside routinely drops to 40 degrees Fahrenheit below zero during the long winter season. Although personnel earn extra isolation differential pay, eat excellent food and have access to racquetball, television and movies, the life is tough, and few people stick it out for long, he said. "If you work those hours and never see the sunshine, depression sets in quickly. Also, little irritations amplify quickly," he said.

The people who are attracted to jobs in the Far North are often outdoor sports enthusiasts who enjoy the kinds of recreation that they need extra time to travel to, Humphrey said. "Operators and computer operations supervisors generally make more money and have more time off than their counterparts in Anchorage, and those people stay several years," Humphrey said. Programmers or analysts get bored with the sameness of the situation — they need to be in a cosmopolitan atmosphere like Anchorage, so they don't stay long, he said.

Even with the difficulties, the jobs are much sought after, Humphrey said.

"Money and time off are the motivators," he said. Given the entrepreneurial spirit in Alaska, the time off allows people to build small businesses or work on projects, Humphrey added.

Micros help Christmas tree grower harvest profit

By Paul Korzeniowski
CW Staff

CADILLAC, Mich. — Often, Christmas mixes the good with the bad: The joyous holiday spirit can be dampened in long department store lines.

So it is with Emerald Tree Associates, the third largest U.S. Christmas tree grower and distributor here. "In the last month, we've had to add a third shift and work 24 hours a day to keep pace with our work load," noted Steven Seeberg, owner of the Christmas tree company. "This year has [been] our busiest holiday season." He claimed that in 1984, Emerald will sell half a million trees grown on 8,000 acres in Michigan and Tennessee.

The main reason why Emerald can handle such business growth, Seeberg said, is the company's purchase two years ago of two IBM Personal Computers and the PC Focus data base management system from New York-based Information Builders, Inc. "Working with a computer is much more efficient than working with a manual system," the owner maintained. "Last year, we were only testing the system. This year, we know what it can do."

Yearlong process

Although Christmas tree sales are seasonal, the work for this year's harvest began 12 months ago. "In January, we begin planning our planting and spraying," Seeberg noted. "In March, we plant approximately two million trees. The trees are sprayed for bugs in May and June. In July, we conduct an inventory for all trees and mark the trees that will be sold at Christmas. In October and November, we conduct our harvest."

The PC Focus system fills two requirements. Its data base management facilities are used to track tree planting and growth. Seeberg, who is not a computer programmer, wrote various applications for Emerald, including inventory, order processing, shipping, invoicing, standing timber, supplies and cutting contracts. "With PC Focus, we are able to track where trees are planted, how many are planted, how fast they grow, when they are sprayed and the cost of maintaining our fields," the owner said.

The microcomputer system also allows Seeberg to control the distribution of the trees. "We work with a number of supermarket chains," he said. "One store may call for additional trees. Rather than sending it more trees, we may be able to ship [the store] trees from a nearby member of the chain."

Information produced with PC Focus interfaces to Emerald's accounting system from American Business Systems, Inc., a Westford, Mass., software vendor.

Mail-order pine trees

In addition to its Christmas tree business, Emerald sells miniature pine trees by mail order. PC Focus is used for credit checks, generating mailing lists and ordering the trees, Seeberg said.

Emerald's relationship with PC Focus has taken a few soap-opera twists. In 1979, the tree seller had turned to a time-sharing and mainframe version of PC Focus. "We liked [PC Focus], but we were paying close to $20,000 for the three months we required the system," Seeberg said. "It was just too expensive for us to keep."

Consequently, the company reverted to its manual system.

When IBM announced its Personal Computer, Seeberg realized that for the three-month cost of the time-sharing system, Emerald could purchase a complete computer system. And it did.

The choice of software was simple. "We didn't look at any package other than PC Focus," Seeberg said. "We were familiar with it and liked its features."

Seeberg said he hopes to enhance the system and eliminate the company's overtime. "We have orderd an [IBM Personal Computer AT] and should receive it in February," he said.

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WANG from page 1

ed network and supports Wang Office network-based applications, such as electronic mail.

Other features

Other VS 65 features include support for up to 2.6G bytes of disk storage, nine-track or cartridge-tape systems, remote diagnostics and up to 48 ports for workstations and peripherals. The VS 65 also supports Wang's relational data base management system, called Professional Application Creation Environment.

The price for a VS 65 package with 1M byte of main memory; a 5¼-in., 360K-byte diskette drive; 147M-byte internal fixed disk; two-port disk controller; data storage cabinet with 147M-byte fixed disk and a 76M-byte removable disk; and four 4230-VS workstations, is $54,300, the vendor said.

The price for a field upgrade from a VS 15 to a VS 65 is approximately $12,000, according to the company.

Aimed at System/36 mart

Wang is aiming the VS 65 at the same market as IBM's System/36, the announcement indicated.

In a statement accompanying the VS 65 announcement, John F. Cunningham, Wang's president and chief operating officer, said, "Recent announcements and statements of direction confirm IBM's need for distributed data processing solutions to overcome an incompatible and costly product mix."

In related announcements, Wang unveiled two packages, the VS 85-S and the VS 15-2WS.

The VS 85-S includes the VS 85 mini, now offered with two 147M-byte, 8-in. internal fixed disks, and a tape cartridge drive. Previous versions offered less storage.

The announcement indicated that Wang is aiming the VS 65 at the same market as IBM's System/36.

The price for a VS 85-S with 1M byte of main memory, the internal drives and cartridge, four 4230 workstations, Wang Word processing and one compiler, is $86,000, Wang said.

The VS 15-2WS replaces a variety of previously offered VS 15 packages. The price for the VS 15-2WS with 1M byte of memory, a 76M-byte fixed disk, two 4230 workstations, a 16-port serial controller, a fixed disk controller, operating system, assembler program and 360K-byte diskette drive, is $21,000, the vendor said.

In addition, Wang has reduced prices of some 4200 series VS workstations. The 4230 64K-byte workstation supporting data and word processing, has been cut $400 to $3,400.

The cost of a 4205 model, a 32K-byte DP workstation, has been cut $300 to $2,450. And the price for the 4220 workstation for remote DP and synchronous communications, has been cut by $250 to $2,250, according to the company.

Finally, the price of the Local Communications Option, allowing the Wang Professional Computer to serve as a VS workstation, has been reduced by $400 to $1,600, the company said.

More information on the VS announcement is available from Wang, located at One Industrial Ave., Lowell, Mass. 01851.

VS COMPUTER SYSTEMS CHARACTERISTICS

System	VS 15	VS 65	VS 85	VS 100	VS 300
Address Space	16-bit	32-bit	32-bit	32-bit	64-bit
Communications Protocols	WSN* Transport; Wangnet; Wangnet's Wang Band; Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-HASP; TTY	WSN* Transport; Wangnet; Wangnet's Wang Band; Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-HASP; TTY	WSN* Transport; Wangnet; Wangnet's Wang Band; Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-HASP; TTY	WSN* Transport; Wangnet; Wangnet's Wang Band; Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-HASP; TTY	WSN* Transport; Wangnet; Wangnet's Wang Band; Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-HASP; TTY
Memory Size in Bytes (minimum-maximum)	256K-2M	1M-4M	1M-4M	1M-8M	4M-16M
Purchase Price (Basic CPU and memory)	$11,500	$19,000	$64,000	$85,000	$170,000
Operating Systems	VS/OS	VS/OS	VS/OS	VS/OS	VS/OS
I/O Ports	6	6	6	16	15
I/O Channel Speed (bit/sec)	2.5M	2.5M	4.2M	8.3M	16.6M

* Wang Systems Networking

CW Chart

EFT Expo set for March 22

SAN FRANCISCO — The Electronic Funds Transfer (EFT) Association has announced that the EFT Expo, its annual convention and exposition, is scheduled for March 22-24 at the Fairmont Hotel here.

The convention will concentrate on the point-of-sale market and point-of-sale strategies for supermarkets, convenience stores, department stores and petroleum marketers. Other topics are videotex services, EFT standards, telecommunications options and security.

The registration fee is $450 for an EFT Association member, $525 after Jan. 15. For a nonmember, the fee is $575, $650 after Jan. 15.

The EFT Association can be reached through P.O. Box 66200, Washington, D.C. 20035.

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Management found impeding OA implementation

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — A national field study has found that 75% of the 110 business and nonprofit organizations examined are experiencing big problems with office automation because of insufficient management attention to people problems, such as user training and ergonomics.

The two-year study, conducted by the nonprofit Educational Fund for Individual Rights, was released at the organization's National Conference on People, Organizations and Office Technology, held here Dec. 12-13.

"Most organizations find that implementing office automation is much harder than implementing DP was [many years ago]," remarked Dr. Alan F. Westin, president of the Educational Fund.

"Too many applications are vendor driven rather than user designed," he said.

The researchers found such problems as the following:

- Insufficient strategic planning by top management and failure to involve the personnel department in such OA issues as job design, work satisfaction and performance monitoring.
- Inadequate resources for training and orienting new OA users.
- VDT work environments that do not meet ergonomic standards and weak management communication to users about VDT health and safety issues.
- Low levels of employee involvement in implementing new office automation technology, which unnecessarily raise employee fears and thus undercut OA implementation.

More than 115 site visits

To carry out the field study, the researchers conducted more than 115 site visits to major companies and institutions and contacted approximately 1,100 employees, 650 managers and executives, 55 information systems managers and 40 union leaders.

The Educational Fund for Individual Rights is a nonprofit research foundation in New York that specializes in privacy and labor management issues.

The $275,000 field study was supported by grants from IBM, Hewlett-Packard Co. and NCR Corp.

Employee OA complaints 'manageable'

"The good news is that employee complaints [about OA] are manageable," Westin said at the conference. He said the research showed that about 10% of the sites had excellent "people-technology programs" to handle the human resource implications of OA.

The effective OA programs featured a long-range, strategic plan, employee involvement and training and ergonomic standards for VDT workstations, Westin said.

Only 5% to 10% of the sites visited had satisfactory ergonomic work conditions — such as adjustable chairs and proper lighting. "While some employees do worry about health effects from VDTs," the researchers said, "the central health issue for office workers is the serious physical discomfort and harmful stress they experience in intensive VDT use as a result of poor job design, ergonomic conditions and management practices."

'Big Brother surveillance'

The Educational Fund researchers said that electronic work monitoring is a growing concern among nonunion and union employees, yet only one-third of the organizations visited had developed work performance standards that avoided employee feelings of "Big Brother surveillance."

Westin, professor of public law and government at Columbia University, noted that while no legislation regulating VDTs has been enacted so far, future legislative activity will depend on whether employers develop and implement good VDT management practices.

"Society will not let management apply OA oppressively," he said.

SANTA from page 1

Make that three, St. Nick. "I'll take a CPU upgrade from our IBM 3083-E to a 3083-J," said John Harodecki, DP director for St. Louis-based Ozark Air Lines, Inc. "We are really starting to run out of CPU cycles. If we can solve that problem, we will have the world licked — at least for a while."

Gosh, Santa, I hate to badger you about upgrades but . . . "I am easy to please. All I want for Christmas is a bigger CPU," said David Dowrie, computer services manager for the Oregon Transportation Department in Salem, Ore. "We have an IBM 3033, but a 3081-K is what I would really like. We always seem to be out of gas; we never have quite enough capacity to meet our user demands."

Hey, Mr. Claus, how about some help with all these micros? "I would ask Santa to put control over all the micros in the accounting department in DP's hands," said Robert Belvin, director of distribution and MIS for Beech-Nut Nutrition Corp. in Canajoharie, N.Y. "While I am in favor of micros, I think we have created a situation where our accountants are becoming keypunch operators and programmers. They are building their own data bases that are not tied to the mainframe. We are heading for trouble by creating one-person DP departments. That problem has to be addressed."

Same for me, Santa. "What I would like for my DP shop is a clear direction on where micros are going and how they are supposed to fit into the total picture," said Ronnie Barker, DP manager for Levi Strauss & Co. in Little Rock, Ark. "Everybody is saying 'I want one, and I want to do this and that with it.' But there seems to be a lot of confusion about what the real role of the micro will be. We need to get some direction, maybe in the form of policies and procedures."

That's all well and good, St. Nick, but what I really need is some more people. "I would ask Santa to make Cheryl Tiegs work for me," joked Sammy Sawoya, director of information processing and international MIS for Mattel Toys, a division of Mattel, Inc., in Hawthorne, Calif. "But seriously, I wish for a better trained group of people, including better managers and shift leaders."

Longer days needed

Yes, Santa, that's it — more people! "I want more personnel to do the job," said Loren Miller, MIS facilities manager for the Nevada Power Co. in Las Vegas. "We are constantly strapped for time to do our work. We need more folks, including systems and applications programmers, to do our work or more time to use our people. Maybe we need longer days."

Wait, wait! Aren't you forgetting something important, Santa? What about our communications needs? "What I would like most is to get hold of some cleaner communications lines," said William Wimer, vice-president, MIS, for Fanny Farmer Candy Shops, Inc. in Bedford, Mass. "With some better communications lines we would not have to do as much retransmission of data as we have had to do in the past."

But what about me, Santa? Can you bring me reliability for Christmas? "I want 100% uptime," said Donald Pressley, DP director for the Oskosh Truck Corp. in Oskosh, Wis. "When we have downtime, our 120 users get awfully angry. Also, we are experiencing some growing pains and response time is sometimes a problem. So, Santa, if you could give me one-half-second response time on all our applications, everybody here would be very happy."

SCS conference set for Jan. 24-26

SAN DIEGO — The 1985 Society for Computer Simulation (SCS) Multiconference will be held January 24-26 at the Bahia Hotel here.

The multiconference includes four separate conferences: Modeling and Simulation on Microcomputers; Computer Simulation in Emergency Planning; Distributed Simulation 1985; and Artificial Intelligence, Graphics and Simulation.

In addition, several professional development seminars will be offered at the multiconference.

The conference prices range from $155 to $195, depending upon registration (advance or after Jan. 1) and membership in SCS. One-day professional development seminars are $130 in advance or $150 for registration at the conference. The two-day seminar costs $200 in advance, $260 at the conference.

More information can be obtained from SCS, P. O. Box 2228, La Jolla, Calif. 92038.

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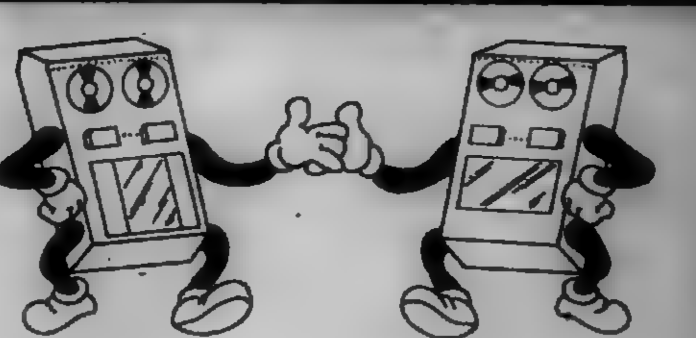

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Private lines used to bypass local telephone rates

WASHINGTON, D.C. — In a report issued last week, the Federal Communications Commission said that large-volume communications users are making extensive use of private lines to bypass usage-based local telephone rates. The report on bypass, in the works for the past year, is the first to note that private lines can be considered a form of service bypass, as opposed to facility-based bypass in which users directly link to long-distance carriers.

Users are simulating public telephone networks with private-line hookups that are provided by local telephone companies where usage is not measured for price purposes, the report said.

The FCC raised the possibility that, through regulation, it might be forced to raise tariffs on private lines to discourage inefficient use of local telephone networks.

Facility-based bypass serious threat

The report also said that facility-based bypass is a more serious threat to local telephone companies in the long run, and it predicted that this type of bypass will continue to grow.

In other action, the FCC, as expected, approved last week the levy of a $1 monthly charge for residential telephone customers as part of its access charge plan [CW, Nov. 26]. It is scheduled to go into effect in June and will increase to $2 per month by June 1986.

The FCC also said it will allow state regulators to add an additional 35% on top of the residential charge. In addition, the commission will give leeway to telephone companies to provide business customer discounts if it appeared that the $6 multiline business access charge is promoting bypass of the local telephone company facilities by large-volume business users.

According to the FCC, the residential access charge will raise an estimated $1.8 billion that will be applied to "dollar-for-dollar" reductions in long-distance rates by AT&T Communications, which will see the amount of its subsidy to local exchanges lowered. The FCC has estimated this should translate to a 0.6% drop in long-distance fees.

Speaker claims bypass threat more smoke than fire

By James Connolly
CW Staff

FRAMINGHAM, Mass. — The bypass threat is more smoke than fire and will remain limited if local telephone companies focus on improved services and appropriate pricing, advised a Westinghouse Electric Corp. executive at a recent regional business conference here.

"At this point, there is an awful lot of smoke and a little bit of fire. To some extent, bypass has been used as a whipping boy," Robert E. Bennis, manager of communications for the Pittsburgh-based company, said in a speech to the New England Council. Bennis, who also serves as chairman of the International Communications Association (ICA) Public Policy Committee, added that the bypass issue has been used to justify requests such as those for local access charges and for rate hikes on the basis of self-serving studies.

Bennis, who discussed his own company's $26 million, five-year-old bypass project, said, "Much of the significance assigned to bypass has been indicated by the concerned parties in the issue."

According to Bennis, an independent ICA survey indicated that while most large companies have examined the bypass possibility, respondents said it was not a significant telecommunications opportunity, particularly with regard to saving money.

He said that even companies, such as his own, that run hybrid bypass systems using private microwave links and cable television wiring will usually rely to some degree on local telephone wiring like that from Bell Telephone Co. of Pennsylvania. He added that many of those companies using bypass are only using it for narrow applications.

He cited that possible reasons for bypass are that regulatory bodies and telephone company policies have previously discouraged innovation, that divestiture has meant some reliability problems, that local telephone companies cannot or will not provide high-speed data capabilities, that local geography may favor bypass technologies such as microwave and that annual or near-annual telephone company rate increases make it economically worthwhile.

He said that factors against bypass may include the telephone companies' new responsiveness to innovation, a customer's lack of capital, the inability to obtain frequencies, the inability to acquire microwave tower sites, the lack of technical expertise among some bypass vendors and the loss of the security blanket associated with the former Bell system.

Consultant offers guidelines for dealing with deregulation

By James Connolly
CW Staff

FRAMINGHAM, Mass. — The first year after the AT&T divestiture has been rough.

Companies have been forced to cope with disruption and have not received many of the supposed benefits, charged a consultant at a regional communications conference here.

William Page Montgomery, vice-president of Economics & Technology, Inc., said, "I think the confusion factor in 1985-86 [will] be less than it was in 1984.

"But there still will be a confusion level or noise level behind telecommunications that [will have] to be dealt with."

He was speaking at a communications seminar sponsored by the New England Council, a regional business organization.

Advice for users

Montgomery offered his advice for users dealing with the effects of deregulation and divestiture.

He listed the following points as keys to users developing a new focus on communications in a deregulated environment:

- Staffing up telecommunications departments to a level comparable to data processing department staffing.
- Auditing communications resources because some vendors cannot be trusted to keep accurate records concerning items such as the number of telephones or the status of office moves.
- Establishing independence from vendors by adding value to communications resources where possible.
- Trying private instead of public regulation by carefully contracting for equipment and service.
- Establishing a business plan and a strategic plan by looking ahead to where the company will be and what its telecommunications requirements will be in five years.

Montgomery noted that some of the continuing confusion is due to the lack of technical staffs at the Department of Justice and the court of U.S. District Judge Harold Greene, who are overseeing divestiture.

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Greene OKs holding companies' expanded services

WASHINGTON, D.C. — U.S. District Judge Harold Greene, who presided over the court-ordered split of the seven regional holding companies from AT&T, has approved the regional holding companies' request to enter new lines of business outside their regulated telephone service.

The regional holding companies had filed requests for waivers from the court provisions barring them from entering competitive markets, seeking to offer such services as computer sales, foreign operations, real estate telecommunications services and office products.

Less than a year after the official breakup of the AT&T monopoly on Jan. 1, 1984, Greene granted approval to the 13 waiver requests but added several conditions designed to prevent anticompetitive abuse.

Waiver requests opposed

The waiver requests had been vigorously opposed by computer equipment vendors, TRW Corp. and the North American Telecommunications Association, representing the independent interconnect industry.

While permitting the regional holding companies to expand their service offerings, the court will require them to establish separate subsidiaries to offer the services, finance the businesses independently of the parent company, establish monitoring standards and limit the investment in the subsidiary to 10% of the regional holding companies' net revenues.

The new lines of business the U.S. District Court approved are the following:

- Bell Atlantic's provision of equipment leasing through a subsidiary, Tri-Continental Leasing Corp., that will provide third-party financing by purchasing the equipment for subsequent lease. This would include telephone equipment such as private branch exchanges, word processing, data processing and photocopying equipment.

Bell Atlantic agreed not to permit Tri-Continental to finance the purchase and leasing of Bell Atlantic equipment. It also agreed not to lease equipment or offer information services or long-distance services through Tri-Continental.

- Permission for Bell Atlantic to acquire the Sorbus, Inc. services division of Management Assistance, Inc. to provide computer maintenance services.
- Five requests for foreign business ventures, such as consulting, and cellular radio ventures proposed by Pacific Telesis Group, Nynex Corp., U.S. West and Ameritech Corp.
- Permission for U.S. West and Ameritech to provide real estate services, such as installation, consulting and contracting. They are barred, however, from offering shared tenant service for buildings.
- Permission for Nynex, Bell South and Pacific Telesis to enter the office products business, subject to conditions barring them from jointly marketing products with their telephone service and prohibiting the office products organizations from procuring goods and services for resale through a subsidiary that also offers regulated telephone service.

While granting the waivers, Greene asked that the Department of Justice, which had signed off on the proposed waivers, "to be particularly vigilant in the exercise and monitoring . . . of these enterprises . . . if violations are detected."

Upcoming meet to scrutinize security topics

BAL HARBOUR, Fla. — The 1985 National Insurance and Protection Conference, a session on security and risk management sponsored by the American Bankers Association (ABA), is being held at the Sheraton Bal Harbour here Jan. 29 to Feb. 1.

The conference will include 41 sessions, as well as discussion groups and exhibits. Session speakers will include Dr. Patricia Zigarmi, vice-president of Blanchard Training and Development, Inc., on "Applying the 'One Minute Manager' to the Banking Industry"; and Dr. Michael Mescon, dean of the College of Business Administration at Georgia State University, on "Management: New Perspectives from an Old Foundation."

Other participants include Boris Melnikoff, corporate director of security for First Atlanta Corp.; Garard Kenna, president of Profit Protection, Inc.; and Marsha Covey, president of the Colorado National Insurance Agency.

Subjects to be addressed include access control systems, shared networks, encryption, risk management, information systems, physical security and data security. In the area of physical security, hostage taking and ATM security will be addressed.

Registration is $495 for ABA members and [illegible] for nonmembers. More information is available from the ABA, Security and Risk Management Division, Attn.: Vicky Barr, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

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Policeman walks DP beat to squelch computer crime

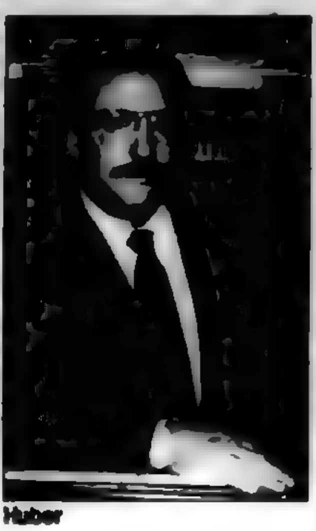
By Donna Raimondi
CW Staff

MINNEAPOLIS — Last year, a financial institution here fired 20 employees in the first 10 months of the year for using the company computer system to steal money. When asked why criminal charges had not been brought against the employees, the company said, "We've handled it within."

This attitude — expressed in private to a police officer who specializes in computer crime — is common among companies that will not publicize such incidents because they are afraid to lose customers or release sensitive information to the police, said Robert Huber of the Minneapolis police department.

Such secrecy is one of the reasons why more money does not go into developing computer crime expertise in police departments, Huber said. "If businesses aren't reporting the crimes, it is hard to justify spending money on training," he said. "Law enforcement really needs full cooperation from a business reporting a computer crime," he added.

Huber, a 16-year veteran of police work, said he took a three-month leave to study computer programming seven years ago and was invited by the Federal Bureau of Investigation to join its computer crime training classes in Quantico, Va., two years ago. In addition to computer crime investigation, Huber is responsible for the police department's Data General Corp. Eclipse 230 computer system and software acquisition recommendations. He also writes programs, monitors the equipment and trains police officers in terminology and evidence procedures for computer-related crimes, he said.


Huber

Off duty, Huber lectures nationally on computer crime investigation to groups. He will soon train IRS agents in the investigation of white-collar computer crime, he added.

"Huber has made us more aware of our security efforts, and we are now exploring how to secure our environment [better]," said Sandra Evans, an office equipment manager at the Wilson Jones Co. in Chicago who has consulted with Huber. Evans said Wilson Jones was impressed enough to invite Huber to speak on computer crime and security measures at the 1984 Comdex/Fall show.

FBI statistics revealed some bad news, Huber said. Only 1% of computer crimes are even detected, and of that number, only 12% are reported to police departments, he said. Only 3% of the reported computer crimes end in conviction. This means there is one chance in 27,000 that a computer criminal will go to jail, he added.

Some businesses are relying on their information systems to such an extent that without their computers, they would be out of business in a few days, Huber said. The way he sees it, businesses are open to attack on two fronts — the malicious hacker and the criminal. Malicious hackers are few in number, he said. Most hackers are playing telephone games and are not even aware of whose system they are on when they gain access, he said.

Criminals are people who steal money or information through the system, like the maintenance technician who placed diagnostic equipment on a system, copied the customer's account information and sold it to a competitor, Huber said.

"Huber serves as a method of getting our foot in the door of the computer theft world," said Pat Farrell, deputy chief. The Minneapolis police were totally unaware of how to deal with computer crimes before Huber's training, Farrell said. Huber gives the business community a sense that they can be helped in as confidential a way as possible, he added, especially when it comes time to make out a crime report. Businesses dislike filing such reports, but they must do so if the crime is to be investigated efficiently, he said.

It is much easier to secure a system to prevent abuses than to try to investigate a crime after the fact, Huber said. Businesses should take several security ideas and put a package together, he said. The more sensitive the information, the more sophisticated the security package should be, he added. It should consist of devices, guidelines, procedures and — if the company is large enough — a full-time security person.

Inmate allegedly enters system to abbreviate sentence

By Kathleen Burton
CW West Coast Bureau

SAN JOSE, Calif. — Thanks to an unattended IBM terminal, an inmate at a Santa Clara, Calif., prison almost computed his way out of jail in time to make it home for Christmas.

Scott Robinson, a truck driver serving a one-year sentence for stealing video games, allegedly memorized the logon codes for the Santa Clara County Sheriff's Department IBM terminal by looking over the shoulders of jail officials as they booked prisoner's records. Robinson allegedly logged on to the computer and altered his own release date from Dec. 31 to Dec. 5.

In an interview with jail officials, Robinson, a computer neophyte, said, "It's not that hard to get into computer files," but refused to admit he had done so.

Jail officials are investigating the possibility that Robinson may also have accessed 1,200 other release records and entered files in the statewide computer system at the Criminal Justice Information Center in Sacramento, Calif., a data network that contains state criminal and motor vehicle records. Officials are also trying to discover if other prisoners were released up to a year before their scheduled release dates, as Robinson has claimed.

The computer-aided escape attempt was discovered when Robinson began mentioning his release date to other inmates. A deputy became suspicious and checked written records, said Capt. Don Tamm of the sheriff's department. Tamm said that the computerized records are used to notify jailers of upcoming release dates but are normally checked against a written log. "Robinson never would have made it past the sign-out window," Tamm added.

> *People treat computers too informally, without understanding their power to do harm.*
>
> — Don Parker, SRI International, Inc.

Lt. Steve Frazza, commander at the Elmwood Detention Center in Milpitas, Calif., where Robinson is currently being held, said Robinson held a "trustee" status, which allowed him access to the medium-security misdemeanor booking area of the jail, where he swept floors and fingerprinted new inmates. The area where Robinson worked is next to the sheriff's law enforcement telecommunications system IBM terminal, Frazza said, so Robinson was able to get a close look at the terminal as sheriff's deputies used it.

To log on to the computer, a four-letter code and the inmate's booking number must be entered. Two codes must be changed before the computerized release date can be altered, and another key is then used to record the changes, Frazza said.

Lt. Jim McLarney of the sherriff's department said that since Robinson's alleged joyride through the data files, security precautions have been stepped up at the facility, which processes 75,000 prisoners a year. Trustees are no longer allowed in the booking area, and deputies have to remove their keys from the computers when they are not in use, he said.

Don Parker, a senior management consultant at SRI International, Inc. in Menlo Park, Calif., said the incident is a classic example of how people treat computers too informally, without understanding their power to do harm. Two basic security principles were violated in the case, Parker said: Only trusted people should have access to sensitive computing areas, and unique passwords should always be assigned to authorized individuals using a terminal.

Officials are currently deciding whether to bring charges against Robinson, who they claim plans to study computer programming after his release. "Looks like Robinson has a good future in programming," a jail administrator said.

ACM Computer Science Conference slated for March 12-14

NEW ORLEANS — The 13th annual Computer Science Conference of the Association for Computing Machinery (ACM/CSC '85) is scheduled to take place here from March 12-14.

Among those scheduled to speak at the ACM/CSC '85 conference are John Darringer, Ph.D., of the IBM Thomas J. Watson Research Center. Also scheduled to speak is Donald E. Thomas, Ph.D., of the Department of Electrical Engineering, Carnegie-Mellon University.

The conference's first keynote address will be delivered by Gerald Estrin, Ph.D., who is a member of the computer science department at the University of California at Los Angeles.

Conference topics

The topics to be addressed by conference speakers range from "Production Logic Synthesis" to "Supercomputers and Distributed Computing."

Registration for the conference is $70 for the full conference and $55 for a single day for ACM members. For nonmembers, registration is $105 for the full conference and $70 for a single day.

On-site registration, for members, is $95 for the full conference and $70 for one day.

On-site registration for nonmembers is $130 for the full conference and $85 for a single day.

Registrations may be addressed to ACM/CSC '85, Dr. Cathy Jo Linn at the Computer Science Department, University of Southwestern Louisiana, P.O. Box 44330, Lafayette, La. [illegible]

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- 65 Public Utility/Communication Systems/Transportation
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- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

CW-138

Virtual processor eases conversion to Sperry 1100/70

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — Announcing the demise of product support for Sperry Corp.'s VS 9 system, used in the public school system here, could have been rather traumatic since the system has been in place for 14 years with happy users. However, a bridging product, called an attached virtual processor, came to the rescue, permitting continued use of VS 9 data files on a new Sperry 1100/70.

According to William Stewart, director of the District of Columbia public school system operational support unit, other Sperry VS 9 users were moving to IBM 370s because they were reluctant to switch over to the more rigid 1100 series. Luckily for the District of Columbia schools, and perhaps for Sperry and the preservation of some of its business, Sperry quickly produced its bridging product — an attached virtual processor that enables the software codes running on VS 9 to be transported virtually free of programming changes to the Sperry 1100 operating system.

'No one else, I believe, has taken the time or effort to use [Sperry Corp.] Mapper in the ways we have.'
—William Stewart, director, District of Columbia public school system operational support unit

Stewart said that the VS 9 users in his public school system are relatively happy with the new 1100, which is running some unusual applications under the proprietary Sperry Mapper system. While the termination of support for the 90/80 was a major factor forcing change, the shift to the 1100 was equally necessitated by the changes in and greater demands on the public school system's data processing needs.

"No one else, I believe, has taken the time or effort to use Mapper in the ways we have come up with," said Stewart, who reported that the school system is now running one data base where five were present before. The combined data base management system, called Resource Management and Control System (Remcis), is now running on the 1100 and was written by in-house programmers using Mapper. It handles financial reporting requirements of all the schools, as well as all personnel management records for students and teachers.

Next year, Remcis will add payroll records, attendance and student grade records as well as the students' daily classroom schedules. All the applications programs will be developed internally, Stewart reported.

"Mapper is a tremendous tool for application generation," commented Stewart, who said that the new on-line data base is now being used in all sorts of report writing where previously batch runs on individual data bases were required.

The shift over from the 90/80 to the 1100 took six months. According to Marvin Raines, director of the District of Columbia public school system's Division of Information Resource Management, the successful transition was accomplished through planning and looking at other installations' experience before the switch was made.

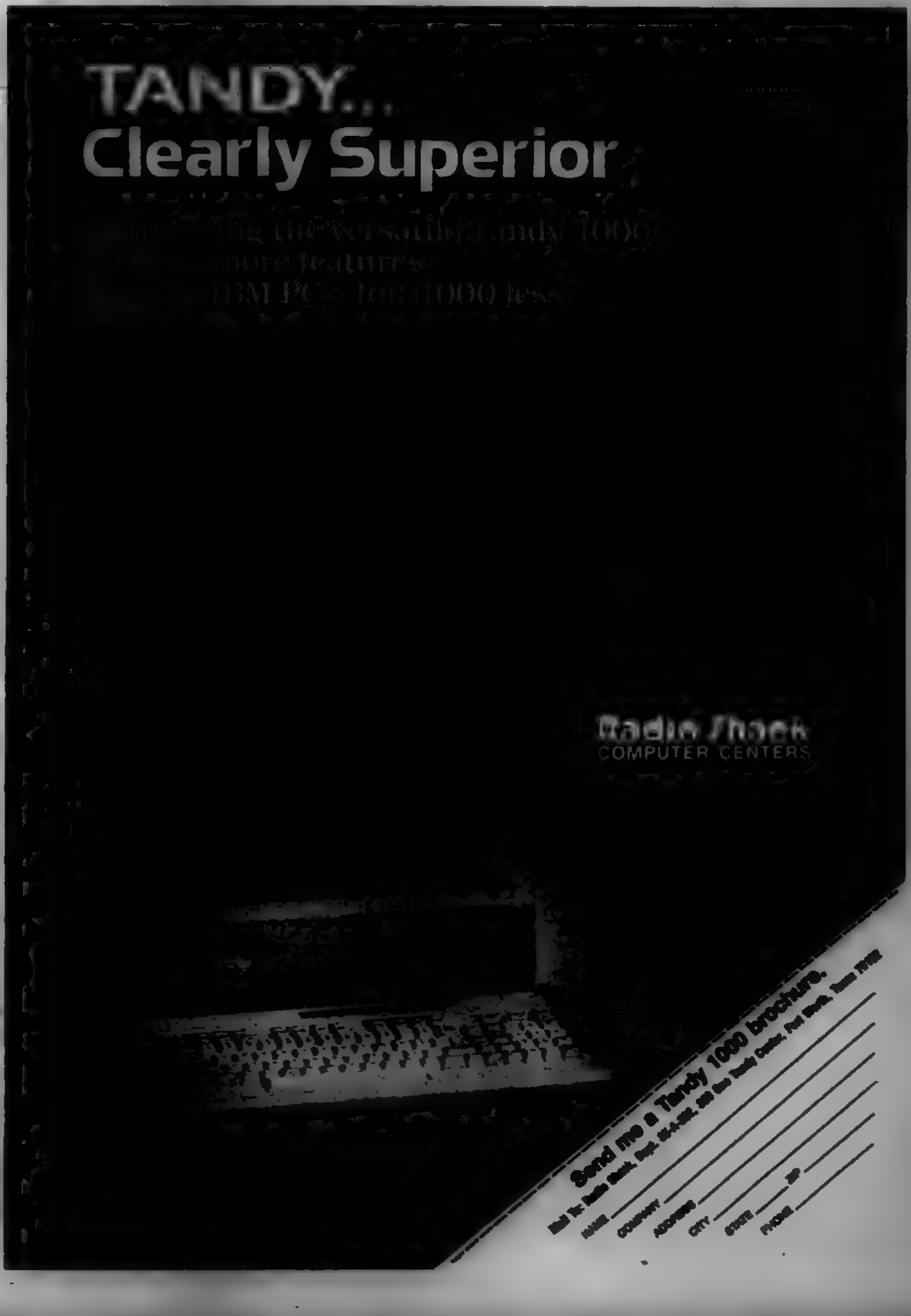
Instead of using turnkey or off-the-shelf software application generators, the Division of Information Resource Management found that it had the in-house programming resources to learn the Mapper system. One junior programmer who was able to master the changeover quickly was a recent graduate of a computer learning school in the Washington, D.C, area, Raines said.

"We found that turnkey vendors were willing to come in and do the job for us, but they wanted to double the cost at the same time," added Stewart, explaining why the school system relied on in-house resources.

However, the installation of the Sperry attached virtual processor made the transition to the use of the 1100 from the 90/80 much easier in that the existing data storage file could be read by the 1100 in their native mode and be accessible as a virtual memory system from the disk drives, Stewart said. But the plans call for the removal of the attached virtual processor from the premises sometime in late summer of 1985, when all the District of Columbia public school system files have been transferred to the 1100 system.

Raines said he is proud of the technology conversion that has been carried out in his shop and even prouder that it was done quicker than expected with the Mapper system, which is not usually used for software program generation. "No one else has taken the time or effort to do it. It's unusual," he said of the eight new applications programs that were transferred in less than a year.

Yet every success brings some new demands. Data requests have jumped now that the previously cumbersome data bases have been merged, Raines reported.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TANDEM

NonStop Transaction Processing

Unix standard expected to push Japan ahead of market

By Randall Litchfield
Special to CW

One question that can never be far from the minds of Americans is: When will Japan train its big guns on the U.S. computer market, quickly becoming No. 1 by inundating it with high-quality, low-priced products as it did with cars and televisions?

It is not that Japan has not tried. From mainframes to micros, Japan's large computer companies have sought the elusive U.S. market foothold needed to become major contenders but have done so mostly in vain. According to International Data Corp. (IDC), the Framingham, Mass.-based research house, the Japanese are a long way from brushing aside 35 years of U.S. leadership in the computer industry. U.S. firms still control about 75% of noncommunist information processing and, outside of the Pacific Basin, the Japanese share is less than 10%.

The fact that Japan has not scored a marketing coup surprises many. The country's enormous vertical manufacturing facilities and technological and financial resources make it perfectly suited to crank out the standard computer items — which are basically not any more technologically difficult than cars and videocassette recorders.

Unlike those items, however, computers have yet to form a mature market where standards are widely accepted. What has stood in the way of the maturation process has been the lack of standardized software. And what might well mature the market in a hurry is AT&T's Unix. Unix could potentially tame an explosive market, and the Japanese could very well direct their energies here.

The OA market has in fact been growing by leaps and bounds — as much as 40% annually in the U.S. on a 1983 base of $13 billion. Stephen McClellan, an analyst with Salomon Brothers of New York went as far as to say that OA is not simply another profitable niche for the computer industry but the future of the industry itself.

Japan could be positioned to pick up the most pieces in the widely predicted computer shakeout. As the industry matures, success increasingly depends on vertical integration. If there is one thing abundant on the islands of Japan, it is strong, well-organized and vertically integrated companies.

Japan has succeeded in certain marketing areas already and has enjoyed its first computer trade surplus with the U.S. in 1983.

However, Japanese success has been in the sale of components, not systems. As an OEM, it lacks all of the marketing clout used so effectively in dominating other industries. Instead of being able to offer leveraged sales of the office voice and data products already available from Japanese manufacturers, the Japanese are forced to sell to domestic distributors — minus the market presence and the meaty profit margins. Anyone familiar with Japanese marketing techniques in the automotive and consumer electronics industries will know that this simply is not the Japanese style of doing business.

According to the Gartner Group, Inc., Japanese manufacturers still lack an understanding of North American office needs to offer any real wide-scale competition. However, leading Japanese companies, including NEC Corp., Fujitsu Ltd. and Hitachi Ltd., are targeting the integrated office and will likely become significant by the end of the decade. The reason, they said, will be that software will have been better defined and will permit a commodity approach to the purchase of hardware. By then, the Gartner Group also expects, Japanese distribution and maintenance organizations will be sufficiently well established.

Litchfield is managing editor of Computer World Canada.

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INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

PETONE — After running its data processing operations in-house for 20 years, Unilever New Zealand Ltd. has transferred its DP operations to an outside service bureau. Faced with the cost of upgrading its 4M-byte IBM 4331 and a high staff turnover, Unilever has opted to off-load to Idaps Computer Sciences New Zealand.

■

KNOWFIELD — A 25% price advantage and a better upgrade path were cited as the two factors that influenced the Victoria retailing cooperative Composite Buyers Ltd. to abandon IBM in favor of National Advanced Systems Corp. (NAS).

Composite Buyers chose the NAS 6650 to replace its IBM 4341 Model 2 because the NAS system offered the same memory capacity and three more channels for less than 75% of the price of the existing IBM rental, a spokesman said. Composite Buyers is a group of 400 grocery retail outlets in Victoria.

■

CROWS NEST — Telecom Australia is suffering from what is being called "a massive brain drain." The company has been losing its communications experts at the rate of about 150 employees a year, mostly to banks, sources said.

■

MELBOURNE — One of the most sucessful partnerships in the history of the Australian computer industry has broken up, insiders reported. Brian Johnstone, joint managing director of Computer Power Group Holdings, has sold his 33.3% share for an undisclosed sum to the other two shareholders, Rupert Murdoch's News Ltd. and Roger Allen, Johnstone's former partner, leaving the two with 50% holdings each.

FRANCE

PARIS — Groupe Bull has unveiled an addition to its Micral range of microcomputer workstations. The new two-workstation Model 90-20 comes with 256K bytes of memory and up to two 600K-byte diskette units and can accommodate a 5M- or 10M-byte fixed disk, the vendor added.

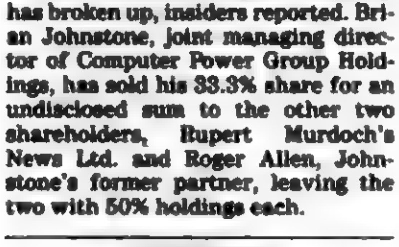
The machines can run under Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems. Pricing starts at $2,790 for the Micral 90-20.

■

PARIS — Telic Alcatel, Groupe Bull and financial investors lead by Credit du Nord Bank have joined forces to create a new microcomputer and peripherals company here.

The company, called Djinntel, will manufacture and market equipment that is compatible with the French Minitel terminals; has value-added features such as automatic dialing, call management and optimization of use of telephone lines and servers; and can access videotex services.

Directing the new company will be Jean-Pierre Talvard, the former director of product development at Compagnie Generale d'Electricite.



JAPAN

TOKYO — In a flurry of announcements, Fujitsu Ltd. has introduced mainframe system called the Facom M-3800, a cartridge tape drive called Facom 6475 and an enhanced version of its OS IV F4MSP software.

According to a company spokesman, the M-3800 offers a main memory of 64M bytes, expandable to 128M bytes; a potential memory of 2G bytes; and up to 64 ports. It reportedly can be leased for $76,000/mo and comes bundled with the vendor's enhanced software.

The OS IV software now features the ability to switch back and forth on-line and off-line; comes with the vendor's Advanced Information Manager software, which can handle 400,000 transactions an hour; features half the response time of the former version; and supports up to 2G bytes of memory, according to Fujitsu.

Finally, the Facom 6475 cartridge tape drive has a 2.5M byte/sec response time, 280M-byte capacity, 18 tracks and 32,000 bit/in. density. It can be leased for $2,320/mo, the vendor said.

UNITED KINGDOM

LONDON — British software maker Aregon International will supply Japanese industrial giant Mitsubishi Electronics Corp. with $3 million worth of videotex equipment during the next three years under the terms of a recently signed agreement. Mitsubishi will distribute Aregon products in Japan with options to develop further potential markets in other Far Eastern regions. Aregon is customizing its videotex products to accommodate the Japanese language.

■

LONDON — Nixdorf Computer AG has announced two additions to its Comet software line: Comet International and Comet Oil. The company also announced the creation of an International Oil Divison here.

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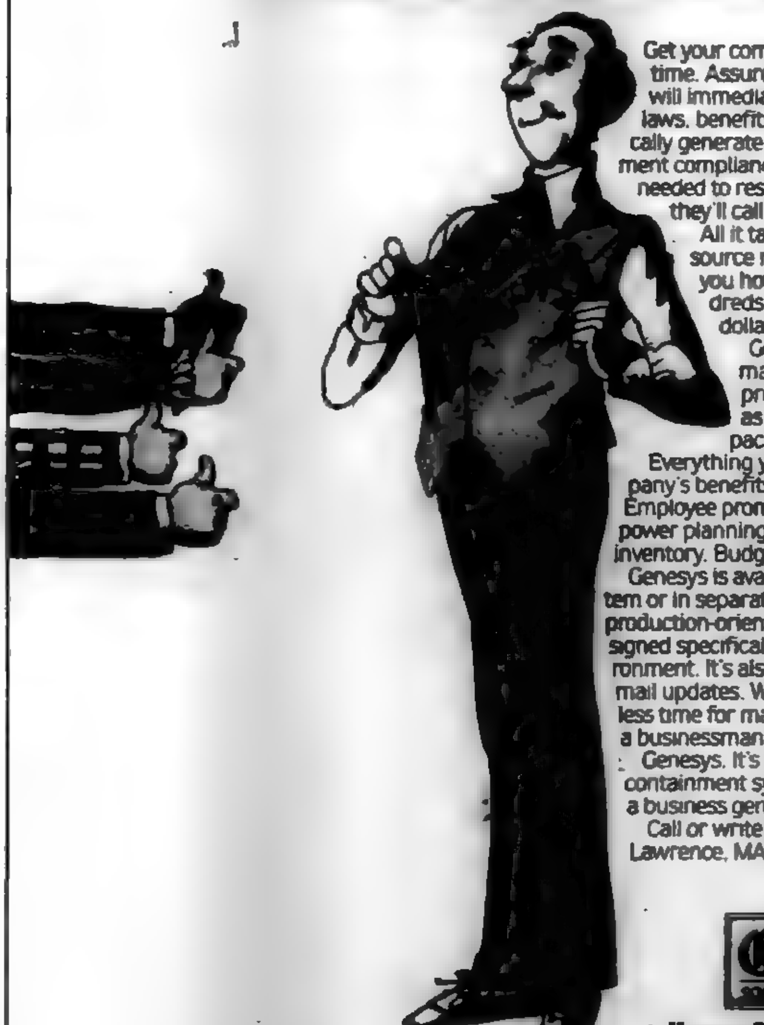

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NEWS

TURNAROUND TIME

Larry Long

Q Computer terminals and microcomputers are now commonplace throughout the company, and we order five to 10 more every month. As more and more applications go on-line, people with no typing background whatsoever are asked to use the computer to enter not only numeric data but text as well. In our training sessions, we find that some are frightfully slow, and we wondered if you could recommend a good microcomputer-based package for interactive keyboard training.

I do not recommend specific hardware or software products. However, any of the major packages should prove adequate for your needs. Besides training software, you might also consider purchasing Dvorak keyboards for hunt-and-peck keyboarders who refuse to learn touch-typing skills. With 70% of the alpha keystrokes on the home row, a novice keyboarder can significantly increase his productivity with the Dvorak system.

Some companies have already implemented Dvorak keyboards in their word processing pools and are experiencing 50% and higher increases in productivity. I expect that within a couple of years, we will be ordering as many Dvorak keyboards as we do Qwerty keyboards.

Q My 10-year career has revolved around personnel services. During the last year, I have worked closely with several programmers who are implementing a new system for us. Lately, I find myself more interested in their work than in my own. I spoke with their manager about transferring to his group, and he encouraged me. He seems to think that I could learn to be a good programmer. I'm about to take him up on the offer but am still concerned whether I have the right type of personality. Is there a stereotype for a programmer's personality?

Contrary to popular belief, programmers cannot be stereotyped. I've worked with hundreds of past and present programmers, and I say without reservation that they are a truly varied lot.

However, I will say that most good programmers possess certain attributes. They can be described as perceptive, persistent, patient, picky and productive.

Q During the last 20 years, I've progressed steadily in a family-owned company to the point that I now manage a 35-person data center. During the last few years, business has gone sour, and we are beginning a third year with no pay increases. I've lost all my best people and have just about decided to jump ship myself.

I wanted to check with you before I begin applying for other jobs. I never finished my bachelor's degree. I could complete the degree in 11 months if I go full-time. I'm in my early 40s but am willing to return to school if the degree is absolutely necessary.

With bonuses, my current salary is about $50,000. Do you feel that my lack of a degree will be a deterrent to my finding an equal or better position?

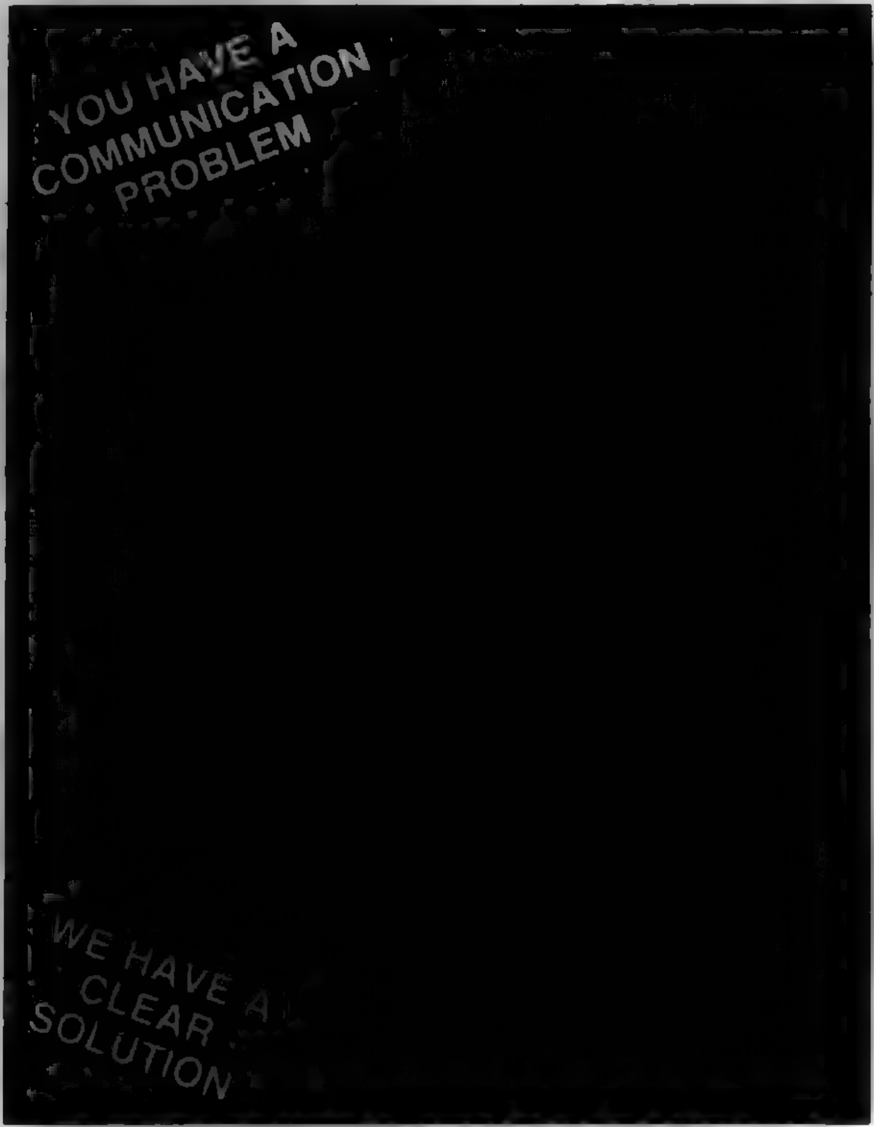
At least 95% of the positions to which you aspire will have a baccalaureate degree as a minimum educational prerequisite. In the past, companies have waived the education prerequisite for truly outstanding people, but this happens infrequently today.

In answer to your question as to whether you should return to school, by all means, yes. With your experience and tenure in the business, the degree area is not nearly so important as the parchment.

Q We are a small company of slightly fewer than 1,000 employees. Currently, our centralized MIS division services our four locations, all of which are in the same state. Against all of my arguments to the contrary, our steering committee voted to decentralize and has asked me to draw up a plan to accomplish the move. I feel that such a move is premature and will hinder our efforts to be responsive. Is there anything I can say or do to reverse its hasty decision?

There is no such thing as pure decentralization of information services. You can distribute people, hardware, software and data, but somebody has to mind the store, whether you choose geographic or functional decentralization. Is your committee suggesting that each site maintain separate data bases? Who will set standards, ensure compatibility and establish policy?

I've long been a proponent of moving processing capability closer to those who use it but not at the expense of integration and coordination. Approach the steering committee with a plan for what I call "centralized decentralization." That is, outline a plan that distributes computing resources according to the committee's wishes, but accompany it with an organizational structure with control authority for coordinating the information services function.



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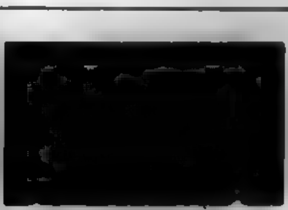

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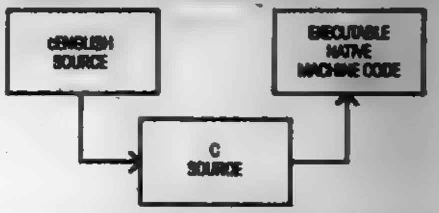
How is portability achieved? cENGLISH through its compiler interface translates cENGLISH into documented C source and uses a host C compiler to produce native machine code.



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SAMPLE cENGLISH PROGRAM

```
IDENTIFICATIONS
  MODULE:  [illegible]
  AUTHOR:  bcs
  DATE     8/29/84
  REMARKS: Sample cENGLISH program that adds first
           names to a file
END IDENTIFICATIONS


GLOBALS
  FIXED LENGTH 1 ans
  FIXED LENGTH 15 Fname
END GLOBALS


MAIN PROGRAM

  BEGIN
    CLEAR SCREEN
    SET ECHO OFF

    USE "NAMES"
    VIEW BY "ID_FNAME" ASCENDING

    AT 23,1 SAY "Add a record? Y or N"
    AT 23,25 ENTER ans USING "!"

    WHILE ans EQ "Y"
      CLEAR GETS
      AT 6,1 SAY "Enter first name"
      AT 6,20 GET Fname
      READ SCREEN

      INSERT
        Fname = Fname
      END INSERT

      AT 12,10 SAY "Welcome to cENGLISH," & Fname
      WAIT
      AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
      STORE "               " TO Fname
      STORE "  " TO ans
      AT 23,1 SAY "Add another record? Y or N"
      AT 23,30 ENTER ans USING "!"
      CLEAR ROW 1 THRU 23

    END WHILE

    AT 12,10 SAY "That's all for now!"
    UNUSE "NAMES"
    SET ECHO ON

END PROGRAM
```

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Phone (418) 524-4641

C4Q84

CALENDAR

WEEK OF DEC. 30

JANUARY 2-4, HONOLULU — **Hawaii International Conference on System Sciences.** Contact: Nem B. Lau, Center for Executive Development, College of Business Administration, University of Hawaii, C-202, 2404 Maile Way, Honolulu, Hawaii 96822.

WEEK OF JAN. 6

JANUARY 7-8, KANSAS CITY, MO. — **Discover Unix.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 10-11 in Boston, Jan. 14-15 in Houston and Jan. 17-18 in San Francisco.

JANUARY 7-8, HARTFORD, CONN. — **Unix Systems Users Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-8, DALLAS — **Operating Systems: A Comparative Analysis.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 14-15 in Boston.

JANUARY 7-9, ARLINGTON, VA. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 9-11 in Tampa, Fla.; Jan. 15-17 and Jan. 23-25 in Cary, N.C.; and Jan. 22-24 in San Francisco.

JANUARY 7-9, NEW YORK — **PC/Focus for Beginners.** Contact: Julie Leonard, Advanced Infostructures, Inc., 475 Fifth Ave., New York, N.Y. 10017.

JANUARY 7-9, DALLAS — **VM/SP Structure, Flow & Tuning.** Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 7-10, NEW YORK — **CICS Debugging.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

JANUARY 7-10, HARTFORD, CONN. — **Designing On-Line Systems.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, HARTFORD, CONN. — **CICS/VS Command-Level Coding Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, RALEIGH, N.C. — **Unix Workshop.** Contact: Suzanne Battista, Plum Hall, Inc., One Spruce Ave., Cardiff, N.J. 08232.

JANUARY 7-11, HARTFORD, CONN. — **OS/VS Job Control Language & Utilities.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 8-9, SAN FRANCISCO — **Integrating Multivendor Voice and Data Networks.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

JANUARY 8-10, CHICAGO — **Corporate Electronic Publishing Systems: A Conference/Showcase.** Contact: Corporate Electronic Publishing Systems, Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

JANUARY 8-10, LOS ANGELES — **Selecting a Local-Area Network.** Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

JANUARY 8-10, COLLEGE PARK, MD. — **Designing Interactive Computer Systems: A Software Psychology Workshop.** Contact: Conferences and Institutes Program, University College, University of Maryland, University Blvd. at Adelphi Road, College Park, Md. 20742.

JANUARY 8-10, CARY, N.C. — **SAS Programming for New Computer Users.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 22-24 in Cary, N.C.

JANUARY 8-11, NEW

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How to be in 16 places

YORK — **Vsam.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 28-Feb. 1 in New York.

JANUARY 9-11, NEW YORK — **Systems Network Architecture: Concepts, Design and Implementation.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Gary St., Santa Ana, Calif. 92705. Also being held Jan. 21-23 in Los Angeles.

JANUARY 9-11, ARLINGTON, VA. — **SAS Macro Language.** Contact: SAS Institute, Inc., Box 8000, Cary, N.C. 27511.

JANUARY 9-11, HARTFORD, CONN. — **Unix C Programming Language Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 9-11, CHICAGO — **Relational Data Bases.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held Jan. 14-16 in Atlanta.

JANUARY 9-11, WASHINGTON, D.C. — **National Conference on Financial Management Systems for Government.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

JANUARY 10, SAN FRANCISCO — **T1 Carrier Strategies: The New Networking Imperative.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, [illegible]

JANUARY 10-11, ARLINGTON, VA. — **SAS Report Writing.** Contact: SAS Institute, Inc., Box 8000, Cary, N.C. 27511.

JANUARY 10-12, HOUSTON — **The Essentials of Productivity Management.** Contact: The Institute of Industrial Engineers, Continuing Education Program Department, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JANUARY 12-13, NEW YORK — **CICS Command-Level Intensive.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 19-20 in New York.

WEEK OF JAN. 13

JANUARY 13-16, NEW YORK — **Annual Convention and National Retailers Business & Equipment Exposition.** Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

JANUARY 13-16, HONOLULU — **Seventh Annual Conference of the Pacific Telecommunications Council.** Contact: Pacific Telecommunications Council '85, Suite 308, 1110 University Ave., Honolulu, Hawaii 96826.

JANUARY 14-15, SAN FRANCISCO — **Taking Charge: New Directions for Data Entry Management.** Contact: Marilyn Bodek, Data Entry Management Association, P.O. Box 16711, [illegible]

JANUARY 14-15, HARTFORD, CONN. — **Personal Computers — Hands-On Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 14-16, ST. LOUIS — **DOS/VSE Internals, Debugging & Problem Determination.** Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 14-17, ANAHEIM, CALIF. — **Cadcon [illegible] Exposition.** Contact: Morgan-Grampian Expositions Group, Two Park Ave., New York, N.Y. 10016.

JANUARY 14-18, WASHINGTON, D.C. — **Software Engineering and Quality Assurance: A Statistical Approach.** Contact: Dick White, George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

JANUARY 15, ARLINGTON HEIGHTS, ILL. — **The Association for Information and Image Management Seminar.** Contact: The Association for Information and Image Management, 821 N. Stratford Road, Arlington Heights, Ill. 60004.

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EDITORIAL

Time for hard line on software

By most indications, there are so many people engaged in using pirated or pilfered programs in the U.S. and elsewhere that, instead of punishing the offenders, perhaps we ought to award merit badges to those who actually pay for the software they use.

Figures made available recently by the Canadian Computer Dealers [CW, Dec. 17], although rough 'guesstimates' at best, nonetheless are shocking in their magnitude. According to the dealers up north, nine in 10 microcomputer programs in use in Canada are illegal — either pirated (copied and resold for profit) or pilfered (copied and distributed gratis for use within MIS departments).

The costs are obvious, both to vendors who lose massive amounts of revenue and to users, who eventually will pay for those lost revenues through higher software prices. And there is no reason to expect the situation is much different in the U.S.

Given that software piracy and pilferage will remain and likely proliferate as long as the crime is so easy and safe to commit (as in the hacking dilemma mentioned in this space last week), the obvious defense is for vendors to make it harder to copy a program. This should be about as easy as preventing teens from taping live radio concerts.

Nonetheless, vendors like Ashton-Tate, Lotus Development Corp., Microsoft Corp. and others that stand to lose their shirts to runaway piracy are banding together to attack the problem [CW, April 30]. They have to. Apparently, not much help is forthcoming from the U.S. Department of Justice, which, according to one specialist in copyright law, hasn't undertaken a criminal prosecution for software piracy under the Copyright Act of 1976.

Computerworld strongly supports all efforts by the vendor community to combat pilferage and piracy both in the courts and, ultimately most effectively, on the diskettes themselves. But the greatest role in fighting this problem can be played by MIS and DP professionals from vice-presidents to entry-level programmers. It is from their ranks that have come the people most proficient in determining how best to pirate and pilfer software.

I'M SORRY, BUT HE CAN'T SEE YOU NOW. HE HAS A RUSH PROGRAM TO HAND-CODE.
T.J. McMahon
CORPORATE PROGRAMMER-IN-CHIEF
AUTOMATED SOFTWARE DEVELOPMENT SYSTEMS, INC.
Computerworld

DATA PAST

Five years ago

WASHINGTON, D.C. — A rewrite of the Communications Act of 1934 had been unveiled in the House of Representatives. Endorsed by all members of the House Communications Subcommittee, headed by Rep. Lionel Van Deerlin (D-Calif.), the bill hewed closely to advice from President Carter's chief telecommunications advisor, Henry Geller.

Ten years ago

WASHINGTON, D.C. — A compromise to guarantee the privacy of individuals' personal records kept in government data banks had passed both houses of Congress and was expected to be signed by President Ford before Christmas.

LONDON — Results of the benchmarking project run by the British government's Central Computer Agency had appraised some minis with power equal to or in excess of some full-scale mainframes, although the general pattern was "predictable."

LETTER

IBM Cabling System still a contender

I must object to the presentation of the article "IBM Cabling System falls short of mark, user says" [CW, Nov. 26].

The article places greater emphasis on the problems than on the virtues of the Cabling System. The headline strongly conveys the very false impression that we are dissatisfied with the capabilities and performance of the Cabling System, and that we are about to abandon the system already installed at Carnegie-Mellon University.

These are certainly not accurate impressions. While local-area network wiring is proving to be more expensive than we estimated four years ago, the IBM Cabling System as installed (in only one building) is completely adequate for the task and offers many advantages in versatility, configurability and maintainability.

It remains under very serious consideration for campuswide installation.

Thomas W. Bajzek
Pittsburgh, Pa.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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Exception reporting: Less can be more

THE DATA CENTER
John P. Murray

The idea of building exception reporting systems is not new. While a considerable amount has been written about the delivery of systems that key in on and report only the significant aspects of a particular situation, many organizations have accomplished little in this area.

Given today's technology, this is both unfortunate and unnecessary. Consideration of those factors that have historically worked against the delivery of such systems and implementation of some approaches that can prove helpful in overcoming those impediments can increase both client satisfaction and the productivity of the department. Why produce more than is necessary to get the job done?

Information processing clients often argue that, to be effective, reporting systems must produce minute detail. They feel the reports must cover all transactions in detail in order to meet their needs. A feeling exists among MIS clients, sometimes shared by members of the systems and programming staffs, that unless copious amounts of detail are produced, the system is of questionable value.

Part of this problem can be traced to prior constraints of both hardware and software. The limitations of the technology placed real restrictions upon the design of information processing systems. In many instances, the only practical solution was to produce voluminous reports that contained considerable detail. An objective review of many reports currently being produced will yield examples of this phenomenon. It is questionable if those who receive these reports can find time to read, never mind use them.

There are indeed systems, many of them in the financial areas, where considerable detail is required. An invoicing system is a good example. Both the organization's customers and members of the accounting and accounts receivable departments must know what was sold and delivered, when the sales occurred, and when, or if, payment was received.

> *Some information processing functions have so little credibility that clients insist upon great volumes of detail to satisfy themselves of the accuracy of the work being done.*

Unfortunately, some information processing functions have so little credibility within the organization that clients insist upon great volumes of detail to satisfy themselves of the accuracy of the work being done. Clearly, in those organizations where such a situation exists, the original data must be cleaned up and better controlled before any campaign can be mounted to move to a more exception-oriented reporting environment.

There are areas in organizations where vast amounts of detail are not only not required, but may have a deleterious effect.

On occasion, sales forecasting and results monitoring are attempted on too broad a scale. Too much data is manipulated, too much paper produced, and the result is frustration.

Consider a company with 50,000 active customers, 300 sales people and a product line of 800 items. This organization produces on a routine, batch basis, a number of sales reports. One set of reports tracks all sales by salesman and by customer. Another set tracks all sales by product category, and a third set tracks sales by region. All activity for all sales made during each month is printed in each of the three sets of reports. This, of course, amounts to a massive amount of detail.

An analysis of these reports might show that approximately 80% of the total sales were made to 20% of the customers. Further investigation might reveal that 350 of the total 800 products in the line produced 70% of the total sales revenue. The result of such an analysis would reveal that much less detail would provide a significant picture of the sales effort.

If the organization has its sales information under a data base management system, it will be easy to restructure the reports in order to reduce both the print time and paper volume required to produce meaningful reports. All data will still be used as input, but through a more effective selection process, those items that do not affect the business can be combined and printed as totals rather than as line items. The detail will still be available and can be produced when required.

The savings in the cost of paper, machine time, printer use and handling are obvious. If the process is put on-line and CRTs are used, further reductions in these costs can be realized. Perhaps the biggest benefit will be the lowered frustration level of those who must use the information. The sales function can now be managed more effectively and more immediately. Problem areas can be identified and corrected more quickly. The focus can be sharpened to identify and address the critical areas and to target new opportunities.

This may seem a rather elementary and obvious example of the value of exception reporting and perhaps it is, yet, such situations exist in many organizations. We tend to become sensitized to the work our departments produce. It never hurts to take the time to step back and look at what is being sent to our clients. An objective analysis of improvements in new technology may make exception reporting a more viable process.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

And visions of robots danced in my head

HUMAN CONNECTION
Jack Stone

There is no question that within a few years, enterprising systems folks will export cost-effective applications of robotic machines of all makes and styles from the production facilities of America to the offices.

This conclusion was driven home in the futuristic movie *Runaway*, in which these machines had not only become well established in such challenging environments as building construction, but even more impressive, they were serving as maids and housekeepers.

The plot of the film concerns an evil crook who replaces processor chips of user-friendly robots with chips programmed to turn the little fellows into user-hostile killers. Tom Selleck, a police officer who specializes in robotic deviants, tracks down the mad machines and dispatches the crook with alacrity.

Robot runs amok

It is not difficult to extrapolate from Selleck's saga and accept the inevitability of robots, designed to alleviate the shortage of skilled workers in computer centers. But one wonders how Selleck would handle a programming robot that has run amok.

- *The time*: Christmas Eve, the year 2010.
- *The place*: The offices of a major computer operation.
- *The scene*: Several dozen robot programmers are busily working at their desks, typing madly away at mainframe terminals, entering code at six to 10 times the rate of their human counterparts.

Doris Sisterman, a bright, young analyst who heads a small programming department is conducting an important meeting with her staff. In attendance is a robot with the name "R9D9" stenciled on its chest.

"Are we all agreed, then? The problem is of such crisis proportions that we must call Officer Selleck?"

"Yes!" responds the staff. The robot's antenna is seen to droop at the decision.

A few minutes later, Selleck races in with full regalia: steel headgear, leaded clothing and a zapper ray gun. "Where is the creepy, crawling monster? Let me at it!"

Sisterman puts her hand up to slow down the attack and says soothingly, "Whoa now, hold your horses and quiet down. Although our situation is desperate, you must appreciate that we certainly don't want you upsetting the other robots.

"We have delegated virtually all of our detail work to our robot teams. The machines take care of the computational support of system design, layout and documentation of the program specifications, parameter selections, detail coding and programming documentation.

"As a consequence, we find ourselves relieved of all the tedium, drudgery and routine aspects of the programming job, and we can focus all of our energies on the creative aspects of our assignments. However, the bottom line is that there is so little creative work to do that it's difficult to get psyched up to do it. So we programmed R9D9 here to play 'Adventure' with us, setting it up so that we find all the treasure and come up with a perfect score. The victory really gets our creative juices flowing.

Beyond the giant, green snake

"But someone changed his processor chip, and we can't move beyond the giant, green snake. We've tried everything — lighting the lamp, drinking the water, we even let the bird out of the cage.

"Unless we find a way to kill it, we won't win the game and we'll wind up without the incentive to design new systems.

"Please, Tom, will you find the sinister source of this horrific act?"

Selleck points his zapper at the visual sensor of the robot and demands, "All right, you bucket of bolts, who is the culprit? Tell me or I'll blow you right into electronic heaven."

R9D9 cringes. "I'll come clean. I did it — but with good reason. They were giving 'Adventure' a bad name with all their wins, and being a player myself, I couldn't stand the corruption."

Have a wonderful holiday and great New Year! ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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Even the briefest glance explains why the DECwriter III™ (the LA120) teleprinter has established Digital's long-standing reputation in the terminals market. This heavy duty teleprinter is every bit as tough as it looks.

It gives you exactly what you want. Fast draft speed printing at 180 characters per second. Fanfold paper capabilities in widths up to 15". A choice of 8 character widths. And extensive communications support, including auto answerback and auto disconnect.

Most importantly, the DECwriter III teleprinter is a true master of forms. Some 45 features, like horizontal pitch, left/right and top/bottom margins, as well as horizontal and vertical tabs, are all summarized right on the keyboard, allowing you to set up formats in an unusually quick and simple manner. Then, once set, all can be stored in non-volatile memory. And the DECwriter III teleprinter can provide crisp, legible forms up to an impressive 6 parts.

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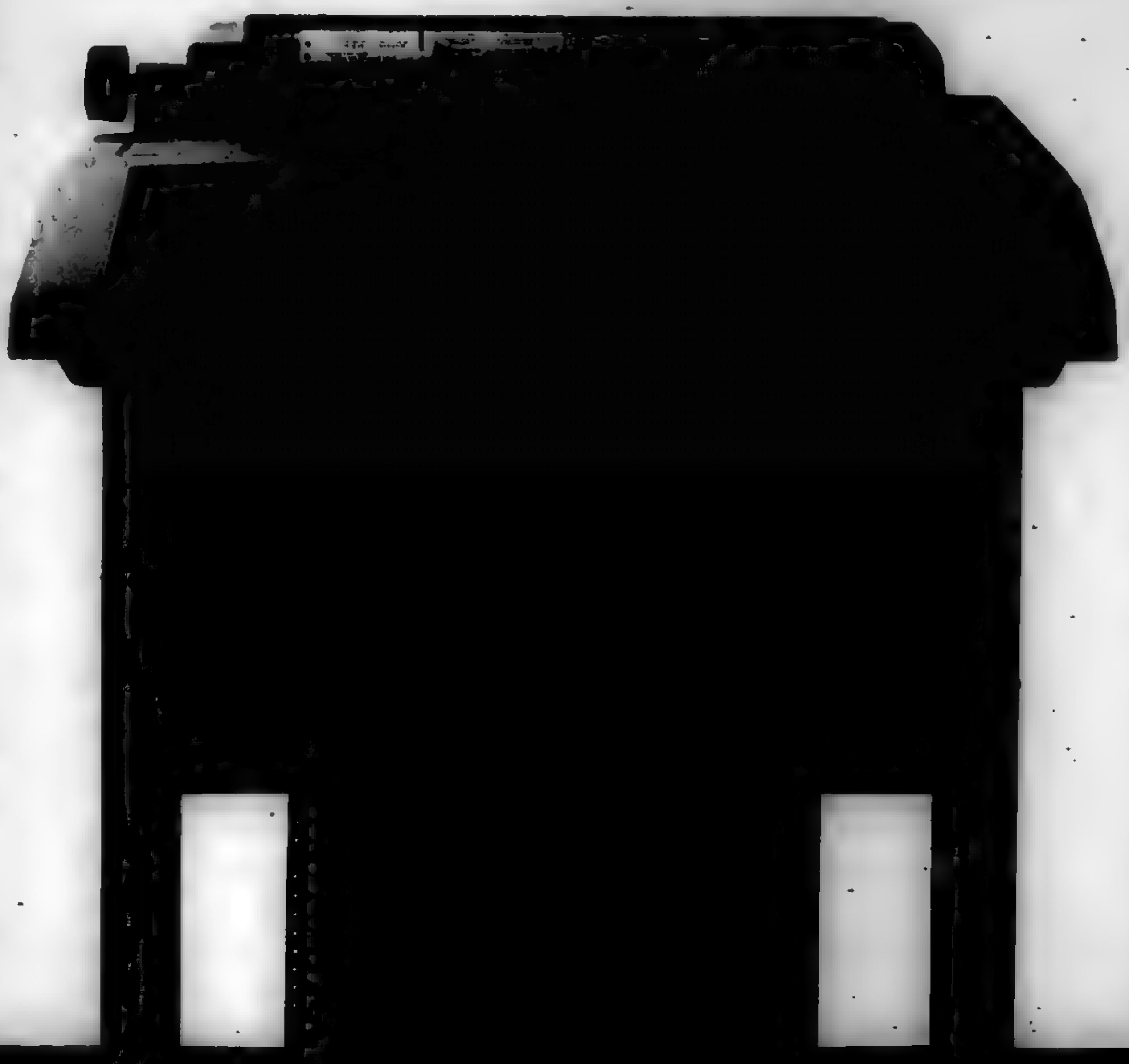
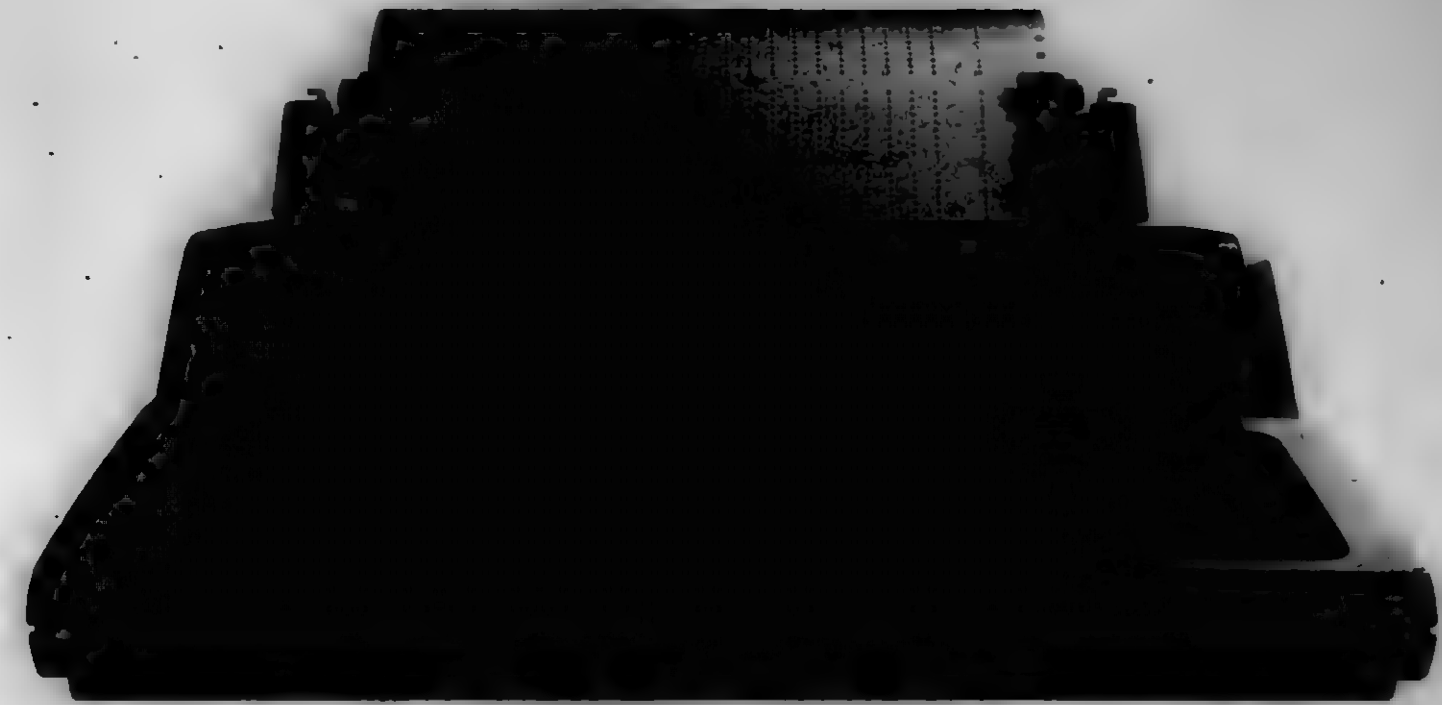
Flexibility is the word that best describes the Letterwriter 100™ teleprinter. For starters, you have a choice of multiple print speeds. You can print a draft copy of a one page proposal in just 10 seconds. Then,





by simply pressing a single button, you can shift from a high speed 240 characters per second to a high quality 30 characters per second, with printing that's difficult to distinguish from true letter quality. There's even an optional 80 character per second memo mode that's ideal for interoffice correspondence.

For further versatility, the Letterwriter 100 teleprinter lets you select from 8 different character widths, multiple character sets and a wide variety of typefaces. In fact, you can store 5 different typefaces resident within the teleprinter, and the selection can include Courier 10, 12, and Italics, Gothic 10 and 12, Orator 10, and APL, so you can select the style that suits the job as easily as pressing a key. And, in the event you'd like to illustrate a particular point, bit map graphics help you do just that.

The Letterwriter 100 can handle the paper that best suits your needs. Sheet, fanfold or roll, in any width up to 15."

Finally, the Letterwriter 100 product tackles all your forms. Setup is simple, and the high quality dot matrix printhead provides crisp, legible copies through 4 part forms.

In short, the Letterwriter 100 is the one teleprinter that finally lives up to the requirements of your whole office.

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In many situations, the applications themselves suggest a clear solution.

But just as often, the solution isn't quite so clear.

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SOFTWARE & SERVICES

JAD project aids design

User involvement stressed in structured method

By Gary Rush
Special to CW

Most DP professionals agree that increased user involvement ensures better systems design and reduced maintenance. Now there is a new way to achieve this through a structured meeting technique called Joint Application Design (JAD).

This technique, developed by IBM, uses an impartial, trained session leader and an agenda structured to extract a high-quality statement of business system needs in a fraction of the time normally required when using traditional methods.

This method replaces traditional techniques in which analysts interview users and then translate their needs into DP terminology. The traditional methods often fail because of the communications gap between data processing and the business community or user.

The JAD method provides a technique for documenting business requirements from the user's perspective and in the user's language. It does this with clearly defined steps, an impartial session leader to guide the participants, workbooks to assist both the session leader and the participants and the dynamics of a workshop environment.

In companies using JAD, the relationship between DP and users has improved, requirements and design specifications are being gathered more quickly, maintenance is being reduced because the system was designed right the first time, and backlogs have significantly diminished.

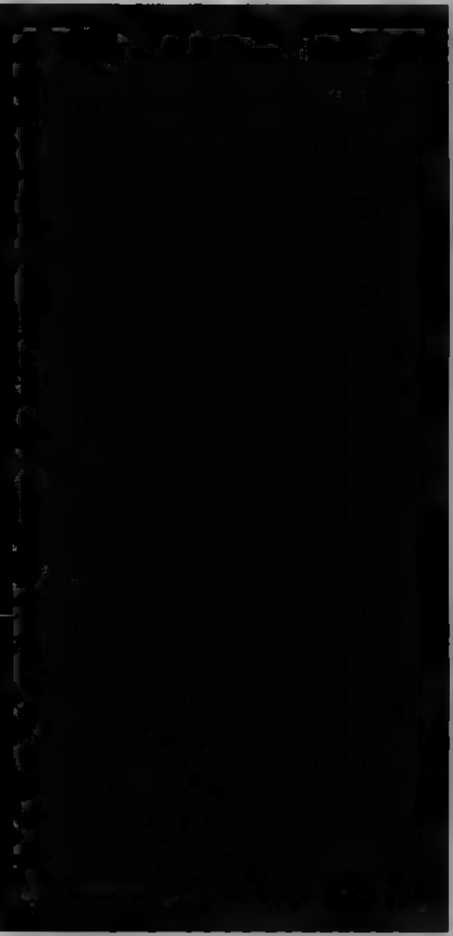
JAD can provide better requirements faster. Furthermore, involving users in the process of designing their business systems makes users feel that the system developed really is their system.

JAD works because it enables the business community to specify its system needs without having to resort to technical jargon. In addition, an impartial session leader ensures that all sides are represented, the workshop environment fosters a concentrated effort, and preworkshop preparation ensures high-quality needs.

The JAD process begins by identifying a user executive who sponsors the business system. The executive sponsor provides

See JAD page 38

Rush is a member of Exxon Corp.'s Development Center in Florham Park, N.J. He has functioned as a Joint Application Design (JAD) session leader and is a comanager of the JAD project within Guide, an IBM users group.



■ Help/38 Systems, Inc. announces a productivity aid for RPG-III/34

All software should be free, software developer maintains

By Maura McEnaney
CW Staff

TYNGSBORO, Mass. — Richard Stallman faced the crowd and boldly voiced his opinion. "I don't believe that people have the right to hoard software. Those who do are enemies of society."

Stallman, 31, is the originator of the Emacs editor and a former affiliate of the Artificial Intelligence Laboratory at MIT. Recently, he has become an outspoken advocate of free software.

As one of four panel members at a recent Wang Institute of Graduate Studies discussion of software protection and later during a phone interview with *Computerworld*, Stallman outlined his latest project — a Unix-compatible software system that will be given away to the public.

Stallman has been independently working on GNU, which stands for Gnu's Not Unix, a project that reportedly will include a kernel and utilities needed to write and run C programs. The product is

See FREE page 38

SOFTALK/PAUL GILLIN

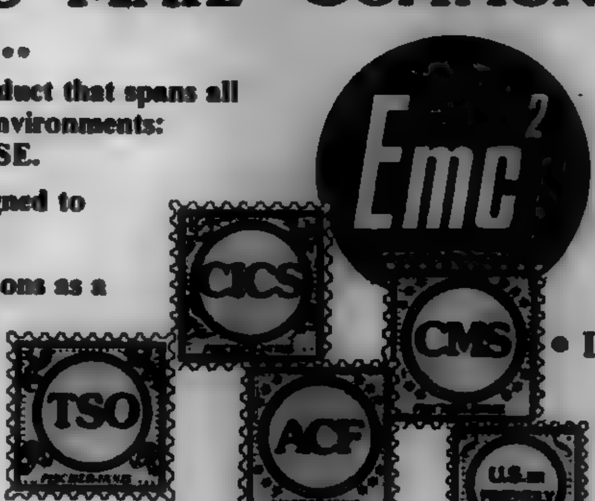
Sigma passing mourned

Sigma is dead.

The charter of the provisional Special Interest Group on Software Maintenance (Sigma) of the Data Processing Management Association (DPMA) was revoked last month for failure to recruit enough new DPMA members. The group plans to reorganize but as an independent entity.

Sigma's failure is unfortunate. With all the attention that software maintenance has received over the last couple of years, it would seem that the time was right for more formal recognition of the complex factors involved. It is generally agreed that maintenance costs in the average DP shop are approaching 50% of the programming budget. In some cases,

See [illegible] page 34



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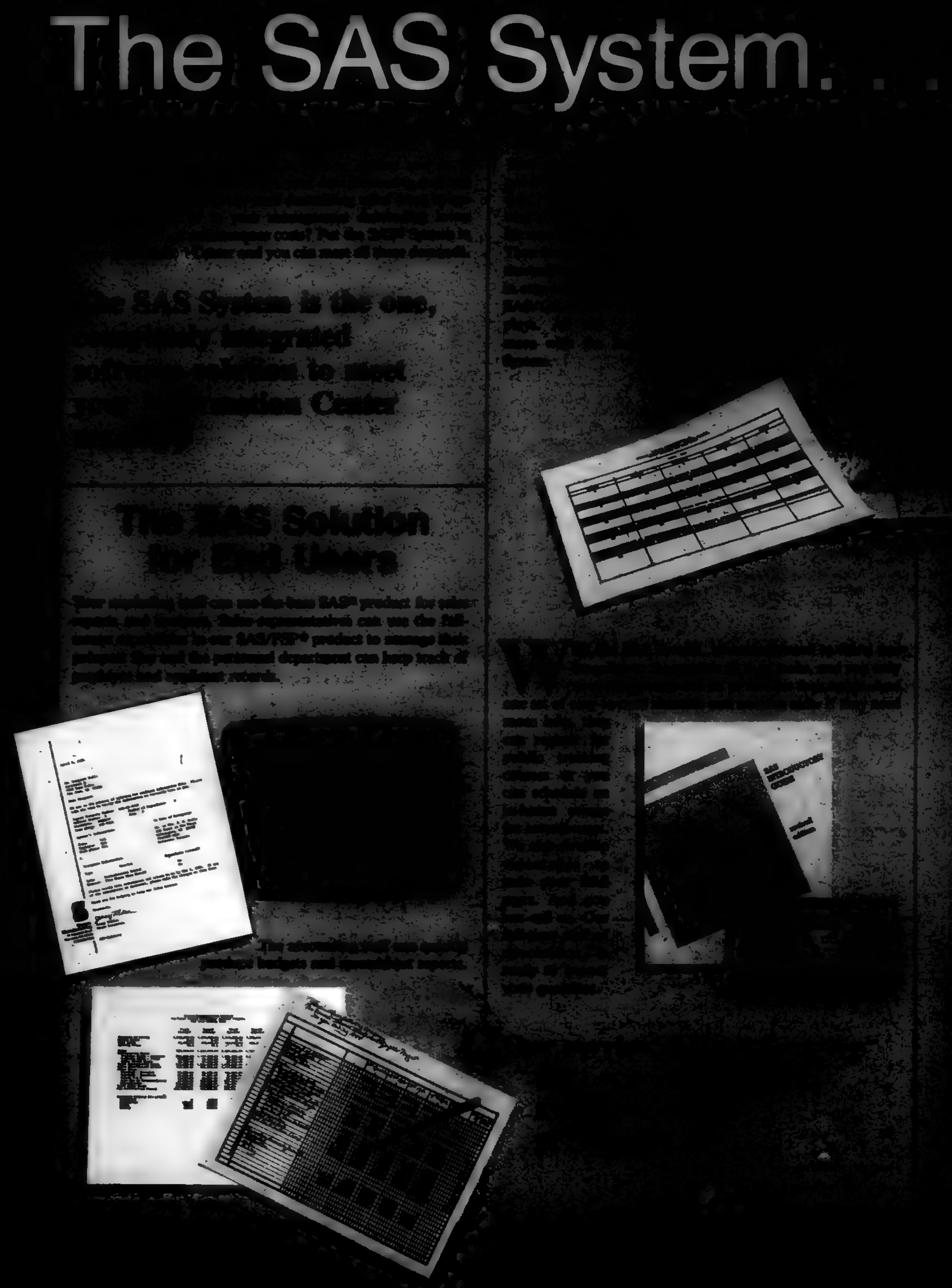

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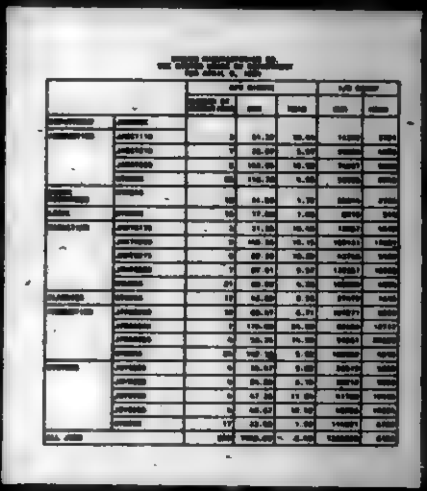

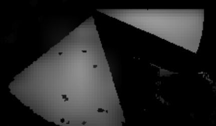

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RPG Lite converts RPG-III into free-format language

MINNETONKA, Minn. — Help/38 Systems, Inc. has announced a productivity aid that makes IBM's System/38 language — RPG-III — a free-format language.

According to a spokesman, RPG Lite allows programmers to type in source statements without prompting or formatting, just as they would for Cobol, Fortran or Basic. The package allows programmers to indent their coding into logical blocks and it then converts the code into compilable, formatted RPG III.

RPG Lite is said to reduce the IBM source entry utility (SEU) load on the System/38, allowing many programmers to code simultaneously without slowing response time because programmers can enter up to 100 lines of RPG-III without hitting Enter. Multiple statements reportedly can be coded on one SEU line. New programs can be coded with RPG Lite and new routines can be added to old programs.

RPG Lite is priced at $795, the vendor said.

More information is available from Help/38 Systems, which is located at 15102 Minnetonka Industrial Road, Minnetonka, Minn. 55345.

SIGMA

from page 31

that figure is closer to 80%. Sigma's commendable purpose was to draw attention to this issue. But its execution was faulty, at least as far as the DPMA was concerned. In revoking Sigma's charter, the organization said that Sigma had failed to recruit 100 DPMA members — a de facto requirement for certification. The DPMA also noted that Sigma had failed to petition for transition to regular status — a requirement for provisional DPMA special interest groups.

Christian Meyer, international vice-president for association growth and support at the DPMA, said, "Other than generating a newsletter, no further formative work went into the special interest group." He added that the basic structure was simply not in place to expand membership.

The group's officers maintain that they tried to recruit new members but could not satisfy the DPMA's requirements. "DPMA felt Sigma had not done enough in recruitment," said Ned Chapin, a DP consultant at Infosci, Inc. in Menlo Park, Calif., and former president of Sigma.

Sigma did succeed in signing up about 55 DPMA members and 115 non-DPMA members during its charter year. However, DPMA rules require all members to become part of the DPMA once the special interest group moves to regular status. For members, that would have meant paying the $50 DPMA fee plus an additional $15 for Sigma membership.

The group also apparently had never been clear on the requirements for certification as a DPMA special interest group. "We were trying to get members whatever way we could on a limited budget," said Nicholas Zvegintzov, editor of Sigma's newsletter, "Software Maintenance News." However, he added that Sigma never really knew how many DPMA members it had.

What Sigma lacked in organizational details it made up for in zeal. In 1984, Sigma members spoke at the National Computer Conference, the Information Management Exposition & Conference and professional development seminars for the DPMA and the Association for Computing Machinery. It was also heavily involved with the Second Annual EDP Software Maintenance Conference held in Washington last May.

No lack of interest

Those who were involved with Sigma agree that the organization's failure was not due to lack of interest. "The subject is still not very popular," said Girish Parikh, a Chicago-based consultant and author of two books on software maintenance. "Most people concentrate on development. People don't usually want to think about their problems."

However, no one sees the maintenance issue going away soon. Parikh said he believes attention will be refocused only through the efforts of groups like Sigma to bring maintenance to the floor.

In the meantime, the group's officers have vowed to try to create a new software maintenance group that is independent of the DPMA. "Software Maintenance News" will continue to be published. Chapin is interested in hearing from anyone who may want to participate in the new group. He can be reached at Infosci, Box 7117, Menlo Park, Calif. 94026.

In addition, the DPMA is welcoming comments from people who would like to rejuvenate software maintenance activities within the DPMA. Meyer is located at BST Consultants, P.O. Box 23425, Tampa, Fla. 33623.

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At 300 characters per second, our LaserJet printer is even faster.

Ten times faster than the best daisy-wheel printers. Yet the image is as sharp as you'll get from a printing press. Amazing.

and when you get to your hotel, change everything.

Two different plotters are also part of the HP personal computer system.

Both create full-color graphics. One with two pens, the other with six for even more detail.

If you like, the system can be knitted together through a LAN.

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The Portable has plenty of capacity; 272K bytes of RAM and 384K bytes of ROM. And with its built-in modem, it can link you with your office printers and plotters. Not bad for a computer that weighs just nine pounds and can fit into a briefcase.

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FREE

from page 31

is said to include an Emacs-like editor, a shell, C compiler, linker and assembler. Stallman said he hopes to have the project completed by the spring of 1985.

According to Stallman, "GNU will be able to run Unix programs but will not be identical to Unix." Longer file names, file version numbers, terminal-independent display support and a Lisp-based window system are planned for the product, Stallman said.

Through GNU, Stallman said he hopes to create a complete software system free for anyone to redistribute. "I consider that the golden rule requires that if I like a program I must share it with other people who like it. I cannot, in good conscience, sign a nondisclosure agreement or a software license agreement," he said. Once GNU is launched, Stallman believes they will have a system that no longer requires users to pay for their software. "The purpose of this is to make it possible [for me] to use computers without being ashamed of what I'm doing every minute."

Copies improve software

All software should be free, Stallman said, because it is improved upon only when it is built upon, just as "any [form] of art progresses most quickly when people build on each other's work. Every time you make copies of a program, you make things better for society."

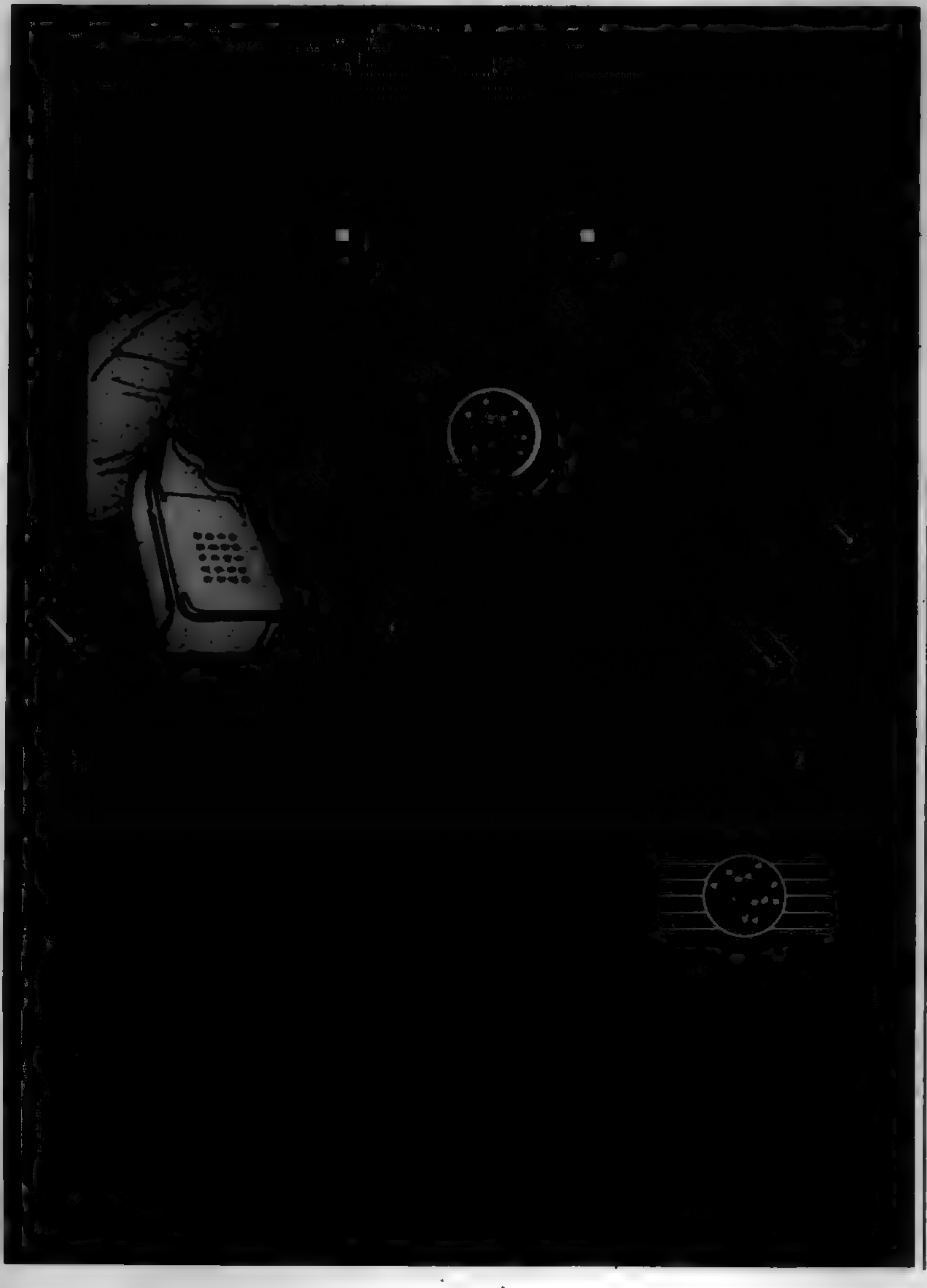
Licensing software only prevents people from being better neighbors, he noted.

"I consider it an utterly intolerable offense when people say I can use a program only if I agree not to share it with other people," he said. With GNU, Stallman said, "I wish to promote the sharing of software and interfere as much as I can with other people's attempts to interfere with the sharing of software."

Copyright laws provide a major interference with software sharing, Stallman said. These laws actually discourage users from being "good neighbors" and can result in fewer people using software programs and a deteriorating quality of the program, he said.

Software protection laws are similar to arson, Stallman said, since, "you threaten to destroy wealth if people don't pay you for it."

Although Stallman supplements his income by consulting for Lisp Machine, Inc., he maintains that, "what I write has to be shared."



JAD

from page 31

the management perspective and sets the purpose and scope of the effort. This management commitment is important to the success of the system design.

The preparation further involves completing a management definition guide and a familiarization guide and preparing the workshop agenda. The purposes of the management definition guide are to obtain user management commitment on timing and support; assign personnel for the sessions; define what management considers to be the purpose, scope and objectives of the project; and to identify the constraints of the project.

The familiarization guide is used by the session leader who interviews line management about the current business environment and encourages users to think about the upcoming design. The information collected is used to prepare the workshop agenda. For very large projects, the preparation also consists of a functional decomposition of the business by both the DP and user participants to ensure that only manageable pieces are tackled at one time.

System needs developed

In the JAD workshop session, all of the business requirements and systems needs are developed. These sessions generally run eight hours a day and usually no more than three to four days at one time. The sessions involve the session leader, one or two people to document the results, one or two DP personnel — usually the project leader and one technician — and up to eight users.

The users range from the lead clerks or technicians up through the second- or third-line management. The data processing personnel are involved to provide assistance to the users and background information on existing systems and technology. They also ensure that they understand the users' needs and can translate the resulting documents into a meaningful system design.

The basic session follows a very simple, flexible, yet thorough agenda. This agenda consists of 10 steps; two involve preparation and eight involve design.

The first two steps cover the ground rules and structure of the session and the current business environment. The remaining eight steps follow the life of a business function through a given area (see story page 31).

Materials, books, checklists, visual aids and other tools to support the technique and the session leader have been developed by IBM. The technique, developed in 1977 by IBM's Chuck Morris, was originally used to assist in installing distributed systems.

In 1980, IBM Canada adapted JAD so that it could be used for any requirements and design-gathering activity. Since then, it has been used by various companies to design everything from grain elevators to robotics to standard DP applications.

JAD consulting and training are now offered by IBM's Information Systems Services organization. In addition to IBM, the technique is used by such companies as Texas Instruments, Inc., American Airlines, Inc., CNA Insurance, Bell Canada, New York Life Insurance Co. and Carrier Corp.

COMMUNICATIONS

Report warns of Inter-Lata mart shakeout

By James Connolly
CW Staff

CHICAGO — The flock of 400 Inter-Local Access Transport Area (Inter-Lata) carriers will thin to 100 in a few years, and that group will be dominated by two dozen carriers who are now building their own networks, according to an industry report by Telephony Publishing Corp. here.

Taking its name from a famous economist, the study, titled "The Independents: The Gospel According to Adam Smith," found that the image of independent communications firms as "sitting ducks in the new competitive market" is a myth.

"Some years ago, the independents [such as MCI Communications Corp. and GTE Sprint Communications Corp.] saw that deregulation was becoming a fact and competition would be a permanent part of their business," the report noted. Seeing the writing on the wall, the independents pursued a two-pronged strategy. "They concentrated on digitizing their networks and also expanded into the more lucrative opportunities that would become available. The resulting mergers, acquisitions and joint ventures were suffused with the spirit of Adam Smith. The independents have now entered the performance phase of their strategy," the report said.

The independents are now focusing on Inter-Lata and multitenant services and the local-area network market, and the market for data communications hardware, software and services "holds promise of handsome profits." The report observed that the independents have been active in the mentioned markets through mergers, financing and construction. It predicted that the market for multitenant services would blossom into a $1 billion annual business within five years.

In the Inter-Lata market, the report predicted that companies like GTE Sprint and United Telecommunications, Inc. would succeed in the $40 billion Inter-Lata market because they are already building backbone networks to serve most of the major metropolitan areas. The study also noted that paging, CATV and videotex have "whet the independents' appetites." But the researchers found that more households will be using videotex than two-way cable by 1990.

In the voice/data communications customer premises equipment market, the study found that manufacturers and interconnects will share 50% of an approximately $8 billion market. Of the balance, AT&T Information Systems will account for 29% and the independents and divested Bell operating companies will share the remainder.

The report concluded that "a definite lack of fanfare has greeted the independents' march into the new markets. Few competitors have been alerted. That ignorance could prove expensive bliss.

"The independents have targeted the corporate market with an array of subsidiaries offering multitenant services, high-speed networks, specialized data bases and equipment for the integrated voice/data communications market. They're right on target."

The report is available for $100 from Telephony Publishing, 55 E. Jackson Blvd., Chicago, Ill. 60604.

Infotron unveils multiplexer

Infostream provides multinode networking

CHERRY HILL, N.J. — Infotron Systems Corp. has announced a voice/data multiplexer designed to integrate with the company's IS4000 Intelligent Switching System to provide multiple-node networking at T1 1.54M bit/sec speeds and higher.

Infostream is said to be a fully featured, software-driven, time-division multiplexer that can be used by itself in single- and dual-link, point-to-point, drop-and-insert or ring configurations. When used with the IS4000, it provides a multinode network operating at 1.54M bit/sec or 2.04M bit/sec with [illegible] or more multiplexers interfacing to each node, according to the company.

Infostream will be an element in Infotron's Advanced Network Integration approach to networking, which will integrate all Infotron products with networkwide management and control.

The multiplexer reportedly also works with Infotron's ANM800 Advanced Network Manager, a centralized monitoring and control system that reports continuous, real-time network status.

The vendor said Infostream will be an element in Infotron's Advanced Network Integration approach to networking, which will integrate all Infotron products with networkwide management and control.

Infostream is said to be software-controlled through a control console from a single, user-determined location. Diagnostics reportedly include remote channel level data monitoring. Infostream also stores multiple configurations for use in applications where separate day and night configurations are needed and features autoreconfiguration to reroute data or voice automatically by using a multilevel priority scheme, Infotron said.

The company reported that configuration changes or channel additions are down-line loaded without interrupting data on unaffected channels and that dynamic circuit allocation allows the user to reallocate bandwidth based on user-selectable priorities.

It supports AT&T-standard Pulse Code Modulation for 24 voice channels per T1 carrier or AT&T's proposed standard of Adaptive Differential Pulse Code Modification, permitting up to 44 voice channels per T1 carrier.

For data transmission, Infostream is said to provide channels for asynchronous or synchronous data at rates from 50 to 19.2K bit/sec. For high-speed data, it reportedly offers channels for synchronous data at rates from 56K bit/sec to 768K bit/sec.

It reportedly provides for bandwidth contention, permitting more devices to session-contend for a smaller number of time slots, such as four 9.6K bit/sec terminals contending for three 9.6K bit/sec time slots.

An optional statistical multiplexer interface card is available.

The company also said Infostream is configured for redundant central logic, link interface and power supplies.

Infostream costs $45,000 when configured for 64 channels and $78,000 for 128 channels.

More information is available from Infotron, which is headquartered at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

■ Equatorial Communications Co. and the New York Stock Exchange have announced an agreement under which the stock exchange will transmit price quotations/46

INSIDE

Voice/Data Communications/46

Amnet switches bow

WATERTOWN, Mass. — Amnet, Inc., a manufacturer of packet switches used in private networks, recently announced a new line of compatible, expandable X.25-based switches built with microprocessor components that are homogenous across the product line.

The Nucleus 6000 product family includes three models: the N6000/XAS X.25 Access Switch, which can support up to 300 packet/sec throughput; the N6000/XTS X.25 Transport Switch, which can transfer 500 packet/sec; and the top-of-the-line N6000/SPX Extended Performance Switch, which can shuttle up to 1,000 packets/sec.

All three models reportedly use the same hardware and software. Packet-processing modules can be added to increase packet throughput, and front-end processing cards can be added to increase the number of lines.

Packet routing, data-link protocol support and packet I/O queue management are said to be handled by dedicated microprocessors. "A typical node may include 20 microprocessors. Each microprocessor executes its own program from local [random-access memory], but they all manipulate common tables and data packets," the company reported.

The Nucleus 6000 system is segmented into control and port sections. The control section has up to 10 packet processors, common memory for packet routing

See SWITCH page 40

Easy Software tool links HP 3000, electronic mail

Easy Software Co. has introduced Easynet/3000, a combination of hardware and software that allows the Hewlett-Packard Co. HP 3000 computer running under HP's MPE operating system to connect to Western Union, Inc.'s Easylink electronic mail system, as well as to Telex and TWX facilities.

The system allows simultaneous transmission of messages from any terminal connected to an HP 3000 instead of through a Telex operator and eliminates the need for Telex and/or TWX equipment, the vendor said.

The software — HP Store — resides on the HP 3000 and is responsible for the overall management and configuration requirements of communications channel usage.

The hardware is connected between a hard-wired asynchronous RS-232 port on the HP 3000 and each communications line handled by Easynet/3000. One asynchronous port, one Easy Software Easynet/3000 Terminal Interface Controller channel and one modem are required for each communications line.

The package costs $7,275, which includes software and hardware maintenance for one year.

Easy Software is located at 348 E. South Temple, Salt Lake City, Utah 84111.

Network to carry stock prices

MOUNTAIN VIEW, Calif. — Equatorial Communications Co. and the New York Stock Exchange have announced an agreement under which the stock exchange will transmit price quotations via Equatorial's satellite-based network.

Under the five-year agreement, Equatorial will operate the point-to-multipoint network, which will provide the stock exchange's 4,000 subscribers with real-time price quotations through Equatorial's receive-only, 2-ft-wide earth stations.

The agreement follows a pilot program under which 25 earth stations were installed during the first quarter of 1984.

A stock exchange spokesman noted that many of the exchange's subscribers are in outlying areas where land-line service is expensive or difficult to obtain.

The New York Stock Exchange is located at 11 Wall St., New York, N.Y. 10005; and Equatorial Communications is at 300 Ferguson Drive, Mountain View, Calif. 94043.

VOICE/DATA COMMUNICATIONS

HEWLETT-PACKARD CO.
HP Remote Job Entry/1000-II

Hewlett-Packard Co. has announced an IBM 2780/3780 communications capability for the HP 1000 family of scientific and industrial computers.

The HP Remote Job Entry/1000-II (RJE/1000-II) reportedly allows HP 1000 computers to emulate the 2780/3780 workstation protocol for remote batch data communications. The HP 1000 had been limited to 2780 emulation on the HP 1000 E/F series.

The package is said to allow HP 1000 users to transfer files, access data bases and submit jobs for remote processing on IBM computers or computers emulating the 2780/3780 protocol.

The product supports a line speed of 19.2K bit/sec and achieves more than 90% line efficiency and less than 2% CPU utilization, according to the vendor.

The HP RJE/1000-II uses an intelligent microprocessor-based interface card to handle the bisynchronous communications link to the IBM host. The interface card provides fast and flexible communications with a range of computers by off-loading much of the I/O handling and task scheduling.

It reportedly operates with dial-up lines and leased lines and is suitable for applications such as communicating product manufacturing specifications from computer-aided design machines to HP 1000 computers on the factory floor.

The cost for HP RJE/1000-II ranges from $2,400 to $5,000. The programmable serial interface card needed to operate HP RJE/1000-II costs $2,325.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304.

SWITCH

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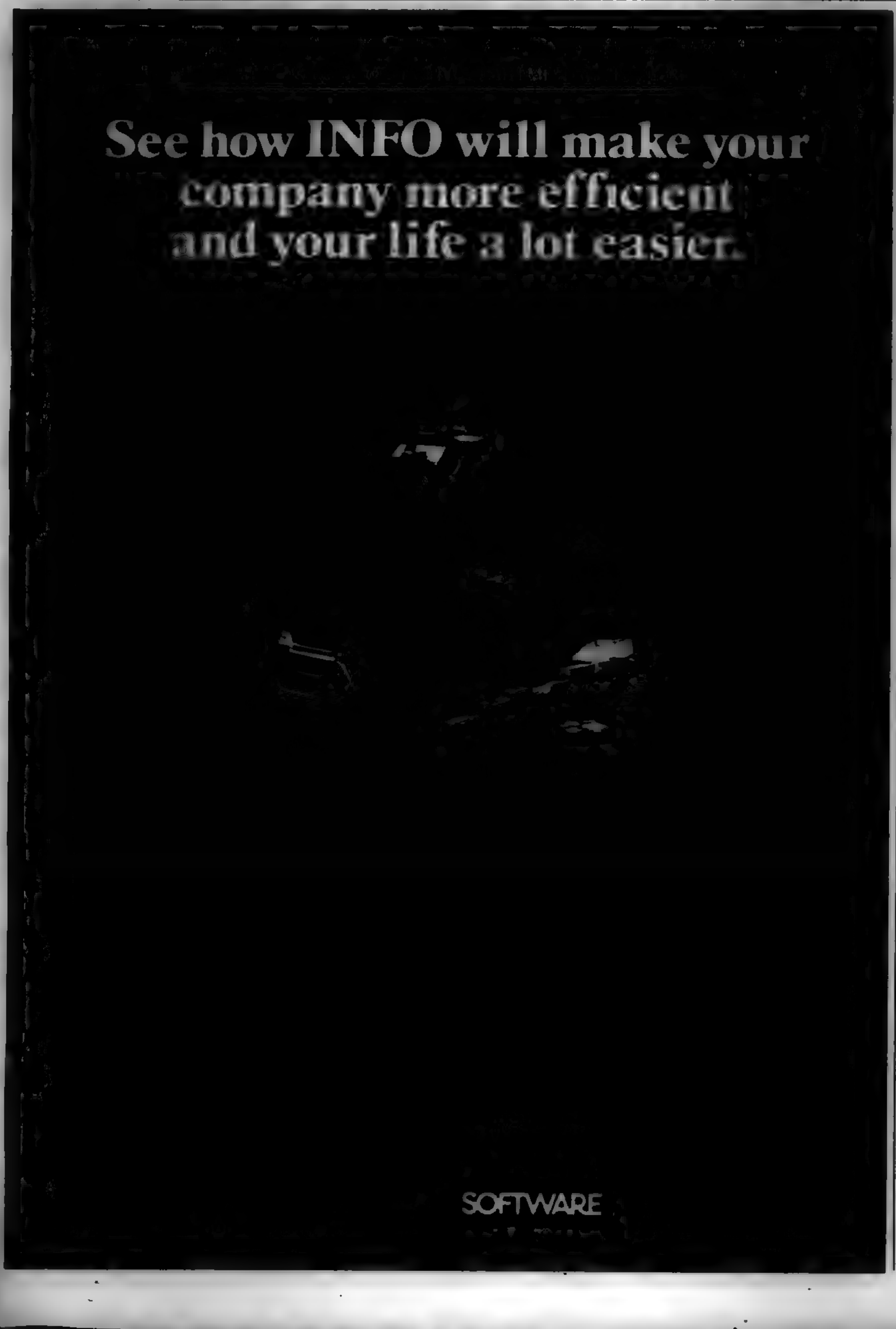
and other tables, an intelligent buffer, direct memory access (DMA) and buffer management.

The switch's port section has a proprietary bus that supports DMA transfers of data packets to and from front-end processors used to terminate lines. These front-end processors come in a low-speed version, supporting four RS-232 or V-24 ports at an aggregate rate of up to 19.2K bit/sec and in a high-speed 64K bit/sec version for subscriber lines or network trunks. As an option, dual-control sections, power supplies and redundant data base storage are available to heighten switch uptime.

The included network management system, controlled by separate data base processors, features distributed data bases for load sharing of call processing and other net management features. Also touted as original is the Nucleus 6000's dial-out X.25 capability, which complements the dial-in facility.

The Nucleus 6000 is available 90 days after receipt of order and ranges in price from $30,000 to $200,000.

Amnet is located at P.O. Box 412, 101 Morse St., Watertown, Mass. 02172.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SOFTWARE

SYSTEMS & PERIPHERALS

INSIDE

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IBM 3380 damage: Tip of a larger problem?

HARD TALK
Tom Henkel
CW Senior Editor

When IBM notified its 3380 disk drive users that a chemical used to kill bacteria in air-conditioning systems could damage the drives [CW, Dec. 17], it may have opened up a whole new area of concern for users and manufacturers of electronic equipment.

It is clear that in spite of the dramatic electronic breakthroughs that have made hardware faster, smaller and more reliable, much has to be learned about how these new technologies react in everyday environments.

IBM recently determined that a buildup of tin oxide in the head disk assembly was causing intermittent head disk assembly problems at several sites. The tin oxide is part of the chemical biocide used to kill bacteria in the water used in air-conditioning systems.

The chemical apparently lingers in a gaseous form in the computer room air the 3380 uses for head disk assembly cooling.

Although you have to give IBM credit for identifying an obscure technical problem, some users feel the explanation is somewhat farfetched. Several 3380 users contacted recently admitted that they have experienced higher than normal head disk assembly failures in 3380s, but seemed reluctant to admit that the problem was a direct cause of tin oxide contamination. Even makers of 3380-compatible disk drives, which use the same basic technology as the 3380, seemed to view IBM's biocide warning with some skepticism.

Storage Technology Corp. (STC) and Memorex Corp. were reluctant to state flatly that tin oxide in computer room biocides was a serious enough problem to warrant immediate action. After originally stating that a biocide containing tin oxide was safe if used in the chemical manufacturers' recommended quantities, STC decided to side with IBM, recommending discontinuing use of the biocide. Memorex is still studying the whole affair.

In fact, organometallic biocides may be only one type of chemical that can adversely affect 3380s. David Lema, director of the Teale Data Center of Sacramento, Calif., a service bureau run by the state, said his shop was having higher than normal head disk assembly failures about 10 months ago (roughly one a month over a six-month period). Because the Teale center does not use an organometallic biocide, Lema said IBM sent in a special team of investigators, which removed eight of 80 head disk assemblies and took various samples from the computer room to find out what was causing the problem.

So far, IBM has been unable to find any specific contamination problem at Teale. Lema believes the Teale center, which is located in a mainly agricultural area, may have been affected by pesticides used by surrounding farms. Following that possibility, the center reduced its outside air intake from 100% hourly to 15% hourly — the lowest legal fresh air intake in California. As a result, the problems have subsided. "We still have failures," Lema said, but the rate is no longer abnormally high.

The question that remains in the wake of the 3380 head disk assembly failures is whether the whole affair is just a bizarre incident or the tip of a much larger problem.

The thin-film head technology used in the 3380 has been a chronic sore spot for IBM as well as for other vendors that have tried to emulate IBM's product. Every manufacturer that has tried to develop a thin-film head disk drive has encountered at least one major technological setback that has delayed bringing the product to market. Clearly, the thin-film head technology challenges today's manufacturing techniques, but at this point, it seems fair to question whether the technology is just too fragile and too difficult to manufacture to be the mainstay of any major vendor's storage product lineup.

IBM is already in the throes of developing a larger version of the 3380, which analysts say will offer roughly 1.6 times the performance of the original 3380. Word is that the unit will also use thin-film read/write heads. It will be interesting to see whether IBM sticks with the thin-film technology when it develops an even bigger drive to replace the 3380.

See [illegible] page 42

CAD graphics system introduced

NORTH BILLERICA, Mass. — Raster Technologies, Inc. has announced a three-dimensional graphics system, the Model One/380, for applications in mechanical computer-aided design, geophysical processing, simulation and architectural design.

The Model One/380 features the company's 32-bit floating-point coprocessor and command set, up to 4M bytes of local display memory, a 1,280- by 1,024-pixel resolution, up to 24 bits of image memory for truer color and a 16-bit depth buffer, the vendor said. The product also includes a Zilog, Inc. Z8000 microprocessor.

The product's functions include coordinate transformations, light model calculations, smooth shading and hidden surface removal. Porting these functions to the local graphics system results in higher performance on the host, the company said.

The Model One/380 comes standard with a direct memory access port conforming to Digital Equipment Corp.'s DR11W and DRV11B specifications, the company said.

The price for a Model One/380 with 19-in. monitor, keyboard, data tablet and mouse is $41,500, the vendor said. The product will be available in February.

More information can be obtained from Raster Technologies, 9 Executive Park Drive, North Billerica, Mass. 01862.

DEC-based graphics system out

DAYTON, Ohio — CAD CAM, Inc. has announced the CAD CAM Complete System graphics design station, based on the Digital Equipment Corp. LSI-11/23 or LSI-11/73. It also features a NEC Corp. 7220 graphics display microprocessor and an Intel Corp. 8605 microprocessor display system controller.

The dual-screen workstation comes with either 512K bytes or 1M byte of random-access memory (RAM) and up to 50M bytes of disk storage.

Monitor resolution is 1,024 by 1,280 pixels, and color is an option.

The price for CAD CAM Complete System based on the LSI-11/23 with 256K bytes of RAM and a 2M-byte floppy disk is $37,500, the vendor said.

The price for a system based on the LSI-11/73 with 1M byte of RAM, a 25M-byte fixed disk, 25M-byte removable disk and a 1M-byte floppy disk is $47,500, the vendor said.

The price for the color option is $7,500, the company said.

More information on the CAD CAM Complete System can be obtained from CAD CAM, which is located at 2844 E. River Road, Dayton, Ohio 45439.

STC adds disk controller, drives, 3380 disk emulation for 4305 storage subsystem

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has announced IBM DOS/VSE support for its 4305 Optimiser Storage Subsystem, the 8890 Sybercache Intelligent Disk Controller and 8380 disk drives. The 4305, 8890 and 8380 are hardware- and software-compatible with IBM's 30, 4300 and 3080 series and equivalent processors.

The STC units can reportedly run without software modifications under all releases of IBM's VM/370, MVS (including SE, SP and XA) and now DOS/VSE Release 3.5.

The 4305 I/O device, which now emulates an IBM 3380 disk device, will reportedly deliver to DOS system users the performance requirements necessary to optimize applications sensitive to response time.

The STC 8890 Sybercache Intelligent Disk Controller helps solve performance-related I/O problems in an interactive or batch system environment by improving the response time for applications, the vendor said.

The two 8380 disk drive models are capable of storing 2.5 billion characters of data with a transfer rate of three million char./sec. They reportedly offer the DOS/VSE system user a storage capacity of 2.5G bytes and a reduced access time averaging 16 msec.

A typical configuration — a 4305 Model 3 with one storage director and two storage modules with 24M bytes of memory —costs $60,000. The same 4305 with four storage modules (48M bytes of memory) is priced at $120,000. The 8890 with 3M bytes of memory costs $116,250, and with 6M bytes, it costs $130,950.

The 8380 Model AA4 is priced at $87,225; and one, two or three B4 units can be attached to the AA4 for $63,150 each, according to the vendor.

More information is available from STC, 2270 S. 88th St., Louisville, Colo. 80028.

Netlink offers 3703 enhancement

RALEIGH, N.C. — Netlink, Inc. has announced a microcode enhancement for its 3703 Network Processor that features support for IBM's Remote Job Entry (RJE) Station Facility, which is said to emulate IBM's 3777 Model 3 and Model 4 multiple logical units. The added emulation is said to permit Ascii, Binary Synchronous Communications or Personal Computer devices to attach to IBM's Job Entry Subsystem 2 or Subsystem 3 with full RJE console function.

The 3703 is a physical unit-type cluster controller node said to map multiple protocols concurrently to user-defined multiple logical units. It is meant for use with host CPUs using IBM's Systems Network Architecture.

Functions include multiple logical units per port, permitting concurrent operation of screen and printer, the vendor said.

The price for the enhanced microcode provided with new orders of the 3703 Network Processor ranges from $8,500 to $12,500. Upgrading to the enhanced microcode costs $500.

Netlink is located in Suite 110, 2920 Highwoods Blvd., Raleigh, N.C. 27625.

DISKS

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Recall that IBM was one of the first companies to scrap most of its Josephson Junction research projects, claiming the cryogenic technology was too expensive to build and, perhaps more importantly, too difficult to maintain in the field to be a viable technology for CPU designs.

IBM is not saying exactly what is going wrong with its 3380 head disk assemblies as a result of tin oxide contamination. Some say the problem is a simple one; the chemical is building up on the disk platters and on read/write heads in sufficient quantities to cause a head crash. Others, however, tell a more complex story. One technician said the tin oxide is breaking down the effectiveness of the tiny three-stage filter that blocks particulate matter from entering the 3380's head disk assembly, causing more foreign elements to enter the head disk assembly. Another theory is that tin oxide is also breaking down the plastic used in the 3380 cabinet, which in turn releases another gas that can damage the 3380 storage media.

Whatever the cause, IBM clearly has a problem it would like to solve. The company is replacing failed head disk assemblies without charge and is taking special care to contact 3380 users about the potential problems. IBM is obviously viewing the 3380 situation as a very serious problem — one that may cast a shadow on the future of thin-film heads as a technology in IBM disk products.

Reach the Danish computer market with Computerworld/Denmark.

The Danish EDP market is growing at an incredible rate of 23% annually. Last year, this market was valued at more than $185 million. And the U.S. is Denmark's major supplier of EDP products accounting for 40% of the country's computer equipment imports.

When Danish computer professionals with purchasing power want the most up-to-date local and international information on the EDP industry, they read *Computerworld/Denmark*, sister publication to *Computerworld*. *Computerworld/Denmark* is a bi-weekly newspaper serving the Danish computer community with the latest developments in hardware, software, terminals and other computer products and services. And, in every issue, the *MicroWorld* section reports on the special needs of the micro end-user and the status of the market.

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GRAPHICS SYSTEMS

SKOK SYSTEMS, INC.
Artech 217 Workstation

Skok Systems, Inc. has announced the Artech 217 Workstation desktop computer-aided design and drafting system, based on the Hewlett-Packard Co. 32-bit Model 9000 desktop processor.

The Artech 217 is compatible with Skok Systems' Artech 220 and 220GP design stations that run Skok's application software, and all three can be networked, according to the company.

The product features a 14-in. monochrome display screen, keyboard and graphics tablet. A Motorola, Inc. 68010 microprocessor uses 2M bytes of random-access memory in a standard configuration.

The price for an Artech 217 entry-level system, including the Artech 217 Workstation, dual-disk drive and Arplan two-dimensional design and drafting software, is $29,900.

Skok Systems, 222 Third St., Cambridge, Mass. 02142.

CAE SYSTEMS, INC.
CAE 2000/550 color workstation

CAE Systems, Inc. has announced the CAE 2000/550 color workstation, based on Apollo Computer, Inc.'s Domain DN550 color workstation. The unit supports existing CAE 2000 electronic design automation tools and interfaces.

The CAE 2000/550 can operate in a stand-alone configuration or as a node in the company's multiengineer Worksystem design environment.

The workstation's software can be used to color multiple wave forms individually, to identify nodes on the circuit diagram and to highlight circuit blocks and key data.

The Apollo DN550 workstation is based on the Motorola, Inc. 68010 microprocessor and a dedicated bit-sliced graphics processor. The CAE Systems configuration is available with up to 3M bytes of main memory and can support up to 24 concurrent processes, each with 16M bytes of virtual address space, the company said.

The resolution of the workstation's 19-in. CRT is 1,024 by 800 pixels, and the unit can display eight colors simultaneously, according to the company.

The price for the CAE 2000/550 with 1.5M-byte memory, 50M-byte hard disk storage and software is $62,800.

CAE Systems, 1333 Bordeaux Drive, Sunnyvale, Calif. 94089.

'That's all I want for Christmas, Dad, a little computer with all the answers for fourth-grade math.'

POWER SUPPLIES

NOVA ELECTRIC MANUFACTURING CO.
Galaxy 1000

Nova Electric Manufacturing Co. has announced the Galaxy 1000 on-line 1 kVA uninterruptible power supply, said to include a battery charger, battery, inverter and ¼-cycle static transfer switch.

The Galaxy 1000 features total harmonic distortion of less than 3%, with the output waveform closely approximating the power produced by electric utilities, according to the vendor.

It is intended for static loads of up to 1,000 VA, but a short-term overload of up to ten times its rating is provided, the company said. Voltage regulation is ±1%, and frequency regulation is ±0.5%. Battery backup time reportedly is nine minutes.

The Galaxy 1000 costs $3,600.

Nova Electric, 263 Hillside Ave., Nutley, N.J. 07110.

BOARD-LEVEL DEVICES

DATA-SUD SYSTEMS/U.S., INC.
Versabus/Vmebus Adaptor

Data-Sud Systems/U.S., Inc. has announced the Versabus/Vmebus Adaptor Versabus board, said to enable users to install and operate most Vmebus boards in a Versabus card cage.

The card's interior is cut out to the size of a double Virtual Machine Environment (VME) board and is fitted with a standard P1 connector. Another cutaway is provided in which the user reportedly may place a VME P2 or other connector for special purposes, such as an I/O channel. The adapter board takes one slot in the Versabus rack.

Direction of data and address buffers are jumper-selectable for master or slave modes, and address modifier transcoding by programmable read-only memory is possible, the company said. The board's base address is programmable anywhere in the 16M-byte Vmebus memory map. Operating temperature is zero degrees Celsius to 70 degrees Celsius, and power requirements are +5V, +12V, -12V and +5V standby.

The price for the product is $495.

Data-Sud Systems/U.S., Suite J, 2219 S. 48th St., Tempe, Ariz. 85282.

PRINTERS/PLOTTERS

OUTPUT TECHNOLOGY CORP.
OT-700 printer

Output Technology Corp. has announced the OT-700 matrix printer, said to offer correspondence-quality printing at 350 char./sec and a dot-addressable graphics capability.

Centronics Data Computer Corp.-type parallel and RS-232C serial interfaces and a 4K-byte buffer memory are offered as standard features, the company said.

Other features are 136-col. carriage width and character sets including foreign languages.

The OT-700 printer costs $1,795.

Output Technology, Suite 205, 606 110th Ave. N.E., Bellevue, Wash. 98004.

MICROCOMPUTERS

SMALL TALK
Paul Korzeniowski
CW Staff

Fewer surprises as micro industry reaches maturity

Have you noticed that microcomputer whiz kids are becoming wheeze kids? Steven Jobs and William Gates are fast approaching the Big Three-O. Potential whiz kids, such as the college-age founders of Arktronics, Inc. are finding that duplicating the company-run-out-of-a-garage-success of Apple Computer, Inc. is practically impossible.

The microcomputer industry has grown up. It has reached the stage when parents hand their sons the car keys and go to sleep rather than pace the floor. The change was evident at Comdex/Fall '84, which was slow-paced and lacked the excitement of previous shows.

This change can also be traced to decisions made in large corporations. No longer are companies frantically searching for the best data base management system or spreadsheet package. Most are content with one package and are slow to replace it. There may be a better integrated package than Lotus Development Corp.'s 1-2-3, but a large-scale displacement of 1-2-3 is unlikely, if not impossible.

Since the microcomputer industry has reached this new age, users should not expect many surprises in 1985. Hardware shapes up as a two-company race, with IBM and Apple pulling away from the rest of the field.

IBM's Personal Computer AT and Apple's Macintosh solidified these companies' premier positions. Currently, they account for 40% to 50% of the market, which may increase to 50% to 60% at the end of 1985.

Tandy Corp. made a valiant attempt to stay with this pack in 1983 when it introduced its TRS-80 Model 2000, but that machine was quickly lapped, and Tandy, like a myriad of other vendors, is now trying to copy IBM with the recent announcement of the Tandy TRS-80 Model 1000, an IBM Personal Computer-compatible machine.

Data General Corp. and Hewlett-Packard Co. have decided to run in the laptop microcomputer race, which is not as prestigious as the desktop race. They are not intimidated by the lack of success of other vendors, like Gavilan Computer Corp., Visual Computer, Inc. and Convergent Technologies, Inc.

But they should be intimidated. Simply put, most employees would rather leave their work at the office than bring it home.

Despite the fact that HP will introduce an AT&T Unix-based laptop and IBM will announce its laptop entry, this market will again fail to experience the boom that pundits have incorrectly predicted for at least two years.

In software, the big squeeze will continue. In 1984, Visicorp, once the premier software company, was crushed as it

See GROWN page 45

Grid adds to Compass line

Enhancements include systems, application software

By Kathleen Sullivan
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — Grid Systems Corp. earlier this month added to its Compass II line of portable computers by introducing two models that feature a larger electroluminescent screen. Grid also lowered the price on older Compass II systems and unveiled three software packages: Gridmaster, Gridpaint and Gridtask.

The Grid Models 1131 and 1139 are said to feature an 8.5-in. diagonal, bit-mapped screen that can display 25 lines and accommodate up to 128 char./line. (The other members of Grid's portable computer family have 6-in. screens and display up to 80 char./line on a 25-line screen.)

The Compass II Model 1131 includes 256K bytes of random-access memory (RAM), 384K bytes of nonvolatile bubble memory, up to 512K bytes of user-installable read-only memory cartridges and a built-in 300 or 1,200 bit/sec modem. It is priced at $6,795.

The Compass II Model 1139, a 512K-byte version of the computer, sells for $7,995. Like the rest of Grid's computer line, the systems can run Grid's proprietary operating system or Microsoft Corp.'s MS-DOS, the company said.

Compass II price reductions

In the same announcement, Alan B. Lefkof, Grid's vice-president of marketing, said the company would be dropping the price of the two original Compass II systems, introduced last June, by 10% to 12%. The 256K-byte Model 1121 will now cost $5,995, and the 512K-byte Model 1129 will be priced at $7,196.

The firm's expanded line of integrated software packages includes Gridmaster, an icon-based desktop organiser said to provide programs that keep track of appointments, addresses, files, organizational charts and project schedules. It also features an automatic telephone dialer and a calculator, the firm said.

In addition, icons that represent automated desk and management functions appear on a line at the bottom of the screen that holds up to 10 icons at a time. The program sells for $250.

Gridpaint, an Apple Computer, Inc. Macintosh-like paint program, is said to allow users to create a variety of on-screen graphics images. Using Grid's electronic pens, paintbrushes, rulers and compasses, users can draw circles, rectangles, lines and free-form shapes. By connecting the computer to a digitizer from Datacopy Corp., also based here, users can transfer photographs to the computer screen, the company said.

In a demonstration at the company's headquarters, the firm showed how to design images using either Grid's keyboard and built-in commands or a mouse. Gridpaint includes 11 different patterns that can be used to fill in an area. The program sells for $200, the company said.

Finally, the firm introduced Gridtask, a high-level programming language that is said to allow users to create custom applications that can hide the underlying complexities of the system from inexperienced users. Gridtask divides the screen into two windows. While an applications program is running in the background in one window, the Gridtask window displays a menu of choices available to the user, the firm said.

For example, with Gridtask a program could be written that would allow a sales manager to retrieve revenue data from six different host computers by pressing one key and without understanding how the process takes place, the company said. Gridtask sells for $250.

Further information may be obtained from Grid, 2535 Garcia Ave., Mountain View, Calif. 94043.

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- Sweet Micro Systems has announced Trump Card, a board that increases IBM Personal Computer speed and throughput/44

INSIDE

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Software utility converts Dbase II to C English

CHICAGO — C Line, Inc. has announced a utility that converts programs written for Ashton-Tate's Dbase II so they can be used with C Line's C English.

C English is a fourth-generation programming language that possesses many characteristics of C, the company said. The converter reportedly was designed so that large or complex Dbase II programs can be run under C English.

The Dbase II-to-C English converter is said to transform Dbase II files into a format suitable for the target data base manager used by C English. It is also said to create a compiled program that runs faster than an interpreted Dbase II program. Because C English uses a syntax similar to Dbase II, it does not require programmer retraining, the vendor said.

A C English compiler interface reportedly provides complete portability by translating C English into source code and using a host C compiler to produce native machine code. The converter reportedly saves program development and runtime charges.

The software utility runs on an IBM Personal Computer XT with IBM's PC-DOS 2.0 and other machines with Microsoft Corp.'s MS-DOS 2.0 and a hard disk.

The product is priced at $200 with the C English language and $500 without the language. C English costs $795.

C Line is located at 20 W. Ontario, Chicago, Ill. 60610.

Grammar aid out

LONGBOAT KEY, Fla. — Is your writing riddled with worn-out cliches? Did a coworker point out a spelling error in the memo you sent to your supervisor? If so, Decisionware, Inc. says it has a product that may help you: a grammar corrector that works on an IBM Personal Computer with IBM'S PC-DOS operating system.

Decisionware's Rightwriter software incorporates artificial intelligence techniques to analyze documents for errors in grammar, usage, punctuation, style and spelling, the vendor said.

The package reportedly helps tighten writing by pointing out wordy phrases, weak sentences and overused words. It also points out cliches, slang, passive voice and jargon, Decisionware said.

The product is said to base its decisions on 1,500 grammatical rules and a dictionary of more than 30,000 words. It also uses the U.S. Department of Defense's standard to calculate the reading grade level for each document, Decisionware said.

Rightwriter works with documents created by a number of word processing packages, including Micropro International Corp.'s Wordstar, Software Publishing Corp.'s PFS:Write and Microsoft Corp.'s Word, according to the vendor.

The product requires 96K bytes of random-access memory and two disk drives.

Rightwriter costs $75.

Decisionware is located at 4030 Gulf of Mexico Drive, Longboat Key, Fla. 33548.

Enhanced PC/Net-link available

ROCKVILLE, Md. — Informatics General Corp. has announced an enhanced version of its PC/Net-Link, a menu-driven software package for information retrieval from on-line data base services. PC/Net-Link, for the IBM Personal Computer XT or Personal Computer with external hard disk drive, now features downloading and uploading capabilities, according to the company.

The package automatically logs on and provides a menu-assisted approach to data bases from most major on-line retrieval services such as Dow Jones & Co. and Lexis/Nexis, Informatics said. Enhancements reportedly permit the user to create and edit search formats offline and later upload them to the chosen data base and to download search results to hard disk.

"PC/Net-Link also allows the searcher to find information even if the data base and its service are not known," said Lucinda Leonard, vice-president for Informatics' Library Services Division.

Integrated directory

"The package contains a single integrated directory of data bases from all of the services it accesses," Leonard said. "Its two-level subject menus lead the searcher to the right group of data bases for the search. The searcher then has two options: Reviewing a list of data bases within that group, or seeing an on-screen description of a specific data base's contents and a list of the retrieval services through which it is available."

The enhanced PC/Net-Link, available now, is priced at $550. Required communications software costs an additional $100.

Informatics' Library Services Division is located at 6011 Executive Blvd., Rockville, Md. 20852.

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Trump Card boosts IBM micro performance

CRANSTON, R.I. — Sweet Micro Systems has announced the Trump Card microcomputer board, said to increase speed and improve throughput of selected tasks in the IBM Personal Computer and compatibles.

Trump Card is said to run programs from 10 to 100 times faster than a Personal Computer alone and is said to provide from three to five times throughput improvement in assembly language benchmarks.

The product plugs into an IBM Personal Computer or compatible and features a 16-bit Zilog, Inc. Z8001 microprocessor, the vendor said. Trump Card is compatible with Microsoft Corp.'s MS-DOS and IBM's PC-DOS.

Trump Card reportedly has its own operating system called ZSYS, with capabilities including dual-program processing, allocation of unused memory for cache storage, and monitor support.

The product is provided with three languages: TBasic Compiler, compatible with IBM Basica source files; C-Compiler to compile all standard C programs; and a Y Z8000 Structures Assembler, the company said.

Trump Card sells for $995. The price for Trump Card with 256K bytes of random-access memory (RAM) is $1,395, and the price with 512K bytes of RAM is $1,695.

Sweet Micro Systems is located at 50 Freeway Drive, Cranston, R.I. 02920.

SOFTWARE

THE INFORMATION PEOPLE
Organizer II

The Information People has announced an enhanced version of the Organizer II, a universal operator interface designed for the IBM Personal Computer line.

Organizer II is a window-based application integration package that reportedly features a menu generator with a built-in help facility and the capability to process multiple system commands with prompted operator entry.

The product also incorporates a facility for multiple disk mount requests and verification and a disk file management system, the vendor said.

The enhanced version of Operator II reportedly makes use of the IBM Personal Computer's speed, color, line graphics and expanded memory features.

Using the product, microcomputers running Microsoft Corp.'s MS-DOS; IBM's PC-DOS; Digital Research, Inc.'s CP/M, MP/M and Concurrent CP/M; and Musys Corp.'s Turbodos operating systems can be made to appear functionally identical, according to The Information People.

Organization II is priced at $149.

The Information People, 443 Hudson Ave., Newark, Ohio 43055.

GROWN

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failed to deliver much of anything except Visicalc. The settlement of a legal dispute returned Visicalc to its developer, Software Arts, Inc. Visicorp then merged with Paladin Software Corp.

Micropro International Corp. and Digital Research, Inc. may join Visicorp. Micropro has been unable to sever its dependence on Wordstar, as seen by the recent debut of Wordstar 2000. Digital Research will curse the day that IBM chose Microsoft Corp.'s MS-DOS operating system. Despite the fact that Digital Research has delivered solid, state-of-the-art systems, few seem interested in purchasing them.

Despite the criticism that Symphony received, it ensured Lotus' position as the most important micro software supplier. Symphony has not equaled 1-2-3's success, but it has been ranked as one of the five top-selling products of 1984. Jazz, a bona fide winner, will enrich Lotus' already-vast coffers.

IBM plans to be a contender for the title of second most important micro software developer. While its recent offerings were not earth-shattering, they do carry the Big Blue label, a guarantee of success.

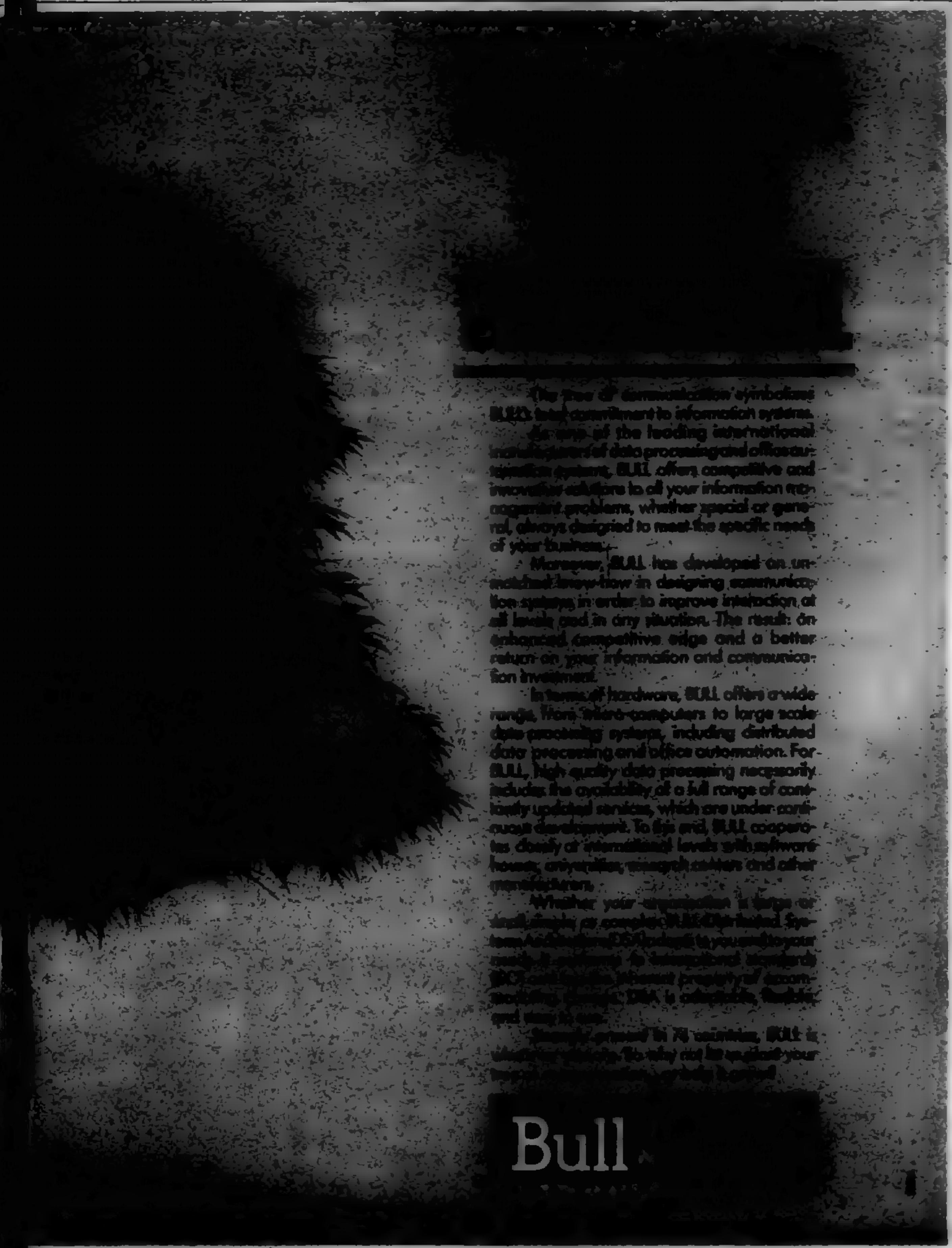
Emerging software companies will have to tangle with IBM and Lotus for a market share. Vendors, such as Lightyear, Inc., that are pioneering new applications by incorporating artificial-intelligence-like capabilities have the best chance for success.

In addition to good products, the pioneers will require marketing expertise, venture capital and a lot of luck. Vendors offering little more than an improved data base manager or word processor seem destined to fail.

With hardware and software somewhat stabilized, peripherals are becoming the area of innovation. A number of companies are following HP's lead by offering laser-jet printers. With printer cost coming down, these products will become popular.

As the quality of micro graphics have improved, tools that transform graphics into slides or read graphic input, such as a photograph, have emerged. Firms are solving training problems by uniting micros and video recording units.

The fact that peripherals are the main area of innovation in the microcomputer industry tells us how the industry has changed. In sum, 1985 looks like a typical year in a mature industry.



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COMPUTER INDUSTRY

Exec questions IBM role

Apple's Sculley credits Big Blue with spurring market growth, cites need for 'different vision'

By David Gimes
CW Staff

PALM SPRINGS, Calif. — IBM's entry into the personal computer market in 1981 helped spark the industry's sensational growth, but Big Blue's dominance has also stunted innovation in the field, according to the head of Apple Computer, Inc.

John Sculley, president and chief executive officer at Apple, said IBM's entry into the market helped to "lend tremendous credibility to the personal computer." However, he said, the industry has paid a high price by allowing IBM to set the important standards for microcomputers. In so doing, he asserted, IBM has been able to "define the shape of the industry. And I think that's a dangerous situation."

Sculley made his remarks at an industry conference sponsored by Infocorp, a Cupertino, Calif.-based market research company. Praising IBM as the best managed traditional corporation in the world, Sculley said he worried that "the vision of the personal computer is going to be defined largely by the dominance of a company that sees the world through the eyes of being the largest mainframe company and that looks at the personal computer as a lower cost, smaller version of those larger products that it makes for computer experts."

Acknowledging the criticism Apple has received for not making its systems IBM-compatible, Sculley said the firm has a "different vision" for the industry. He defined that vision by saying, "Give the person a creative tool and build computers for the noncomputer expert."

Sculley conceded that Apple was in trouble a year ago when sales of the Apple II, III and Lisa were sluggish and earnings depressed. "The question was: Is IBM going to own it all? Was George Orwell right in 1984?" he said.

Sculley then showed the television advertisement that Apple ran during the 1984 Super Bowl introducing the Macintosh computer. The ad depicts a Big Brother-type society — a thinly disguised reference to IBM. Sculley said Apple almost did

See APPLE page 50

Sperry plans major product line expansion

By Charles Babcock
CW New York Bureau

NEW YORK — Sperry Corp. has lost too many sales to other manufacturers by concentrating on mainframe computers and is planning to offer a full line of interconnectable micro, mini and supercomputers as well as mainframes, Sperry officials told security analysts here recently.

Joseph J. Kroger, president of Sperry's Information Systems Group, said Sperry has the second largest revenue-producing computer base in the world; it will yield $17 billion in 1985. Selling additional products to that customer base would yield a profit growth of 25% to 30% by 1986, he added.

At the end of the briefing, security analysts questioned whether Sperry should view the customers for its projected micro and mini offerings as part of its customer base. Even if a Sperry mainframe is in operation at a given site, the location may be

See SPERRY page 50

- A ratio measuring the health of the semiconductor industry continued its recent decline in November/46
- Trilogy Ltd. recently named a new chief executive officer and announced it is negotiating to buy a small semiconductor manufacturer/46
- Apple Computer, Inc. possibly moved closer to the Fortune 500 market with the recent announcement that General Electric Information Systems Co. will resell Apple's Macintosh and other products to its customers/50

NCR to move micro plant, boost production

DAYTON, Ohio — NCR Corp. recently said it will shift production of the NCR Personal Computer IV from Clemson, S.C., to Augsburg, West Germany, and will establish assembly plants in both the U.S. and in Augsburg and elsewhere in Europe.

The company described as erroneous a published report that said NCR would seek an outside supplier for an IBM-compatible microcomputer to be sold under the NCR label.

NCR claimed, rather, that it intends to increase production of its latest micro product, which has been the subject of an intense advertising blitz in recent months.

Additionally, the company denied that it will close down the Clemson facility. The personal computer development staff as well as the manufacturing operations of other NCR divisions will remain at that plant. Production of self-service terminals, however, will be shifted from Clemson to Ithaca, N.Y.

According to NCR, all production of NCR-built parts for the micro product will be transferred to Augsburg. Final assembly of the NCR components, along with components from outside sources, will be done in Augsburg and at a handful of plants in the U.S. and abroad. The shift will enable the company to switch to a zero inventory or just-in-time approach, whereby inventories are closely matched to actual production levels, according to Vernon Yates, vice-president and general manager of the personal computer division.

In addition to the inventory strategy and a reduction in distribution costs expected from establishing satellite assembly plants, the changes will enable the division to respond better and more quickly to specific machine configuration requirements, Yates said.

Despite a widespread perception that the NCR micro is encountering difficulties penetrating a saturated retail market, Yates said the company has been meeting its goals for signing up dealers.

Staying alive vs. IBM dominant theme at conference

By David Gimes
CW Staff

PALM SPRINGS, Calif. — Has IBM become an unbeatable opponent in the computer industry wars or just a formidable adversary? That question was the dominant theme of a recent industry conference here.

"There is one question that has to be faced: Is IBM invincible?" said Richard J. Matlack, president of Infocorp, a Cupertino, Calif.-based, market research company that sponsored the annual conference attended by top industry executives.

In his remarks during the conference's opening session, Matlack answered his own question by suggesting that, although IBM promises to provide increasingly tough competition in various segments of the industry, there are still opportunities for those companies that act wisely.

"My firm belief is that IBM does an outstanding job at what it does, and there's a lot we can learn from its activity," Matlack said. "But the opportunities that exist in this marketplace are still the most exciting of all the industries I can think of."

Matlack described the formidable challenge posed by IBM by charting some of Big Blue's successes, ranging from its domination of the mainframe business to its controlling roughly 40% of the personal computer retail distribution channels in the roughly 3½-year period since it introduced the Personal Computer.

Pressure on smaller manufacturers

In 1984, Matlack said, IBM put a lot of pressure on the computer industry, particularly on the smaller manufacturers. He described the debut of IBM's Personal Computer AT as "a very powerful and important" announcement. Moreover, the introduction last August of IBM's Topview software was perhaps one of the most important software announcements that will ever hit the personal computer business, he asserted.

Matlack offered his views on how IBM's actions during 1984 have affected some of the microcomputer makers and how those firms stand to fare in coming years:

- **Apple Computer, Inc.** "Apple's made a lot of noise and smoke, but it's real hard to tell how successful it has been in waging war against IBM." The key question, Matlack said, is whether Apple can, even at its size, maintain a position of strength, or "[is it] going to be battered by the onslaught of IBM?"
- **Hewlett-Packard Co.** Describing HP as the "kind and gentle" company with "tremendous technology," Matlack said HP has done well in technical markets but less so in other markets. But given HP's size and strengths in innovation, "is it big enough to . . . assume a major role?"
- **AT&T.** "The firepower is there, but a demonstrated ability on the marketing side is not there yet."
- **Kaypro Corp.** Kaypro has done well supplanting Osborne Computer Corp. after Osborne's bankruptcy filing, but "it's taken so many shots to the body . . . that it's real hard to see if it's going to survive or bleed to death first."
- **Compaq Computer Corp.** "Compaq is very vulnerable to IBM price cuts." The company is in "a very defensive position. It's not clear what its alternatives are; perhaps some other niche."

More personal computer makers are likely to be driven out of business because of the market dominance of IBM and Apple, Matlack said. A similar consolidation is likely to occur among microcomputer software and disk drive manufacturers.

SIA figures show continued decline in chip orders

SAN JOSE, Calif. — Semiconductor bookings and billings for the U.S. market declined again in November and marked the third consecutive month that the rate of new orders trailed shipped orders, according to figures released by the Semiconductor Industry Association (SIA).

Average monthly bookings for the U.S. market for the three-month period ended in November were $589.9 million, a 15% decline from the August to October period. November billings totaled $886.3 million, a 2.6% decline that the SIA said reflected massive order cancellations during the August through October period.

SIA President Thomas D. Hinkelman said the association expects December billings to be somewhat higher than those for November but added that fourth-quarter shipments will be down 10% from the third quarter.

Hinkelman said that, for the first quarter of 1985, shipments of completed orders are expected to be flat at best. Regarding 1985, Hinkelman said, "The industry's performance will depend upon three factors — the duration of the present inventory adjustment, the real rate of growth in semiconductor usage and the degree of price attrition."

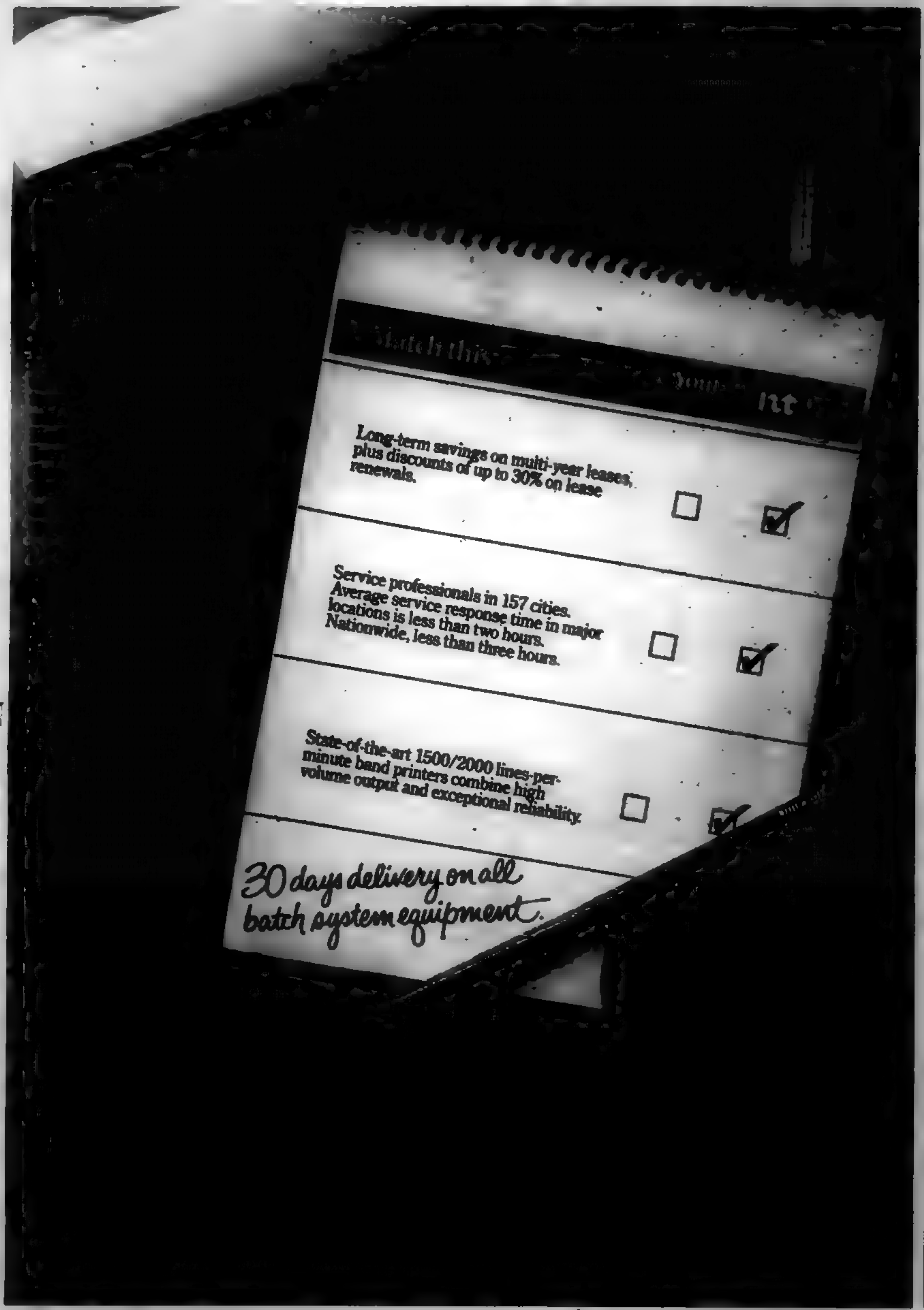
The SIA estimated that, based on current market conditions, the U.S. market for semiconductors will grow less than 10% in 1985, compared to an expected 46% growth for 1984 over 1983.

Since January, the SIA's book-to-bill ratio, a comparison of new orders to completed orders, has declined monthly. The ratio stood at 1.53 in January, indicating 1½ times as many new orders as completed orders for that period. Since then, the ratio dropped to 0.61 in November, indicating fewer new orders than completed orders. For August, the SIA reported that new orders and completed orders were equal, and for the three subsequent months, new orders have fallen short of completed orders.

The deterioration of the market has been demonstrated by the recent announcement by Texas Instruments, Inc. that it is cutting its work force by 2,000 [CW, Dec. 17]. More recently, Intel Corp. announced that it expects fourth-quarter revenues to be 5% to 10% lower than the $432 million it reported for the third quarter, and earnings per share will probably be down about 50% from the 40 cents reported for the fourth quarter in 1983.

According to Gordon E. Moore, chairman and chief executive officer of Intel, the company does not expect any substantial recovery until at least the second quarter of 1985.

"Manufacturers of office automation equipment, including personal computers, are either canceling their orders for semiconductors or rescheduling for later delivery in order to reduce inventories," Moore said.



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Cbema sees revenue rise

WASHINGTON, D.C. — Computer and business equipment industry revenues will increase by 12.4% in 1985 to $173 billion, according to projections made by the Computer and Business Equipment Manufacturers Association (Cbema).

Cbema said that 1984 revenues were $154 billion. It further projected that spending on R&D will climb above $10 billion in 1985, up 11% from 1984. The projected 12.4% revenue increase falls below the 14.1% average annual increase in revenues reported by the computer industry over the last 10 years, said Cbema, which attributed some of the past growth to inflation.

Cbema also predicted that computer industry employment will grow at an average annual rate of 7.1%.

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Trilogy names CEO, seeks to acquire Cmos chip maker

CUPERTINO, Calif. — Trilogy, Ltd. announced recently that company President Henry C. Montgomery has been appointed to the additional position of chief executive officer, assuming the daily operational duties formerly performed by the company's chairman and founder, Gene M. Amdahl.

Trilogy also announced it is engaged in negotiations to acquire a privately held manufacturer of Cmos gate array semiconductors.

Montgomery, 48, joined the company as president in September. He had been president of his own management consulting firm and had previously held executive positions at Fairchild Camera and Instrument Corp. and Memorex Corp.

Prior to Montgomery's joining the company, Trilogy had suffered 10 months of bad news pertaining to its plans to develop a wafer-scale semiconductor and build a large-scale, IBM-compatible mainframe computer around the wafers. The company eventually canceled both projects and took a $43 million write-off.

In a statement announcing Montgomery's new title, Amdahl said the move formalized a gradual shift of day-to-day responsibilities from himself to Montgomery and will allow Amdahl to concentrate on long-range strategies and strategic opportunities for the company.

Shortly after the announcement of the executive reorganization, Trilogy said it was engaged in discussions to acquire California Devices, Inc. (CDI), a privately held manufacturer of Cmos gate array semiconductors.

Based in San Jose, Calif., and with reported annual revenues of about $7 million, CDI now markets three families of Cmos gate arrays and plans further product introductions next year.

Part of strategic plan

Amdahl said the possible acquisition would be part of the company's new strategic plan to acquire outside product and marketing capabilities and to enhance utilization of Trilogy's own facilities. "We believe that the CDI technology, product line and marketing team would combine very well with the resources of Trilogy, including our design capabilities and fabrication facilities," Amdahl said.

Bill Caparelli, a senior vice-president at CDI, said the potential merger would give his company immediate access to Trilogy's development and manufacturing resources, including E-beam, mask-making metalization capabilities of up to four layers, full wafer fabrication and manufacturing capabilities.

According to Caparelli, "CDI currently has technology that enables customers to use a data base common to both the standard cell and our gate arrays [without channels], thus allowing total design flexibility. With direct access to Trilogy's advanced fabrication facility, CDI will have the capability needed to support our plans for advanced, custom product development, including standard cell."

Mitsubishi, Leading Edge meet in court

CANTON, Mass. — Leading Edge Products, Inc. is battling the Japanese giant Mitsubishi Electronics America, Inc. in court to secure its sole supply of microcomputers.

Leading Edge, which sells Mitsubishi-supplied personal computers under its own label, charged that Mitsubishi violated a supply agreement by withholding shipment of computers, according to published reports.

Mitsubishi reportedly had agreed to supply Leading Edge with computers, give it 60-days to pay its bills after the invoice date and lower its prices in the event that market conditions "materially change."

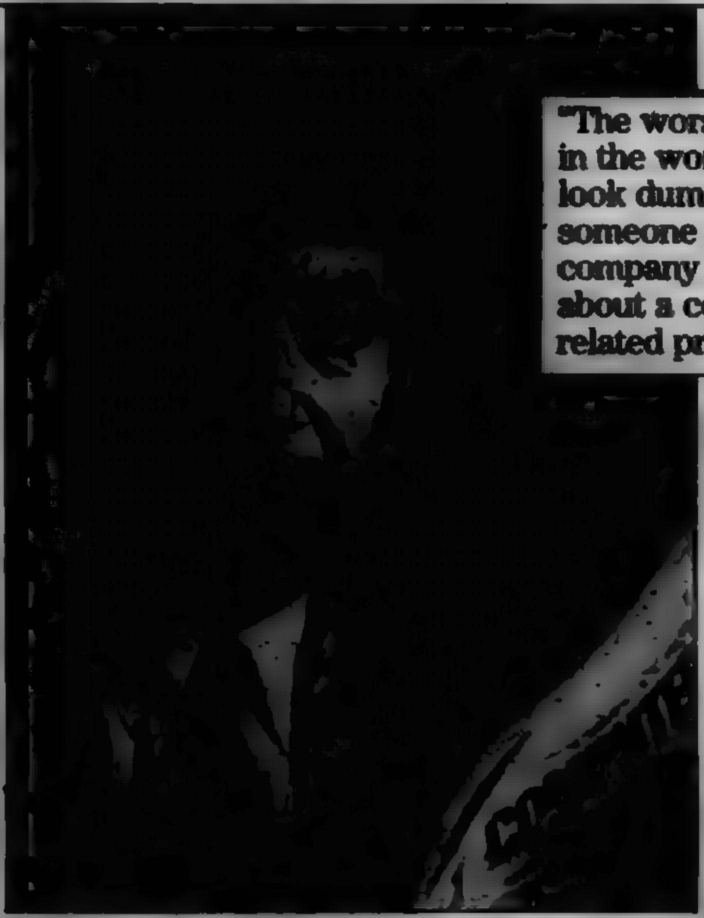
Leading Edge slashed retail prices on its systems by one-third, according to the reports, following IBM's Personal Computer price reductions of 18% to 23% in June. However, Mitsubishi would only reduce its prices to Leading Edge by 7%.

In a corporate *danse macabre*, Leading Edge deducted a portion of its payment representing the discount it felt it was entitled to; Mitsubishi objected; Leading Edge paid in full; Mitsubishi told the company it had violated the contract by withholding a portion of the payment and refused to ship any more computers until Leading Edge agreed to forego price reductions.

Leading Edge filed suit in federal court in Boston claiming breach of contract, and Mitsubishi filed suit against Leading Edge in federal court in Los Angeles seeking payment of bills.

Judge Robert Keeton, in a Dec. 11 hearing in federal court in Boston, issued a temporary restraining order against Mitsubishi, ordering it to continue delivery of the systems, which it has done after holding up 7,000 computers for more than a week.

The companies also are reportedly negotiating to try to resolve the matter out of court.



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Geisco to resell Apple products, offer clients support, service

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) recently announced it will become a value-added reseller of Apple Computer, Inc. products. Geisco has begun developing software to permit electronic downloading of software from corporate mainframes, via its GE network, to Apple's Macintosh computers.

Geisco said it will support, service and maintain Apple microcomputers on behalf of its clients and that its Integrated Communications Services operation will provide hardware support, rentals and leasing.

William V. Campbell, Apple's executive vice-president for sales, distribution and marketing, said the company was excited that Geisco will incorporate the Macintosh machines into its business communications systems.

The arrangement provides Apple with a much needed distribution channel into the Fortune 500 market, which is heavily represented in Geisco's customer base.

Michael J. Emmi, senior vice-president of marketing and U.S. sales operations with Geisco, said the Apple Macintosh will provide his clients with "a new and very friendly alternative."

SPERRY

from page 47

part of someone else's small computer base, an analyst pointed out.

Another questioned whether Sperry would make enough money selling microcomputer products.

Kroger responded that Sperry was offering an integrated lineup. "I think I know our customer base extremely well. They're going to be disappointed if we don't provide [these products]," he said.

Sperry plans to capture more computer sales within its customer base with the following moves, according to Kroger and James B. Aldrich, vice-president for strategic planning and market development:

- Extend its 1100 mainframe line downward to the desktop and upward to the supercomputer [100 million instructions per second (Mips)] range, Aldrich said.
- Make products compatible with IBM's Systems Network Architecture (SNA). Sperry has spent nearly $10 million in its SNA laboratory to reverse-engineer IBM systems and make sure it can link its mainframes to IBM mainframes, Aldrich said.
- Get new products out early in response to demand for new technology, Kroger said.
- Form strategic partnerships with other companies when needed and buy components from outside sources. Sperry has abolished the "not invented here" syndrome, company officials said.
- Offer new software for 1100 series applications to increase demand for the processors. New applications combined with Sperry's fourth-generation language, Mapper, and new micro products "will result in an explosion in the Mips required in our base," Aldrich said.
- Produce multiple products from one technology advance or chip set. A member of the 1-Mips Swift family of microcomputers will be introduced in 1985. A member of the 5-Mips to 18-Mips Saturn family will be introduced in 1988, and a member of the 25-Mips Mercury family will be out by 1990, according to Sperry's plan.
- Make Sperry mainframes interconnectable to increase their maximum Mips range and to allow IBM customers to be able to choose them as expansion units.
- Sperry has shipped 40 of the 1100-90 model mainframes so far this year and expects to ship 91 to 100 units, worth approximately $476 million, by the end of fiscal 1985. Sperry expects to ship 150 mainframes in 1986, according to Sperry Controller Edwin P. Gilbert.

APPLE

from page 47

not run the ad after its board of directors reviewed it and gave it an unenthusiastic reception.

"But it was an important commercial to run because it was a statement that Apple was still in the game, that our best years were not behind us, that we were still willing to bet our future on a vision that was not yet expressed," he said.

Sculley noted that the media also criticized Apple this year for spending $2 million for an extravaganza at San Francisco's Moscone Center to introduce the Apple IIc. Scoffing at the criticism, he claimed the company sold 50,000 IIc's the first day and "got our money back in two hours."

Sculley asserted that new market niches can and must be created in the personal computer industry. "I get real upset when I hear people say, 'Find a niche you can reside in where IBM will leave you alone,' " he said. "What kind of a strategy is that? That's not vision; it's survival."

Sculley said the markets that exist today are finite, and he stressed the need for all companies, not just the industry leaders, to take innovative approaches to creating new markets.

Sculley said he believes the business market for personal computers today is only a small fraction of what it will be in the future. He said nontechnically oriented middle-level managers will be the business people most affected by the so-called information society of the future and suggested that a computer aimed at addressing their evolving needs will be one future market niche.

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This senior management position in the University of Arizona Computing Center (UCC) will manage the Software Services group. This group provides consulting services, operating system and program library software support, and applications development and training.

The consulting function provides consultation in the use of user owned micro and minicomputers and the shared access computers operated by the UCC: Control Data Corporation CYBER 175, two Digital Equipment Corporation (DEC) DECsystem-10's, and three DEC VAX 11/780's.

Operating system and program library support is provided for the shared access computers. The CYBER 175 and DECsystem-10's are linked with a locally developed channel speed connection. The VAX computers are clustered using an HSC50, DEC Computer Interconnect (CI), and DECNET. All computers are front-ended with a [illegible] switch. In addition, software support services are offered for user owned computers on a cost recovery basis.

The applications and training function offers applications development services and courses on microcomputer software, use of the large shared computers, and special applications software packages. All services are offered on a cost recovery basis.

Staffing managed by this position include 8 people in consulting, 4 people in operating system and program library support, and 3 people in applications and training.

The Software Services Group is one of four groups reporting to the Director and Associate Director of the UCC. The other groups are Computing Services, Network Services, and the MicroTech Center. There are a total of 60 employees in the UCC.

Experience in managing activities similar to the above is required. Experience in programming at both the applications and software level on the equipment outlined above is highly desirable. Specialized background experience in a major application area such as statistics or graphics would be a plus. A master's degree is desirable.

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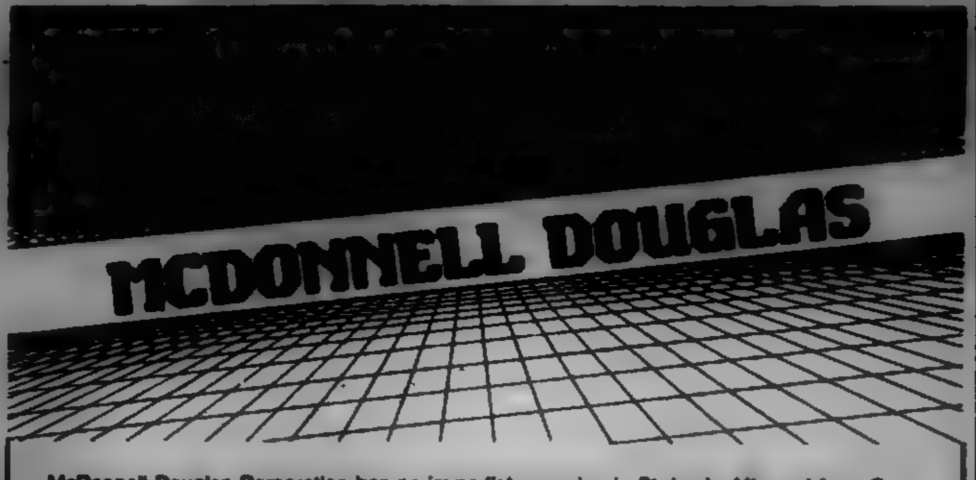

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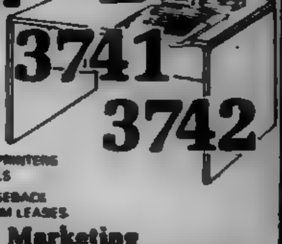

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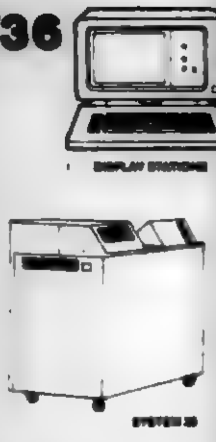

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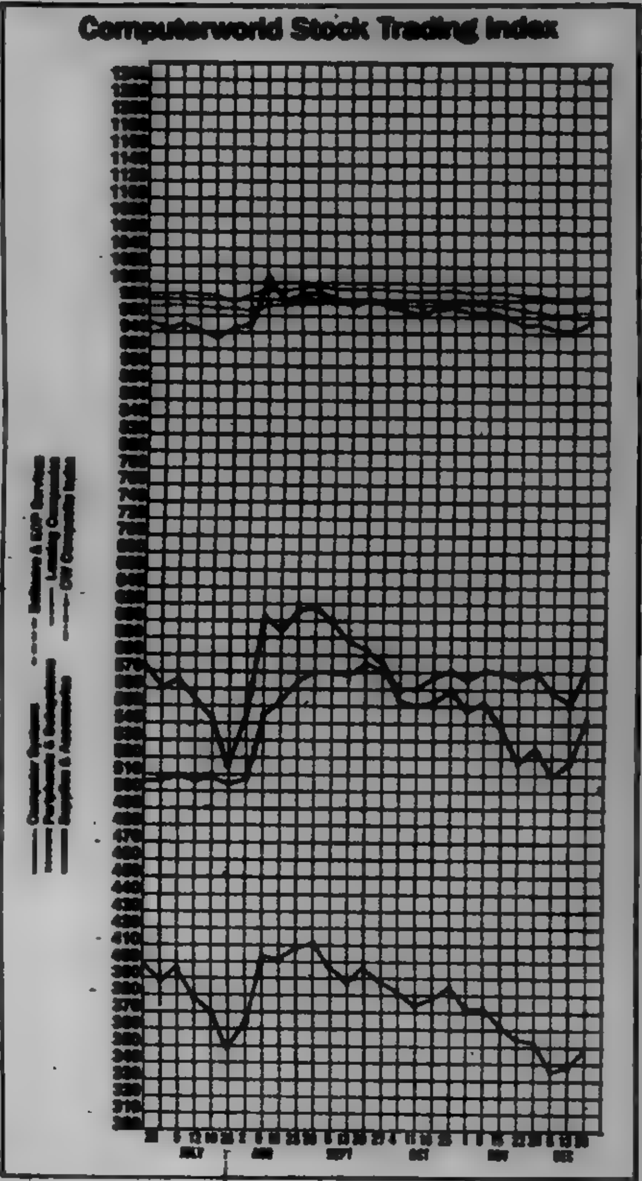
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, DECEMBER 19

All statistics compiled, computed and formatted
by
TRADE QUOTES INC
Cambridge Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE: 1984 RANGE (1)	CLOSE DEC 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	ALPHA MICROSYSTEMS	4- 14	6	+ 1/4	+4.3
[illegible]	ALTOS COMPUTER SYST	7- 21	10 1/2	+ 7/8	+11.4
[illegible]	AMDAHL CORP	14- 30	13 1/2	+1 5/8	+13.8
[illegible]	APPLE COMPUTER INC	19- 43	29 5/8	+2 1/8	+12.2
[illegible]	AT&T	15- 21	19	+ 5/8	+3.4
[illegible]	BURROUGHS CORP	44- 58	57 1/4	+2 1/2	+4.5
[illegible]	COMPAQ COMPUTER CP	4- 15	7 1/4	+ 3/8	+7.0
[illegible]	COMPUTER AUTOMATION	4- 17	4 1/2	- 1/8	-2.7
[illegible]	COMPUTER CONSOLES	6- 25	8 1/4	- 3/8	-4.3
[illegible]	CONTROL DATA CORP	25- 42	30 1/2	+ 5/8	+1.7
[illegible]	CONVERGENT TECHNLGS	7- 41	6 1/8	+ 5/8	+11.2
[illegible]	CRAY RESEARCH INC	36- 77	59 3/4	+2 3/4	+7.0
[illegible]	[illegible] SYSTEMS CORP	[illegible]	20 1/2	+1 1/8	+6.1
[illegible]	DATA GENERAL CORP	27- 70	50 7/8	+4 3/8	+10.1
[illegible]	DATAPOINT CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DIGITAL EQUIPMENT	84-129	108 1/4	+5	+4.0
[illegible]	[illegible] INC	12- 18	15 3/8	0	0.0
[illegible]	ELECTRONIC ASSOC.	3- 15	3	+ 1/8	+4.0
[illegible]	FLOATING POINT SYST	13- 40	17 1/8	+1 3/4	+11.2
[illegible]	FOXBORO	25- 47	28 1/2	+1	+3.5
[illegible]	GENERAL AUTOMATION	0- 10	3 5/8	0	0.0
[illegible]	GOULD INC	20- 44	28	+ 1/8	+0.4
[illegible]	HARRIS CORP	23- 40	28	+ 3/8	+1.3
[illegible]	HEWLETT-PACKARD CO	31- 48	36 1/4	+ 3/4	+2.1
[illegible]	HONEYWELL INC	48- 65	61 7/8	+2 1/8	+3.5
[illegible]	IBM	103-130	123 1/8	+4 3/8	+3.6
[illegible]	IPL SYSTEMS INC	1- 14	1 1/2	+ 1/4	+20.0
[illegible]	ITT CORP	21- 47	30 5/8	+ 3/4	+2.5
[illegible]	[illegible] INC	13- 28	18 3/8	+2 3/8	+15.3
[illegible]	MANAGEMENT ASSIST	6- 29	27 1/8	+ 1/4	+0.9
[illegible]	MATSUSHITA ELECTRIC	38- 69	64	+6 1/8	+10.5
[illegible]	MODULAR COMPUTER SYS	6- 16	8 1/4	0	0.0
[illegible]	MOHAWK DATA SCI	9- 17	10 1/2	0	0.0
[illegible]	MOTOROLA INC	30- 48	34 5/8	+1 7/8	+5.7
[illegible]	NAT'L SEMICONDUCTOR	11- 20	12 1/2	+ 3/4	+6.3
[illegible]	NBI INC	5- 38	13 1/2	0	0.0
[illegible]	NCR	21- 34	27 1/2	+2	+7.8
[illegible]	PERKIN-ELMER	18- 37	23 1/2	+ 1/2	+2.0
[illegible]	PRIME COMPUTER INC	11- 28	16 5/8	+ 3/4	+4.7
[illegible]	SPERRY CORP	35- 50	41	+2 3/8	+6.1
[illegible]	STRATUS COMPUTER INC	6- 17	9 1/8	0	0.0
[illegible]	TANDEM COMPUTERS INC	15- 40	18 3/4	+1 1/8	+6.7
[illegible]	TANDY CORP	26- 42	22 3/4	- 1/4	-1.0
[illegible]	TELEVIDEO SYSTEMS	3- 11	3 1/8	+ 1/8	+4.3
[illegible]	TELXON CORP	8- 17	13	0	0.0
[illegible]	TEXAS INSTRUMENTS	101-150	118 1/4	+4 1/2	+3.9
[illegible]	ULTIMATE CORP	14- 24	17 1/8	+2 3/8	+16.1
[illegible]	VECTOR GRAPHICS INC	0- 7	1/8	0	0.0
[illegible]	WANG LABS "B"	24- 42	28 5/8	+ 3/8	+1.3
[illegible]	WANG LABS "C"	24- 42	27 7/8	+ 3/4	+2.7
[illegible]	XEROX CORP	35- 52	38	+ 3/8	+1.0

LEASING COMPANIES

EXCH		1984 RANGE (1)	CLOSE DEC 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	[illegible] FINANCIAL CP	10- 22	20 7/8	+ 1/4	+1.2
[illegible]	CIS CORP	4- 10	7	0	0.0
[illegible]	COMDISCO INC	8- 42	8 3/8	-1 1/8	-10.4
[illegible]	CONTINENTAL INFO SYS	2- 14	9 5/8	+ 1/4	+2.6
[illegible]	DPF INC	10- 17	17 1/8	+1 1/8	+7.0
[illegible]	FINALCO GROUP INC	4- 12	2 3/8	0	0.0
[illegible]	PHOENIX AMERICAN INC	3- 17	3	- 1/2	-14.2
[illegible]	[illegible] INC	6- 21	8 1/2	+ 1/4	+2.9
[illegible]	U.S. LEASING INT'L	20- 44	30 1/2	+ 5/8	+2.2

COMPONENTS

EXCH		1984 RANGE (1)	CLOSE DEC 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	ADVANCED MICRO DEV	23- 41	28 3/8	+1 1/2	+5.5
[illegible]	[illegible] SEMICONDUCTOR	15- 30	18 1/2	+1 1/8	+6.1
[illegible]	ANALOG DEVICES INC	20- 32	22 1/8	+ 1/2	+2.2
[illegible]	[illegible] CORP	10- 30	11 1/2	+1	+9.5
[illegible]	APPLIED MAGNETICS CP	6- 27	9	- 1/4	-2.7
[illegible]	[illegible] CORP	9- 12	9 7/8	+ 1/8	+1.3
[illegible]	MICRON TECH INC	10- 18	10	+ 1/8	+1.2
[illegible]	TERADYNE	18- 38	28 3/8	+3 1/2	+13.1

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
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SOFTWARE & EDP SERVICES

EXCH		1984 RANGE (1)	CLOSE DEC 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	ADVANCED COMP TECH	2- 6	2 1/4	0	0.0
[illegible]	ADVANCED SYSTEMS INC	6- 27	10 3/8	+1 1/8	+12.6
[illegible]	AGS COMPUTERS INC	10- 22	10 1/8	- 3/4	-6.8
[illegible]	AMERICAN SOFTWARE	12- 31	13	+1	+8.3
[illegible]	ANACOMP INC	2- 10	2 1/8	+ 1/2	+30.7
[illegible]	ANALYSTS INT'L CORP	9- 17	9	+ 1/4	+5.2
[illegible]	APPLIED DATA RES	10- 37	27 7/8	+3 1/8	+12.6
[illegible]	ASHTON-TATE	6- 15	8 1/4	0	0.0
[illegible]	ASK COMPUTER SYSTEMS	13- 31	16 1/2	+2	+13.7
[illegible]	[illegible] CORP INC	1- 3	1 3/8	0	0.0
[illegible]	AUTOMATIC DATA PROC	30- 40	37 1/2	+2	+5.6
[illegible]	COMPUTER ASSOC INT'L	10- 20	17	+ 1/4	+1.4
[illegible]	COMPUTER HORIZONS	8- 30	8 3/8	+ 1/8	+1.6
[illegible]	COMPUTER [illegible]	9- 11	8 1/2	+ 1/8	+1.6
[illegible]	COMPUTER SCIENCES	11- 23	14 3/8	- 5/8	-4.0
[illegible]	COMPUTER TASK GROUP	12- 18	14 1/8	+ 1/4	+1.7
[illegible]	COMPUTER [illegible]	4- 10	4	- 1/8	-3.0
[illegible]	COMPUTONE SYSTEMS	4- 23	6	- 1/8	-2.0
[illegible]	COMSERV CORP	1- 16	3	0	0.0
[illegible]	COMSHARE	6- 14	7	+1	+16.6
[illegible]	CULLINET SOFTWARE	24- 50	44	+4 1/2	+11.3
[illegible]	CYCARE SYSTEMS INC	10- 25	15 1/8	+ 3/4	+5.0
[illegible]	[illegible] SYSTEM INC	6- 27	10 1/8	+1	+10.8
[illegible]	GENERAL ELECTRIC CO	48- 59	58 3/8	+1 7/8	+3.3
[illegible]	GTE CORP	35- 48	40 3/4	+1 3/4	+4.4
[illegible]	INFORMATICS GENERAL	14- 32	10 1/8	- 7/8	-5.7
[illegible]	INFORMATION SCIENCE	4- 17	8 1/4	0	0.0
[illegible]	INFOTRON SYSTEMS CP	10- 43	27 3/4	+1 1/2	+5.8
[illegible]	KEANE ASSOCIATES	8- 15	8 3/4	+ 1/8	+1.4
[illegible]	LOGICON	18- 31	27 3/8	+ 3/8	+1.3
[illegible]	LOTUS DEVELOPMENT CP	18- 40	23	+2 1/2	+12.1
[illegible]	MCI COMMUNICATIONS	6- 18	8 1/8	+ 5/8	+8.3
[illegible]	MGMT SCI AMER INC	9- 30	11 1/2	0	0.0
[illegible]	[illegible]	6- 18	7	0	0.0
[illegible]	[illegible] SYSTEMS INC	27- 50	38 3/4	- 1/2	-1.3
[illegible]	MICROPRO INT'L CP	2- 10	3 1/8	- 5/8	-23.0
[illegible]	NATIONAL DATA CORP	8- 28	8 1/4	- 1/4	-2.9
[illegible]	ON-LINE SOFTWARE INT	4- 29	3 3/4	- 1/2	-11.7
[illegible]	PANSOPHIC SYSTEMS	11- 30	10 1/4	+ 1/8	+1.0
[illegible]	PLANNING RESEARCH	10- 21	10	+ 3/8	+3.7
[illegible]	POLICY MGMT SYSTS CP	22- 78	23 3/4	+1	+4.4
[illegible]	PROGRAMMING & SYS	4- 8	4 3/8	+ 1/8	+3.0
[illegible]	REYNOLDS & REYNOLDS	30- 53	38 1/2	+2	+5.5
[illegible]	SEI CORP	11- 30	13 1/2	+ 1/8	+1.0
[illegible]	SHARED MEDICAL SYST	23- 40	27 3/8	+2 3/8	+10.0
[illegible]	SCIENTIFIC COMPUTERS	3- 14	5 1/4	+ 1/4	+5.0
[illegible]	SOFTWARE AG	5- 19	13 1/4	+ 3/8	+2.9
[illegible]	[illegible] CORP	10- 18	11 3/8	- 1/4	-2.1
[illegible]	[illegible]	7- 17	11 3/8	- 1/4	-2.1

PERIPHERALS & SUBSYSTEMS

EXCH		1984 RANGE (1)	CLOSE DEC 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	AM INTERNATIONAL	2- 7	2 3/4	0	0.0
[illegible]	ANDERSON JACOBSON	4- 10	3 7/8	- 1/8	-3.1
[illegible]	AUTO-TROL TECHNOLOGY	6- 23	8 1/4	+ 1/2	+6.3
[illegible]	AVANT-GARDE COMPUTING	17- 35	12 1/4	-4 3/8	-27.0
[illegible]	[illegible] INC	9- 27	8	+ 1/2	+6.0
[illegible]	[illegible]	1- 11	5/8	0	0.0
[illegible]	[illegible]	17- 30	13 5/8	+ 5/8	+5.2
[illegible]	[illegible] CORP	1- 3	3 3/8	- 1/8	-3.6
[illegible]	CENTRONICS DATA COMP	6- 25	10 3/8	+ 3/8	+3.7
[illegible]	[illegible] CORP	7- 12	7 1/8	+ 1/8	+1.8
[illegible]	[illegible]	4- 30	4 1/8	+ 1/8	+3.1
[illegible]	COMPUGRAPHIC CORP	23- 40	28 7/8	+1 3/8	+4.8
[illegible]	COMPUTER TRANSCEIVER	1- 16	3/8	0	0.0
[illegible]	COMPUTERVISION CORP	30- 50	37 1/2	+2 5/8	+7.5
[illegible]	CONRAC CORP	11- 26	10 1/8	- 1/8	-0.8
[illegible]	DATAPRODUCTS CORP	10- 32	15 3/4	- 7/8	-5.2
[illegible]	DATARAM CORP	4- 17	4 3/8	+1 1/4	+40.7
[illegible]	DATA SWITCH CORP	6- 21	9 7/8	+ 3/8	+17.5
[illegible]	DATUM INC	6- 17	9 1/2	- 1/8	-1.3
[illegible]	[illegible] DATA COMPUT	9- 25	10 3/4	- 1/2	-4.6
[illegible]	DOCUTEL-OLIVETTI	4- 20	8 1/8	+ 1/8	+3.0
[illegible]	ELECTRONIC M & R	3- 11	4 5/8	- 1/8	-2.6
[illegible]	[illegible] INC	7- 18	8 1/2	- 1/8	-1.7
[illegible]	EVANS & SUTHERLAND	11- 50	12 1/2	+2 1/4	+20.0
[illegible]	[illegible] TECHNOLOGIES	3- 14	11 1/8	+ 1/2	+5.7
[illegible]	GEN'L DATA COMM IND	15- 30	18 5/8	+1 1/8	+7.3
[illegible]	HAZELTINE CORP	18- 32	28 3/4	+2 3/8	+9.1
[illegible]	ICOT CORP	3- 8	4 1/8	+ 1/8	+3.0
[illegible]	INFORMATION INTL INC	10- 18	11 1/8	+ 1/8	+1.1
[illegible]	INTECOM INC	7- 21	9 1/2	+ 1/8	+6.0
[illegible]	[illegible] CORP	27- 40	37 1/2	0	0.0
[illegible]	LUNDY ELECTRONICS	7- 10	10 3/4	+ 1/8	+5.3
[illegible]	[illegible] CORP	3- 8	5 3/8	- 1/2	-8.5
[illegible]	MSI DATA CORP	8- 22	16 3/8	+ 3/8	+5.6
[illegible]	NASHUA CORP	18- 30	27 1/8	+ 3/8	+3.3
[illegible]	NETWORK SYSTEMS CORP	16- 34	21 1/2	+4 1/8	+8.1
[illegible]	NO AMERICAN PHILIPS	30- 44	39	+ 5/8	+1.6
[illegible]	NORTHERN TELECOM LTD	30- 40	38 1/2	+1 3/4	+5.1
[illegible]	[illegible]	1- 6	1/8	0	0.0
[illegible]	PARADYNE CORP	11- 28	13 1/8	+ 5/8	+5.0
[illegible]	[illegible] CORP	5- 14	17	+1 1/8	+10.3
[illegible]	PLESSEY CO LTD	24- 41	34 1/2	+ 1/2	+2.0
[illegible]	PRINTRONIX INC	13- 30	10 1/2	+ 1/2	+5.0
[illegible]	QANTEL CORP	4- 23	4 1/2	+ 1/2	+12.5
[illegible]	RECOGNITION EQUIP	10- 17	12 5/8	+ 3/8	+3.0
[illegible]	[illegible] ASSOCIATES	30-100	33 3/8	-1 1/8	-3.0
[illegible]	SCAN DATA	1- 3	1/8	0	0.0
[illegible]	SCAN-TRON CORP	3- 12	12	0	0.0
[illegible]	SCIENTIFIC ATLANTA	8- 22	16 3/8	+ 5/8	+4.1
[illegible]	[illegible] TECHNOLOGY	6- 20	8 3/8	+ 1/8	+1.5
[illegible]	STORAGE TECHNOLOGY	3- 23	2 1/8	+ 1/8	+6.0
[illegible]	[illegible]	1- 13	1 1/2	+ 1/8	+9.0
[illegible]	SYSTEMS & COMP TECH	14- 30	14 3/4	- 1/8	-0.8
[illegible]	T BAR INC	7- 17	7	0	0.0
[illegible]	TAB PRODUCTS CO	12- 20	10 7/8	- 5/8	-5.7
[illegible]	TANDON CORP	6- 30	8	- 3/8	-4.4
[illegible]	TIE INC	8- 12	8	- 3/8	-4.4
[illegible]	TEKTRONIX INC	52- 67	57	+1 3/8	+2.4
[illegible]	TELEX	30- 80	38 7/8	+2 3/4	+7.6
[illegible]	[illegible] SYSTEMS CP	2- 17	2 5/8	+ 3/8	+16.6
[illegible]	TIMEPLEX INC	13- 22	18 1/2	+ 1/4	+1.3
[illegible]	[illegible] TECHNOLOGY	5- 20	7 3/8	+ 1/8	+2.3

SUPPLIES & ACCESSORIES

EXCH		1984 RANGE (1)	CLOSE DEC 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	AMERICAN BUS PRODS	17- 23	21	+ 1/8	+0.5
[illegible]	BARRY WRIGHT	27- 35	23 3/4	+1 3/8	+6.1
[illegible]	DUPLEX PRODUCTS INC	17- 27	23 7/8	- 7/8	-3.5
[illegible]	ENNIS BUS. FORMS	10- 20	23 3/8	+1 5/8	+7.4
[illegible]	3M COMPANY	60- 80	80 3/8	+3 1/4	+4.2
[illegible]	MOORE CORP LTD	30- 51	42 7/8	+ 7/8	+2.0
[illegible]	STANDARD REGISTER	27- 43	40	+1 1/8	+2.8
[illegible]	WALLACE BUS FORMS	23- 33	31 1/2	+1 1/2	+5.0

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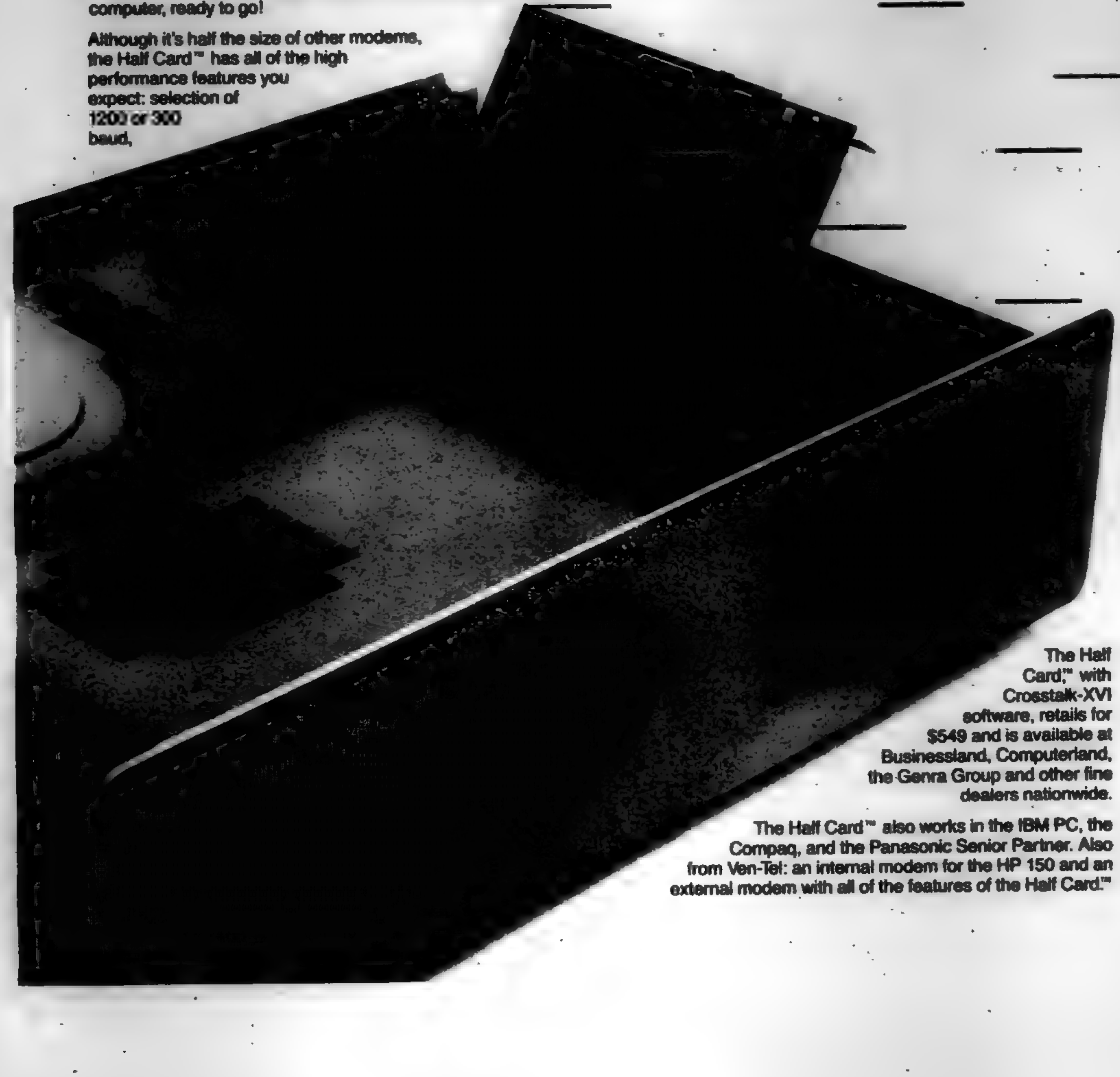

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The "intelligent terrorist," who recognizes the value of computer centers in maintaining the fabric of society, has not yet arrived in the U.S. However, terrorists have launched isolated attacks on data centers here, and respected authorities have issued warnings about the threat to fragile computer-based networks posed by terrorism.

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GRAPHIC DESIGN BY
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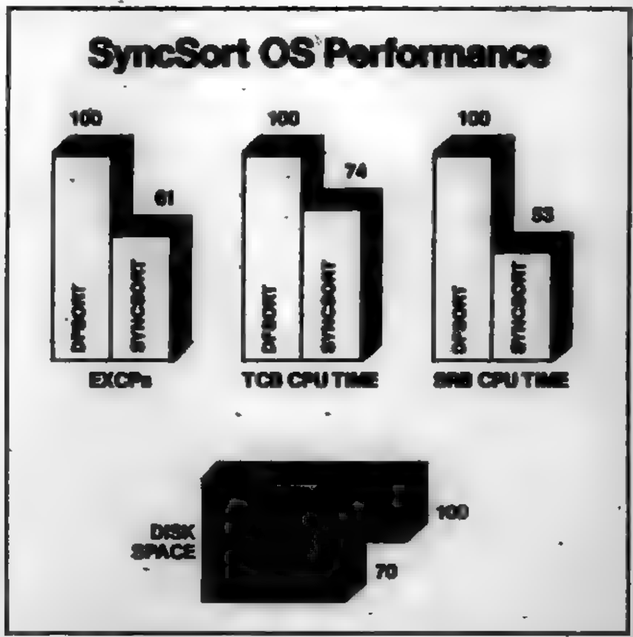

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ANNUAL DP BUDGET SURVEY

SOME WILL GO — HUNGRY

By Donna Raimondi

Corporate data processing budgets are still growing but at a slower rate than over the past three years. Managers participating in *Computerworld's* annual DP budget survey reflected a conservative attitude toward spending, with indications that they will hire fewer staff, buy less software and in general try to make do with existing facilities to serve their organizations even as they expand services.

A greater percentage of respondents claimed an increase in their budgets for 1985 — 82.7% as opposed to 67% in 1984, but the growth rate in DP budgets slipped again for 1985. In a continuing downward spiral from last year's 12.4%, 1983's 17% and 1982's 20.3% increase rates, the DP managers surveyed recently indicated an overall increase in their

Continued on page 5

MICHAEL MEYER

ANNUAL DP BUDGET SURVEY

Continued from page 4

budgets of 9.89%.

The majority of respondents — 42% — felt no improvement at all from what Washington, D.C., officials have labeled the economic recovery. About a quarter of the managers said the economic recovery has had a beneficial effect on their DP budget; most of them noting slight increases in spending. Five of 49 respondents cited decreases resulting from the economy that ranged from hiring freezes to discharge of personnel.

When Congress cut the manpower allocation for the U.S. Army Corps of Engineers, office automation became necessary in order to cope with the work load, which remained the same, said Edward Gutwald at the corps' South Atlantic Division in Atlanta. But automating the office has cost money, especially in time and training, and there have been no extra people or money to do the jobs, he said.

The DP department has become more responsible for microcomputer expenses. This year, slightly more than half of the managers indicated that microcomputers will be purchased from their DP budgets, and 37.7% of micro expenses will come from end-user budgets. In 1984, microcomputers came 50:50 from DP and end-user budgets; in 1983, 19 managers said end-users paid for micros and only six indicated that DP departments paid.

> *The majority of respondents — 42% — felt no improvement at all from what Washington, D.C., officials have labeled the economic recovery.*

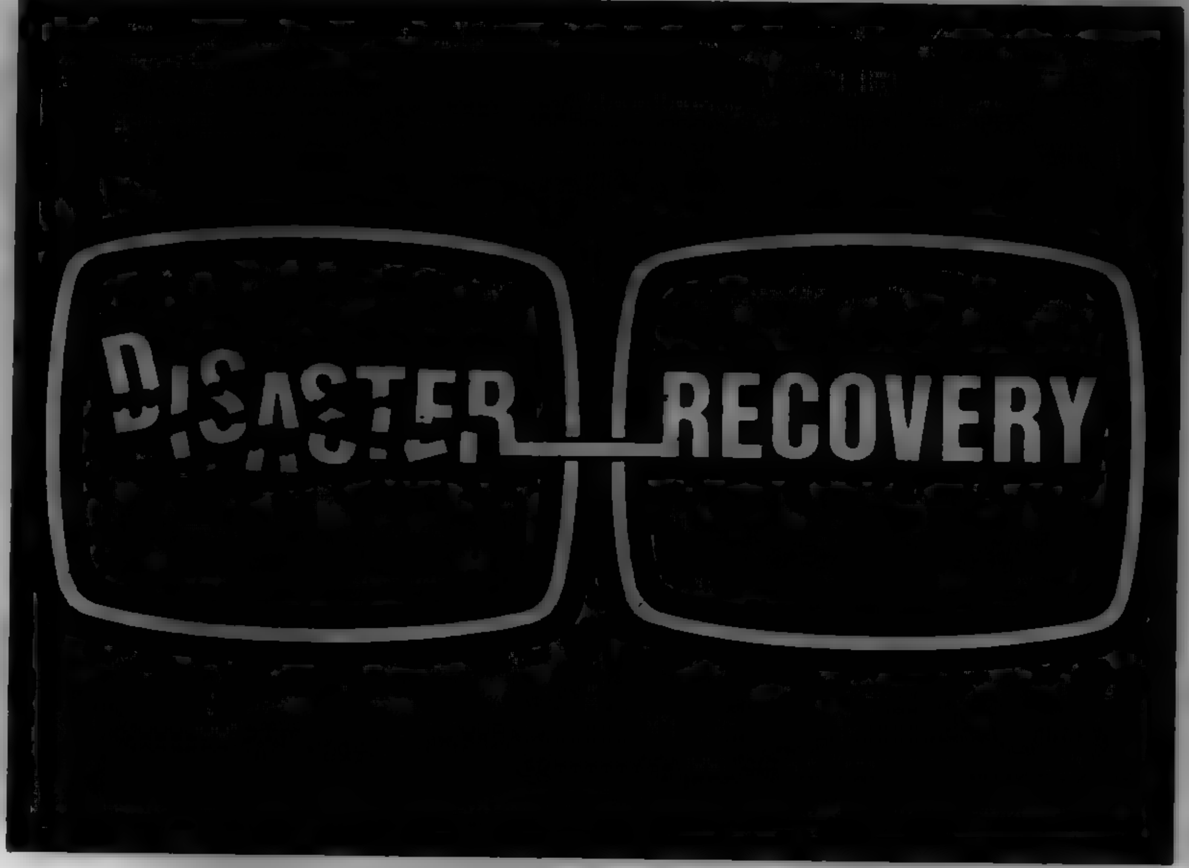
Salaries — the single largest budget item — account for 43% of DP budgets — the same this year as last year. Increases in those departments reporting higher spending for salaries will average 7.3%, up from 6.7% a year ago. Programmer/analysts eat up the greatest share of the salaries budget — 29% — followed by computer operators at 17%, programmers at 14% and DP/MIS managers and systems analysts at 12% each.

The fastest growing item in the salary budget is the DP/MIS manager/director salary, which grew 6.6% from 1984. Computer operators have increased salary expenses by 6%, followed by programmer analysts, 4.9%, and programmers, 4.8%.

Fewer managers plan to hire new personnel in 1985 — 50% as opposed to 57% who planned to hire for 1984. Programmer analysts, computer operators and programmers head the list of new hires.

It is still not easy to find qualified personnel, but compared to the last two years, this problem is less severe. More than half (52.9%) of the respondents still claim to have had trouble finding qualified DP personnel in the past year, but last year the figure was 55%, and in 1983, 82% of respondents claimed difficulty.

Continued on page 6



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ANNUAL DP BUDGET SURVEY

Continued from page 5

This year, systems programmer positions have been the most difficult to fill (33.3%) followed by programmer/analyst slots (25.9%).

There are not enough systems software specialists out there, said G. D. Springer, director of information systems at Atlantic Aviation Corp. in Wilmington, Del. It is also difficult to pay the salaries that such people command, he added.

There is an overall decrease of 3.8% in the personnel turnover rate. The majority of managers — 62.3% — said their turnover rate stayed the same, with 22.6% of companies experiencing less turnover and 15.1% claiming greater turnover.

Maintenance tasks

Maintenance tasks are taking up more of programmers' time, managers reported. The average proportion of time spent on maintenance came out to 55.3% this year, an overall increase from last year's 45.4%. New development tasks account for the rest of programmers' time. In 1983's survey, DP heads said that programmers shared their time equally between maintenance and new development.

Fewer DP shops will purchase software this year — only 67.3% of the group polled will acquire new software packages in 1985, as opposed to 80% who budgeted for software in last year's survey.

Software expenses comprise 12% of the total DP budget for 1985, broken down as follows:

- Application software — 7%.
- Systems software — 5%.

This is a decrease from last year when software accounted for 19.6% of the total budget and is more in line with 1983, when software costs averaged 10% of the total amount.

The majority of managers planning to acquire new software will buy business application packages such as accounting, financial and human resources packages. Others will add systems aids such as librarian and productivity packages. Four managers budgeted for data base management systems; several are buying fourth-generation languages and microcomputer products. Three DP heads will purchase micro-to-mainframe links.

Hardware vendors — especially IBM — should be happy to learn that 76.9% of the group surveyed plan to buy hardware products, as opposed to 70% last year. Of the 14 managers who will purchase mainframes, seven said they will install IBM's 4300 series and three are planning to acquire IBM 30 series machines.

In the minicomputer category, one manager plans to buy 10 IBM System/36 computers, and on order at six shops are four Digital Equipment Corp. VAX-11 computers, three Hewlett-Packard Co. HP 3000s and one HP 2000.

Peripherals are high on the managers' shopping lists, as are microcomputers. Of the 13 managers reporting plans for microcomputer purchases, one plans to acquire 400 Wang Laboratories, Inc. Professional micros, and another will install 100 unspecified microcomputers. Three respondents will purchase IBM Personal Computer ATs.

Thirty-five percent of the total DP budget will go to hardware, broken down as follows:

- Mainframes — 18%.
- Minicomputers — 6%.
- Microcomputers — 4%.
- Peripherals — 7%.

The survey group reported that 57.1% of their allotted hardware monies will go to license fees for mainframes, and another 11.3% will pay for license fees for minis and superminis.

Microcomputer and data communications expenses showed up as the fastest growing budget items in this year's survey, although each category makes up less than 5% of the total DP budget. Microcomputer hardware spending increased by 28%, followed by data communications at 17%.

Minicomputer expenses — 6% of the total DP budget — showed a 14.9% increase rate over 1984 figures, followed by application software — 7% of the total budget — at 14.1% and systems software — 5% of the total budget — at 10.3%.

AT&T divestiture-related problems continue to plague many managers. More than 41% of survey respondents said the action has led to worsened conditions, including confusion and delays in communications planning, increased costs and more billing errors. More than half of the companies surveyed felt no impact from the divestiture, and a couple of managers used the divestiture to improve their communications procedures.

"The divestiture forced us to rethink our communications expenses," said Dennis Steizer, president of NBC/Computer Services Corp. "I say, 'thanks AT&T,' " he added. "We worked on multiplexing lines to up the speeds to get more terminal devices on them, added different concentrator-type devices and changed some protocols. We went from asynchronous to bisynchronous to decrease the lines we needed," he said.

Concerns for 1985

In answer to a question about their primary concerns for 1985, 18 out of 49 managers expressed distress about personnel — mentioning difficulties in finding, training, paying, retaining and getting enough productivity out of their staffs.

Ten respondents said their greatest concerns were with microcomputers. Three of these managers are trying to find the microcomputer's place in overall long-range planning goals, two mentioned worries about linking their microcomputers to mainframes, and one each was concerned about evaluation, management or support of micros. One respondent mentioned a "contest of personal computer proliferation" in his company as one of his biggest concerns.

Eight DP heads said they are concerned with end-user problems. One each of the managers surveyed was trying to implement or increase information centers, four expressed problems with sufficient resources for user requests or services. One manager said the lack of user cooperation was a problem for him and another wished to increase the users' understanding of DP's functions.

Six managers said their greatest concern was with the overload on their hardware or services. One of these managers is faced with a 30% per year growth rate and worries about keeping his system's ability and quality; others are either trying to keep the load on the system manageable or trying to improve the system to state-of-the-art technology.

Communication among systems, divisions and networks was an expressed concern of six managers.

In answer to a question about their primary concerns for 1985, 18 out of 49 managers expressed distress about personnel — mentioning difficulties in finding, training, paying, retaining and getting enough productivity out of their staffs.

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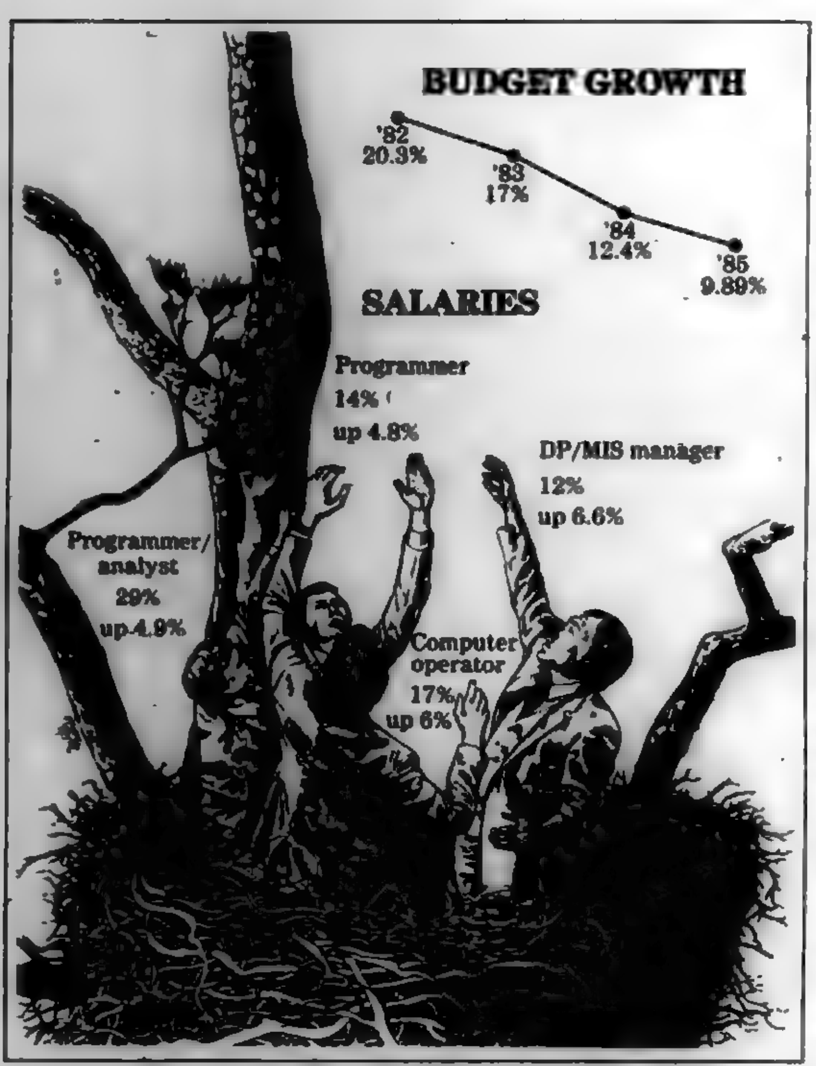


Qualified programmers, analysts difficult to find

Qualified data processing personnel are hard to find, according to more than half of the DP managers polled for *Computerworld*'s annual DP budget survey. Although some difficulty exists in locating staff for any slot in a DP department, the rarest find is a good systems programmer or programmer analyst, according to the group polled.

Finding programmer analysts with appropriate, applicable skills is a tough problem for Glenn Lukowicz of St. Luke's Hospital, in New Bedford, Mass. "The words to stress here are applicable and appropriate," Lukowicz said. He has hired college graduates who have learned plenty of theory that is not in line with present-day needs, he added. They do not know current standards, and they are five to six years behind the times, he said.

Lukowicz has advertised in newspapers and searched agencies for dedicated, competent, pride-oriented programmers with good program development standards, he said. He said he pays above-average salaries and offers a working environment that includes fast response time, color CRT terminals, flexible hours and participation in presentations of new products and decision making, and still has trouble finding people.

"[People do not] want to test or finalize their projects," he claimed, "they only want to code."

"We don't have IBM equipment — we have [Honeywell, Inc.] — and we don't even expect to find Honeywell experience," said John Kozial of the Dukane Corp. in St. Charles, Ill. Most of the systems people who come from college computer science programs are technically minded, and they do not understand the business applications they are called upon to develop, he said. They have difficulty comprehending the users' needs, he added.

Kozial said he finds that the people he interviews are more concerned with salaries or living in a nice area than with pride in their jobs, he said. Dukane — a company that generates revenues worth $40 million annually — pays competitive wages and offers above average working conditions, he said.

Trainees avoided

The company now avoids trainees because it is a lot of work to bring them up to snuff, and when they finally have a grasp on the work, they leave for higher salaried jobs, Kozial said.

"On performance reviews, the trainee will put down as an accomplishment what he has learned, not how [he] has helped the company," he said.

G. D. Springer, director of information systems at General Aviation Sales and Service in Wilmington, Del., noted three problems he has with hiring systems programmers: There are not enough systems programmers, there are even fewer systems people with [Cullinet Software, Inc.] IDMS experience; and even if he finds one, he cannot afford to pay him, he said.

In the Wilmington area, all three of these problems are exacerbated because 15 large banks — including Bankers Trust Co. and Chase Manhattan Bank — have moved here since the beginning of 1984 to take advantage of favorable, new state banking laws. Springer is competing with the banks for staff and finds that the salary — in the high twenties — that his company, which generates revenues worth $180 million annually, can offer a systems analyst with a degree and/or appropriate experience is not enough.

The last two resumes were distressing. One was from a person with a degree and no experience who wanted a salary of $30,000, the other from a person with minimal practical experience who wanted $39,000.

The last two resumes he received distressed him, Springer said. One was from a person with a degree and no experience who wanted a salary of $30,000 a year, and the other was from a person with minimal practical experience in a small installation who wanted $39,000.

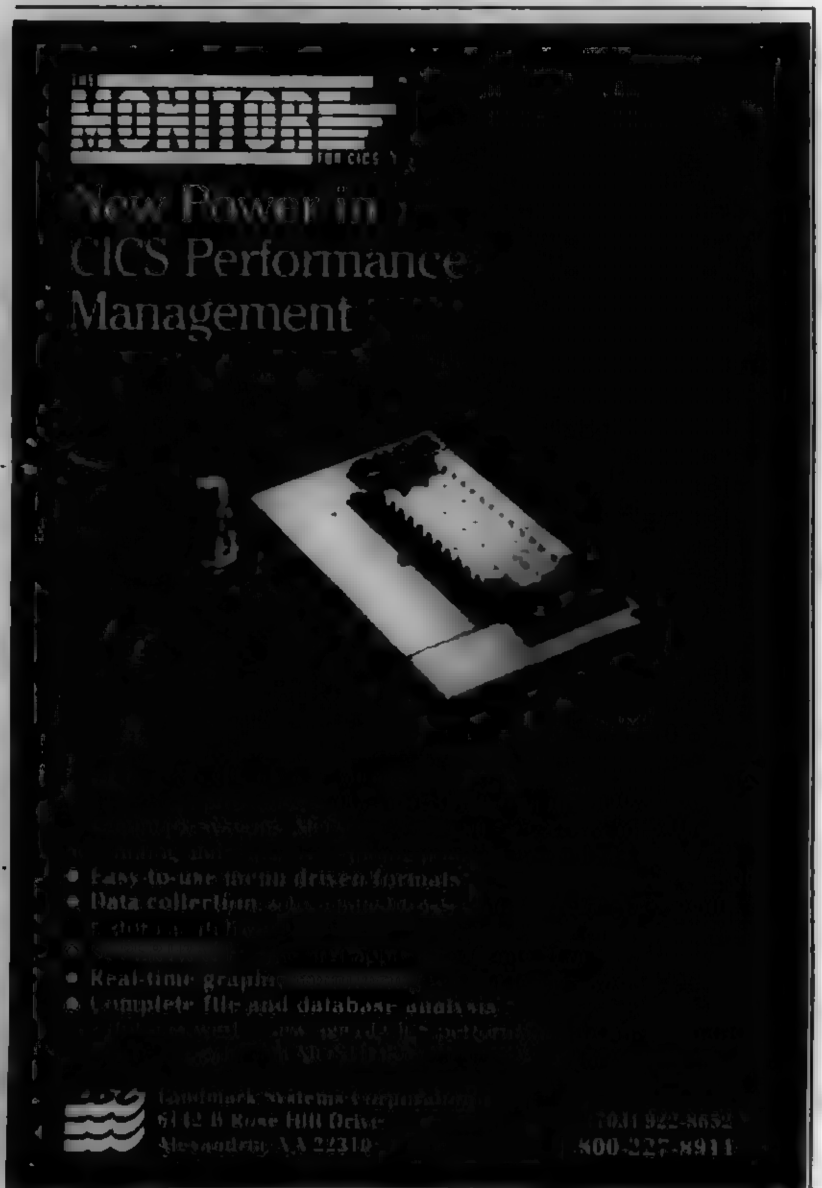
Once a good analyst is hired, Springer said, he is worth another $8,000 a year in the marketplace after gaining a couple of years of experience. Because General Aviation cannot give such hefty raises so quickly, analysts leave the company for greener pastures, he said.

Interns hired on per diem basis

Lukowicz of St. Luke's has partially solved his hiring problems by offering internships to vocational/technical high school students and students at post-high-school technical institutes. If he finds a particularly talented intern, he hires that person on a per diem basis until a position opens.

Springer advertises in newspapers and contacts agencies that specialize in locating the kind of people he needs, but he is not having much luck, he said. Kozial has worked out an admittedly nonscientific method for determining an interviewee's worth, he said. Looking first at how a person sells himself, he takes all sloppy or unreadable resumes and puts them aside. He then interviews the people with impressive resumes, spending a lot of time going over important points.

"Some know how to sell themselves, but they stretch the truth about what they know," he said. He avoids people with college degrees in other disciplines, such as psychology, because he has found over the years that they are in DP because it pays well and not because they like it, he added.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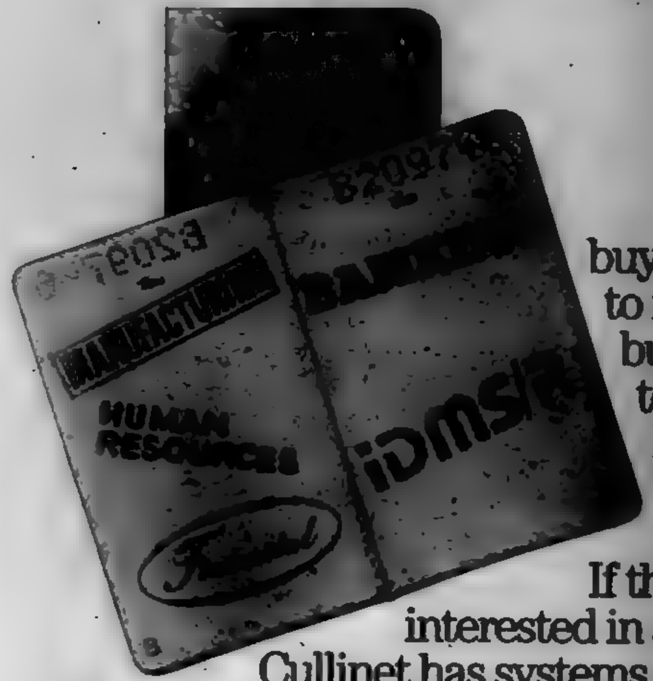

It's an all too common problem. Manufacturing buys an application, and data processing is expected to integrate it with the corporate database. Finance buys an application, and data processing is expected to integrate it, too. And so it goes. Three years later, the job still isn't finished. And the ideal of a *true* database management system is still just that—an ideal.

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DIALING FOR DOLLARS

Bruised and suffering from a few broken ribs, users are emerging from the first year of the AT&T divestiture sore but intact. And perhaps smarter. Although ill-equipped to capitalize on it yet, the heightened industry awareness foisted on users by the Bell system breakup has sown the seeds of change.

In this year of communications line back orders, facility service nightmares and burgeoning options, telecommunications managers have had to adapt to keep their heads above water. In an October speech to the Communications Managers Association on Long Island, N.Y., Donald Procknow, vice-chairman of AT&T Technologies, likened the environment created by divestiture to reading *War and Peace*. "Divert your attention for a minute, and it's hard to pick up again."

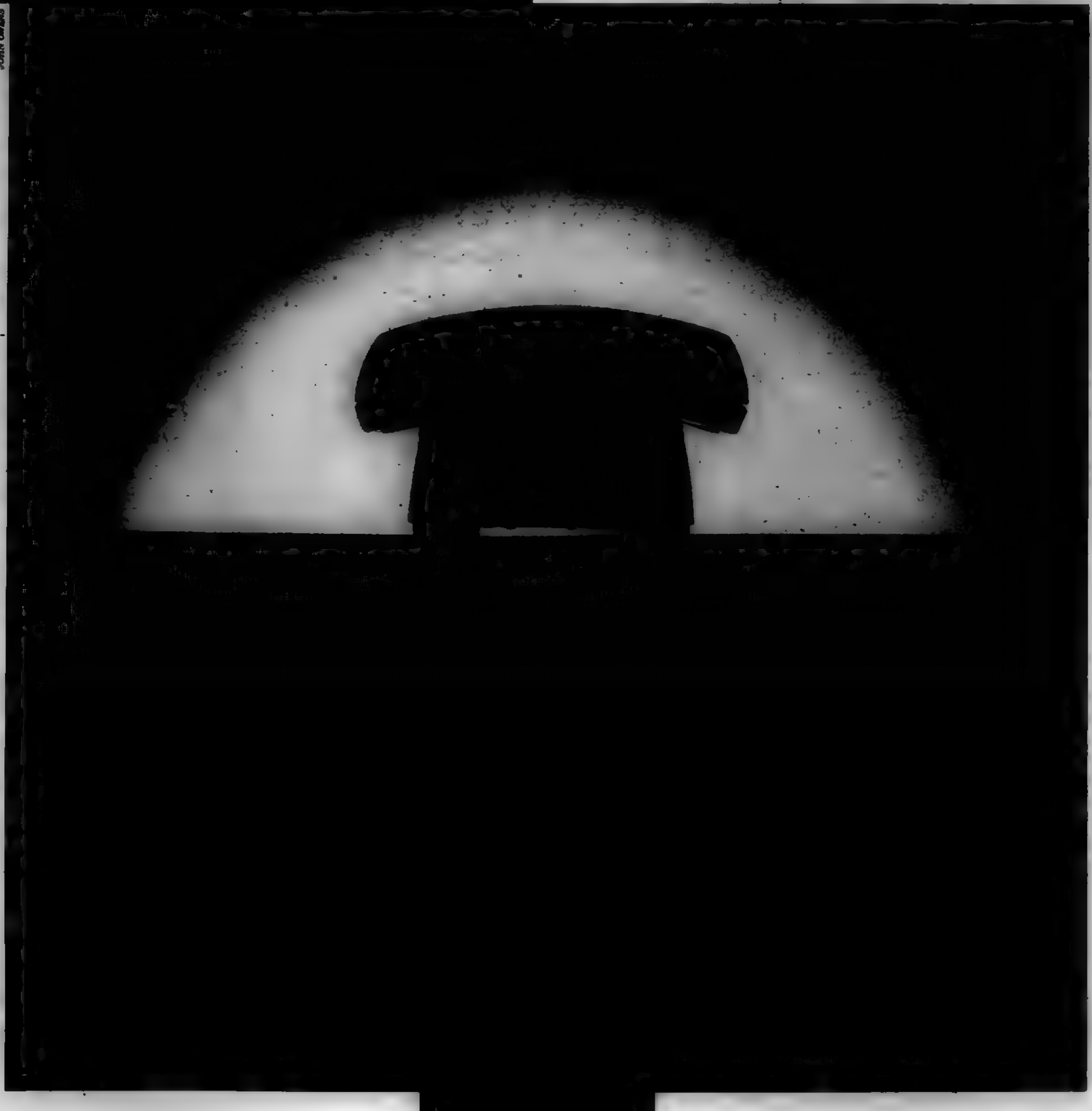
Users, however, have faced up to the task. The explosion of interest in T1 digital facilities is a good bellwether, showing the responsibility — in network design, implementation and management — that users are willing to shoulder now that it is no longer possible to do one-stop shopping with AT&T.

In retrospect, the communications users who foresaw the divestiture storm and, in anticipation, battened down the hatches by factoring delays into their plans and limiting expansion and moves, fared far better than those who hoped they would be able to weather the cataclysm.

Not even AT&T properly estimated how painful the dissection of the Bell operating companies would be. The first clue came early in the year when orders for communications lines began backing up, caught in a coordination glitch between AT&T Communications, the provider of long-distance facilities, and the divested Bell operating companies, which provide local connections.

Horror stories mounted. Line installation delays, which were running up

By John Dix



JOHN OWENS

to six months, were only part of it. Facilities were arbitrarily disconnected. Circuit records were bungled. Company accounts were lost. And many Bell service account representatives were reassigned, leaving the hapless user with nowhere to turn.

In July, the private-line logjam peaked at 44,300 back orders. Wats and 800-service back orders topped out at 36,000. Slowly, the millions of dollars AT&T poured into the job of cleaning up this mess began to take effect.

Today, 58% of private-line orders are installed on time, compared with 29% in July. In October, private-line back orders had been cut to 23,400. While admitting it has a long way to go, AT&T happily reports that Wats and 800-service orders are now nearing normalcy.

Concern over procuring and maintaining communications lines went hand-in-hand this year with worries about how much these facilities would cost.

Before the breakup actually occurred, analysts were predicting that the divested local Bell operating companies' rates would rocket through the roof and that long-distance rates would plummet.

> *The divested Bell operating companies have successfully pushed many rate increases through their respective state public utility commissions but not to the tune many had forecast.*

Yes and no. The 22 divested Bell operating companies, now grouped within seven independent regional holding companies, have successfully pushed many rate increases through their respective state public utility commissions but not to the tune many had forecast. Long-distance rates have not seen any precipitous decline. To the contrary, some long-distance companies like MCI Communications Corp., have, in fact, raised their rates.

Given the state-by-state regulation of local rates, it's hard to quantify local increases. But this year, all divested Bell operating companies began charging federally approved line charges that include:

- Customer Access Line Charges (Calc) for businesses with multiple phone lines. Beginning in May, the divested Bell telephone companies began charging business customers a flat charge for each telephone line they operated. These charges ranged by state from a low of $2.25 to a legal maximum of $6 but averaged $5 per line per month.
- A $2 per line per month Calc for Centrex lines in place before July and the regular business Calc for Centrex lines installed thereafter.
- A $25 surcharge for private lines. The divested Bell operating companies started billing this surcharge in November, although it started to accrue in August. It applies to private lines that are connected to switching or other types of equipment that is capable of rerouting traffic into the local-exchange network. Because of this, the surcharge generally applies to voice circuits rather than data links. The surcharge applies to both ends of an interexchange circuit and only one end of a link that stays within the same exchange.

Implementation of access-line charges directly on business customers — changing somewhat the way the divested Bell operating companies recover costs from AT&T — resulted in a 6.1% reduction in AT&T's Message Toll Service and Wats service. This was the only AT&T rate change that materialized in 1984.

One change that never came about was AT&T's proposed private-line rates, originally filed in October 1983. These proposed rates were substantially higher than the old private-line tariffs because they reflected increases that the divested operating companies and other local-exchange carriers had proposed to charge AT&T for special access.

The special access dilemma

Special access is the type of connection local-exchange carriers provide long-distance companies to complete private-line circuits. Users never see this charge directly — long-distance private lines are procured from a single carrier who coordinates local connections at both ends of the circuit through exchange carriers — but as the long-distance carrier's cost to connect to the local network increases, it will usually be reflected in the rate it charges the end user.

A spokesman for the Federal Communications Commission said that the special access rates proposed by the local-exchange carriers ranged up to 800% depending on location and type of service. These increases were reflected in AT&T's proposed 1983 end-user private-line rates, although the actual increase was offset somewhat because AT&T had proposed lowering its cost per mile [illegible]

In 1984, the FCC found the special access rates to be unlawful and rejected them. As a result, the projected private-line rate shock never came about.

Page Montgomery, vice-president of Economics and Technology, Inc., a telecommunications consulting firm in Boston, said that because of this, many of his company's clients in the

Continued on page 12

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Continued from page 11

Fortune 100 are fairing well.

"Most of our clients that did budgets based on the proposed October 1983 numbers report that they are well under their budgets," he noted. "They might still be paying a little more than they did in 1983 — because of the $6 Calc, for example — but when you average it out, they are well below what they had projected."

We are, however, near the end of this grace period.

New rates expected

New special access rates are expected to be approved by the FCC and to be put in place by the local exchange carriers by Jan. 17. After analyzing these tariffs and compensating for them, AT&T is expected to refile its end-user private-line rates with the FCC around March 1, Montgomery said. "Under this scenario, these rates would go into effect sometime between April 15 and June 1."

Just what the new private-line rates will be is still unclear. Economist Alan Pearce, president of Information Age Economics in Washington, D.C., said the only thing that is certain for 1985 is "significant private-line rate restructuring, where some private-line offerings will go up in price, some will stay the same, and some will go down." Generally, Pearce expects to see the price of lower speed analog facilities to be increased and higher speed digital facilities to drop.

The length of the circuit will also have an effect on whether its cost increases or decreases. Montgomery said that AT&T may lower its private-line rates, but the end user will still see significant increases because of the way the tariffs are structured. Today, private lines are tariffed on an end-to-end basis, but in the future, AT&T will price out access components separately, components that will reflect the increased amount it has to pay local-exchange carriers for special access.

Longer circuits more economical

Under such a structure it becomes obvious that the longer circuits are more economical. Montgomery said that even when AT&T incorporated 100% to 110% special access increases into its proposed 1983 rates, private-line users that had circuits extending over 850 miles would have seen absolute rate reductions because of the offset effect of new, lower dollar-per-mile charges. The break-even point that will determine rate increases/decreases will drop below 850 miles now that the FCC has mandated that special access charges be lowered.

As a category of service, private-line rates will go up because they have been underpriced in the past, an FCC spokesman said. Additionally, the rates of alternate carriers can be expected to increase more than any AT&T rates. This is because the alternate carriers — including MCI Communications Corp. and GTE Sprint Communications Corp. — have been paying the same amount for special access since 1974. This amount will be increased over time until they pay the same amount as AT&T.

The FCC agreed to phase in the special access increases over time to lessen the blow to the alternate carriers. As an example, Western Union, Inc. will pay $300,000 in special access charges next year, and $500,000 — the full amount — by January 1986, according to Montgomery. "One expects that these higher rates will eventually be reflected in the carrier's end-user rates," the FCC spokesman said.

As private-line tariffs increase and the rate differences between carriers erode, users will be spurred to look for more drastic alternatives. By bypassing telephone companies — both local and long-distance carriers — users can take control of rates and realize other benefits, such as implementation of wide bandwidth facilities and control of installation schedules.

> *As a category of service, private-line rates will go up because they have been underpriced in the past.*

Bypass became a byword in 1984, encouraged by rate turmoil, line delays and service problems, but is still more talked about than practiced. This is due, in part, to the fact that users are still waiting until the divestiture dust settles and all the rate cards have been played before calculating the potential of bypass.

Many large companies, however, already practice some type of bypass. According to Jerry Lucas, president of Telestrategies, Inc., a research and consulting firm in McLean, Va., "half of the companies in the Fortune 100 already have bypass systems in place or are very actively looking at [bypass]." He estimated the 1984 bypass market to be about $600 million.

There are three basic types of bypass:

- Circumvention of local telephone company circuits by linking buildings with line-of-sight microwave or infrared light systems.
- Sidestepping the local telephone company by running a direct link from a corporation or institution to a long-distance carrier's point-of-presence within a local telephone company's jurisdiction.
- Total bypass of all telephone companies by operating a private premises-to-premises communications system.

There are many technologies that can be used to achieve the types of bypass outlined. The most prevalent technology used in bypass is micro-

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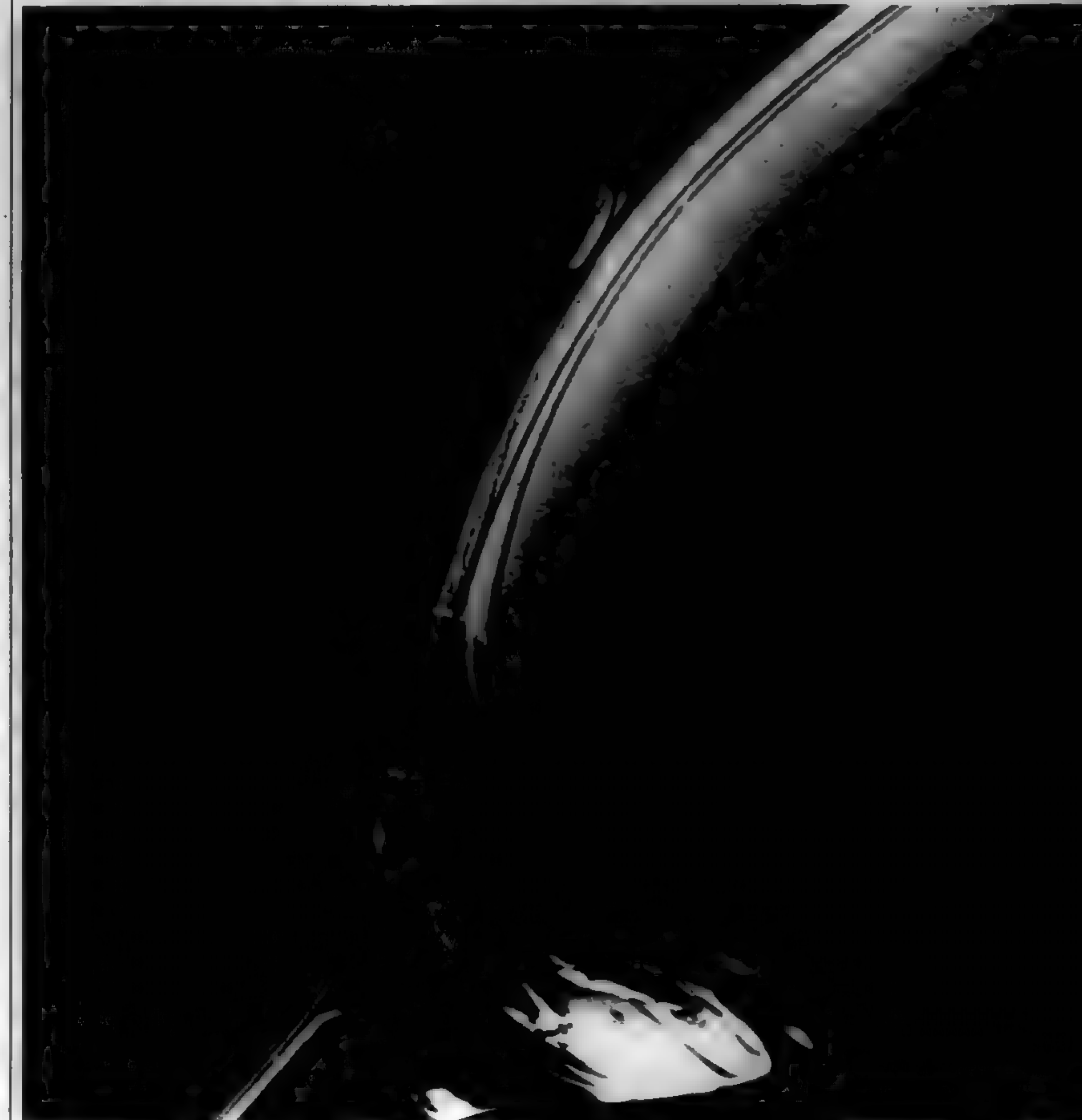

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wave radio systems, typically employed in the first manner mentioned.

Other technologies will mature next year. According to Mark Stahlman, a research analyst with Sanford C. Berstein and Co., an investment research and management firm in New York, "1985 is going to be a good year in terms of the coming to fruition of a lot of these technologies that have been in the development stage [during] the last two or three years. Whether or not the market will develop still remains to be seen."

One technology that Stahlman is predicting will be deployed next year is the use of CATV networks to bypass local telephone companies. "The major companies involved with CATV-based data and voice systems began developing systems in 1982 and 1983 and, given two- to three-year development cycles, 1985 is the year the major suppliers and some independents will begin testing."

Another promising technology that both Lucas and Stahlman are expecting to see further developed in 1985 is low-cost, two-way satellite systems. Using something called spread spectrum technology, companies like Equatorial Communications Co. of Moutain View, Calif., can offer services that use small, inexpensive, two-way satellite earth stations.

Stahlman said that spread spectrum technology, which enables use of small earth stations by replicating satellite signal elements, will be brought together with direct broadcast satellite (DBS) techniques in 1985 to spawn a new bypass market. DBS systems were originally conceived to broadcast television signals directly to homes, but because this market has been sluggish, "companies that invested in DBS are going to be compelled to try to address business communications problems." Xerox Corp.'s Computer Services Division recently announced a service that marries these two technologies.

AT&T may lower its private-line rates, but the end user will still see significant increases because of the way the tariffs are structured.

The outlook for other bypass technologies looks less rosy. For example, digital termination systems (DTS), point-to-multipoint digital microwave systems that provide bypass of telephone company local loops, are floundering. Lucas said the problem is that "there isn't enough capacity for widespread use. No one has ever made a penny on data-only services," which are essentially what DTS systems are.

Like most bypass systems, DTS exists at the sufferance of established carriers. Lucas said that the DTS industry has been dampened by AT&T's proposed Dataphone Digital Service rates, its digital service, which are substantially lower than previous rates.

But bypass is not always justified economically. Indeed, Stahlman noted, one of the primary reasons corporations practice bypass is because telephone companies cannot provide needed facilities in a timely fashion. Additionally, some corporations bypass their local carriers because the needed service, perhaps a high-speed digital link, is not available.

Knowing this, many of the divested operating companies — including New York Telephone Co. in New York — are installing fiber-optic networks that some customers will be allowed to access directly.

Such market-driven responses are indicative of change within the telecommunications industry necessitated by AT&T divestiture. While obscured by the problems it created, the competitive benefits of the Bell system dissection will probably be, in the long run, good for the user. Pollyannas point to service options created, competitive pricing and the betterment of communications technology. Critics question the wisdom of removing incentives for divested Bell system companies to offer universal service at fair prices; they wonder what the long-term implications will be of commercializing Bell Laboratories — especially in light of heightened international technology competition — and ask, will the Bell system be put back together again in 10 years?

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Division of Advance Circuits

AT&T breakup expands equal access opportunities

By John Dix
CW Staff

As a condition of AT&T's divestiture, the former Bell operating companies are required to provide all long-distance carriers with the same quality connections to their local networks. By September 1985, under terms of the so-called equal-access divestiture provision, roughly one-third of all local telephone switches are to be upgraded for equal access. By September 1986, 70% of all exchange switches are to be updated.

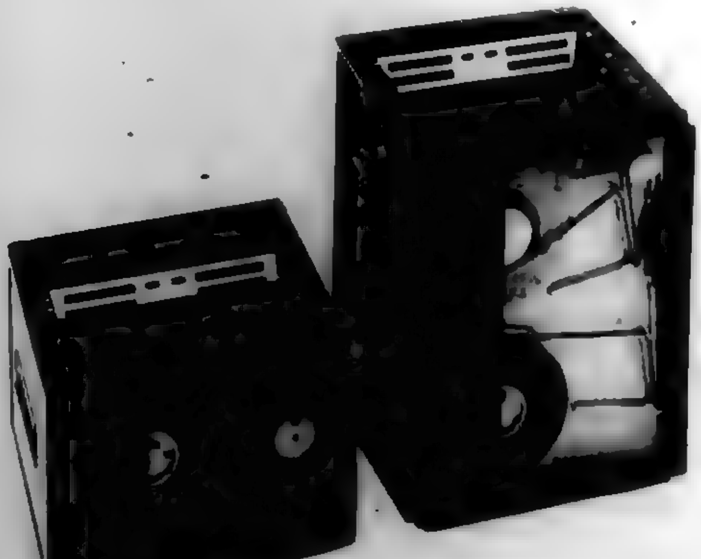
Equal access essentially puts carriers like MCI Communications Corp. and GTE Sprint Communications Corp. on a footing equal to AT&T. It increases service quality of the alternate carriers, enables their services to be accessed by dialing a single digit as with AT&T and provides the carriers with the signaling elements necessary to provide accurate billing, all of which are factors important to corporate users.

As equal access becomes available, users will be asked by their local telephone company to choose a primary long-distance carrier. That carrier will henceforth be accessed by dialing the digit "1," just as the long-distance grid of AT&T has been selected for all these years.

In addition, users can access carriers other than their primary choice by dialing "10" and a three-digit carrier identification code. Known as the "10XXX" dialing option, this does away with the pre-equal access need to access alternate long-distance companies by dialing the carrier, entering an identification code and then dialing the desired number.

For corporate users, the advantages of equal access requires careful analysis of applicable tariffs. Once assessed, least-cost routing tables in a company's private branch exchange (PBX) can be updated so that traffic is automatically routed over alternate carriers where favorable tariffs are available.

Some PBX manufacturers' least-cost routing schemes are not capable of inserting the 10XXX digits needed to access nonprimary carriers. Besides ensuring that capability, users should find out how much reprogramming for equal access will cost and what it will entail — on-site updating or a new load from the vendor.



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Latas: mapping the divested Bell companies

By John Dix
CW Staff

It is perhaps fitting that the acronym for Local Access Transport Area, or Lata, sounds like it belongs in a surveyor's lexicon, because it is in fact used to distinguish geographical boundaries.

When AT&T divested itself of the Bell operating companies, the jurisdiction of each local company was subdivided into areas known as Latas. These areas determine which traffic can be carried by the local operating companies and which has to be handled by a long-distance or inter-Lata carrier.

The 22 Bell operating companies were divided into more than 160 Latas, depending mostly on the population density of a given area. Wyoming, Rhode Island and Maine, for example, are among the states that are considered single Latas, whereas California has 10 Latas, and Texas has 14.

Logistically, the creation of Latas has vastly complicated the life of users. Circuits that were once the province of a single operating company may now cross a Lata and require the involvement of an inter-Lata carrier such as AT&T or MCI Communications Corp. That same circuit, once identified by a single number, may now have three circuit identification numbers, complicating record keeping and the reporting of service problems. Additionally, because inter-Lata and intra-Lata circuits share similar price differences as interstate vs. intrastate services once did, network cost optimization is more difficult.

Given the differences in Lata pricing, many consultants are advocating network configurations that minimize circuit contamination, a condition that results when a line crosses from one Lata into another. Circuits that are contained within Latas can be interconnected at hubs, which can in turn be networked, which would minimize inter-Lata circuits and at least theoretically limit expense.

ED BRAVERMAN

CLEAR AND PRESENT DANGER

By John Desmond

October 1983: A truck carrying a ton of explosives drives through sandbags into the courtyard of a U.S. Marine barracks in Beirut, Lebanon, and detonates with devastating force. The building collapses, and more than 240 Marines lose their lives. A terrorist group takes responsibility for the action.

MELVILLE, N.Y. — On the morning of August 22, 1984, at the General Electric Co. offices here, a man walked into the building with an attache case, deposited the case in a stairwell and walked out.

At 10 a.m. that day, a caller identifying himself as a member of the United Freedom Front (UFF) told a receptionist that a bomb had been planted in the building. Corporate security was notified, and a guard spotted the attache case in the stairwell. The case was conveniently labeled "bomb," according to Stanley Klein, chief of the terrorism section within the FBI's criminal investigation group. The bomb was a "standard terrorist-improvised explosive device" consisting of dynamite, a battery and a timer, Klein said.

The Suffolk County police began evacuating the building at 11:21 a.m., and at 11:26 a.m., the bomb went off. Walls buckled, windows shattered, half the roof was blown off, and the second-, third- and fourth-floor stairwells were heavily damaged. No one was injured, primarily because the terrorists furnished ample warning.

"The difference between terrorist groups in the U.S. and overseas is the level of violence they're willing to achieve," according to Klein. "In this country, terrorists want to make statements without turning people off. It doesn't seem to me that they're willing to take the step of going into loss of life."

The threat of terrorist attacks against U.S. data centers is a little-considered risk. But vulnerability to terrorists is not only a problem for U.S. military outposts in the Middle East, Western Europe or Central America. The U.S. has grown dependent upon complex data processing systems for its institutional well-being. The U.S. Marines could withdraw from Lebanon, but U.S. data centers cannot withdraw from their vulnerability to terrorist

Continued on page 16

INTERNATIONAL TERRORISM

Continued from page 15

attacks. Methods are available for analyzing and reducing the risk, but in the DP community, awareness of the seriousness of the problem is in small proportion to the risk itself.

Moreover, it can happen here.

In five instances between 1971 and 1975, IBM installations in the U.S. and Mexico were attacked. In March 1976, a Hewlett-Packard Co. electronic circuit manufacturing site in Palo Alto, Calif., was bombed. And in May 1976, bombs were exploded on two floors of a building housing the DP facilities of Central Maine Power in Kennebec, Maine, according to records compiled by Belden Menkus, a management consultant who in 1983 published *Notes on Terrorism and Data Processing*, an analysis of the threat of terrorism to DP centers.

> *'There is historical warrant to expect frontal assaults on data centers, placement of explosives on-site, vandalization and arson.'*
>
> — Belden Menkus, management consultant

These were all isolated incidents, according to Menkus, who concluded that terrorists have so far "failed to recognize the role of DP in perpetuating the social/economic structure." However, he added that "there is historical warrant to expect frontal assaults on data centers, placement of explosives on-site, vandalization and arson."

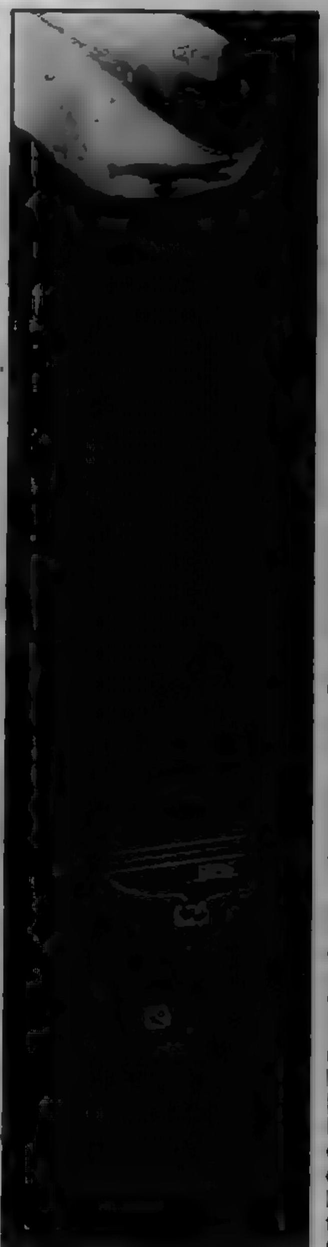
So perhaps the intelligent terrorist has not yet arrived. Yet in October, Georgetown University's Center for Strategic and International Studies (CSIS) in Washington, D.C., warned of the terrorist threat in a report titled, "America's Hidden Vulnerabilities." The report concluded that computer systems should be safeguarded against acts of terrorist sabotage intended to disrupt or cripple society. The report was compiled by a panel of military and foreign affairs experts, including Chairman R. James Woolsey, a former U.S. Navy undersecretary, and Robert H. Kupperman, a senior associate at CSIS who served as the panel's cochairman.

At a press conference announcing the report's conclusions, Woolsey said, "Imagine what would happen to the personal finances of everyone in this room if a terrorist destroyed records of bank accounts, investments, Social Security and mortgages all at once." The report states that vulnerable funds transfer networks exchange money equal to the federal budget — $845 billion — every two to four hours.

Kupperman told *Computerworld* that while the greatest terrorist threat is in Europe, "In the U.S., the prospects for terrorism are increasing." Spillover from areas such as the Middle East is possible here, he suggested, noting the attack on an IBM office in New York two years ago by the Black Liberation Army, an action protesting the company's business dealings in South Africa.

"Such organizations and maybe some more Weather Underground-like organizations are going to get it into their heads to hit computer facilities," he said. He advised DP and information center managers to take the terrorist threat seriously, to "begin to figure out how much protection will cost" and to take reasonable precautions against unexpected attack.

Sperry Corp. became more conditioned to expect the unexpected when, on Aug. 10, 1984, two persons entered a company defense plant in Eagan, Minn., and used hammers to smash military computer equipment. A back panel and power supply were damaged, causing a $55,000 to $65,000 loss. The pair gained entry despite the fact that the plant was surrounded by a fence and had posted guards.



According to Tom Kunz, in charge of facilities protection at the plant, the pair is believed to have shown false identification to pass through the gate. Since then, Kunz said, the plant has tightened security with improved badges, a reduced number of entry points and added guards. Kunz said, "When the object [of an intruder] is to go in and damage something, it makes for a very difficult situation."

The difficulty of protecting against the unpredictable is perhaps best expressed by Jake's Law, which says, "With a big enough hammer, you can break anything." Jake's Law is promulgated by Donn P. Parker, a senior management systems consultant for SRI International, Inc., of Menlo Park, Calif., an acknowledged leader among security experts and the author of *Fighting Computer Crime*. SRI recommends that businesses adopt a realistically sober attitude about the threat of terrorism. "It certainly is a risk. The critical question is, how big a risk is it? Nobody knows," Parker said.

SRI has documented 32 attacks against buildings housing data centers in Italy, France and West Germany in the last five years, many by the Red Brigade in Italy, Parker said. In comparison, few attacks have taken place in the U.S., yet the nature of terrorists with the goal of disrupting society is to strike at any time. "All of a sudden, some organization we haven't heard about could pop up, and there could be massive attacks all over the country. People would ask why they weren't warned. It puts the criminal justice community in a very difficult position," Parker said.

Some have charged that the threat of terrorism in the U.S. is being blown out of proportion, especially by individuals who stand to profit from the fear of terrorism. Oliver Revell, the assistant director of the FBI's criminal investigation division, said in November that the nation is becoming unnecessarily alarmed about terrorism. "I think there are a number of people crying wolf and waiting for the sky to fall in," Revell said. "I get tired of hearing [about] the imminent doom they are predicting. We're the ones who have the terrorists on the run, not the other way around."

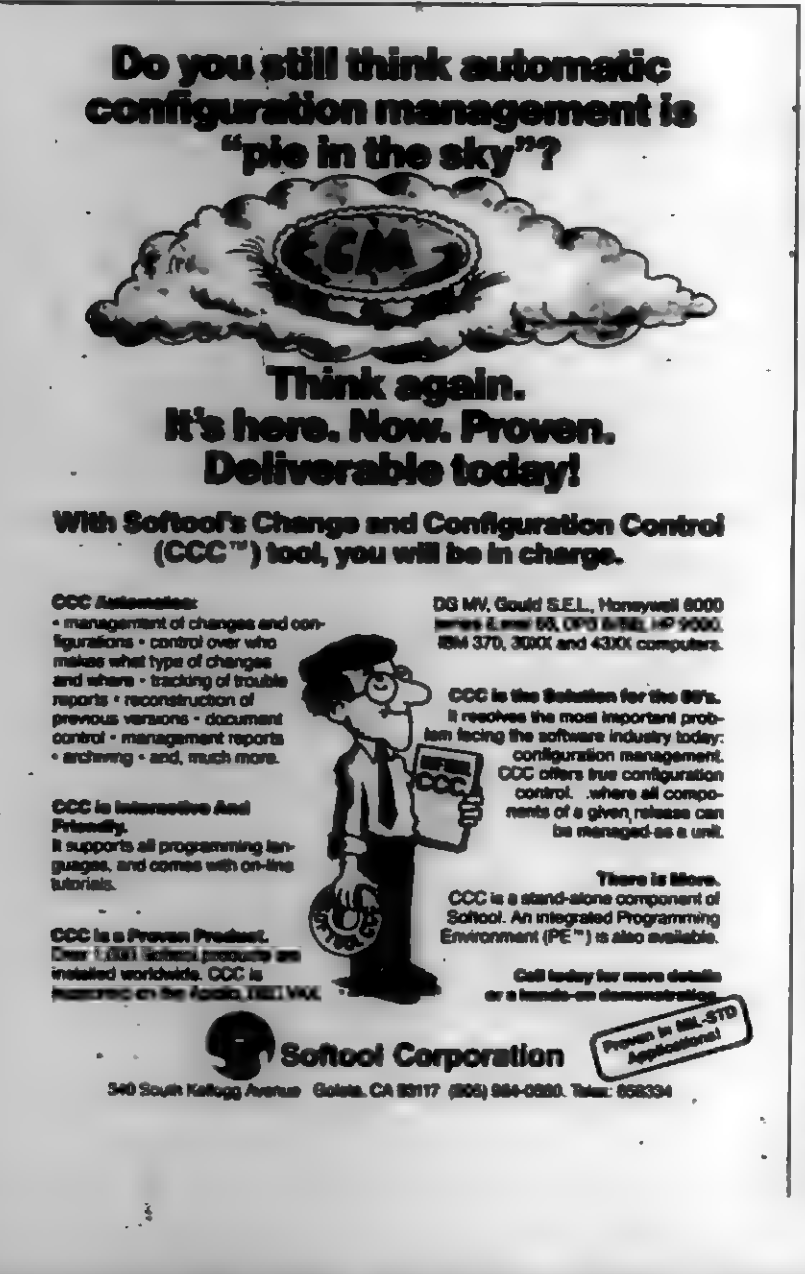
Parker is not so sure. His impression of those who have spoken about the threat of terrorism is that most are "conscientious people who have seen what can happen. They look at the U.S. as becoming dependent on fragile technology, and they feel a responsibility to speak out."

The question of how industry should respond to the terrorist threat is debated as much as the dimensions of the threat itself. The CSIS report recommends that companies perform risk analysis in which they estimate an annual expected loss. The theory states that "investment in any specific measure for risk reduction is economically justified when the measure's cost is less than the expected reduction in loss that it is intended to achieve," according to the report.

Risk analysis is among the federal government's Health Care Financing Administration's security requirements for Medicare contractors. According to Don Abramson, computer systems analyst with the System Security and Testing Group of the financing administration, "The problem with risk analysis is that a lot of people are not comfortable with trying to get broad estimates. Auditors want verifiable facts and figures. But we use experts to outline risks using common sense and a systemized approach, something that can inspire management to do something."

Total Assets Protection, Inc., an Arlington, Texas-based company specializing in computer security, performs a business impact analysis as opposed to a risk analysis.

"We go in and find out the value of keeping the data center up and running. We show them their exposures and vulnerabilities," said Dick Bessenhoffer, vice-president of facilities design and planning at the company.



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INTERNATIONAL TERRORISM

"We try to balance the risk with the cost to protect. You can't have protection costing more than the computer going down."

While practiced in various forms, risk analysis is not universally accepted. SRI, for instance, does not believe in risk analysis. "We do not [redacted] analysis, because there are no valid statistics on which you can justify spending money," Parker said. Figures used to discuss the impact of computer crime are often pulled from thin air, he said. Parker cited a [redacted] study that estimated the impact of computer crime to be $145 million to $730 million, adding, "I say that's nonsense; that has nothing to do with reality." He said no valid statistical studies have been performed in the area, and there is no method of collecting such statistics.

At SRI, Parker said, "We base our recommendations on generally accepted practices or reasonable and prudent business practices. Companies should install significant physical safeguards [to ensure that] if anything does happen, [they will] avoid embarassment, the liability of stockholder suits and actions in court because they have done reasonable things." He said his clients "gradually come around to understanding the situation."

'The major deficiency [of DP security] is that most of these people can't see beyond their noses. They're living on the fact that nobody has blown up their place or come in with a gun.'

— Dick Bessenhoffer,
Vice-president of facilities design and planning, Total Assets Protection, Inc.

IBM may have come to understand the situation better after the UFF planted a bomb in the company's Harrison, N.Y., offices in March. According to IBM spokesman Michael Dutton, IBM is now taking steps to protect its property from physical harm. Asked to detail the measures in effect, Dutton said, "It would be counterproductive for us to discuss publicly the steps we are taking to protect IBM property."

Practical protection

However, Dutton said that IBM does believe it is practical to protect itself against unpredictable incidents such as the UFF bombing. IBM's security personnel and DP professionals are working together to prevent damage to data centers, he said.

SRI recommends adopting the measures taken by companies like IBM to achieve a baseline of security. "We tell them they cannot afford not to do it," Parker said. Companies that follow SRI's recommendations "will probably wind up with less security than they should for the really bad things that can happen but more than they would have if it was a benign world out there," Parker said.

Few statistical figures exist on the adequacy of company and data center security, but security authorities give the impression that security [redacted] firm's level of security on a scale of one to 10, 10 being most secure. Commenting on security levels the company has observed in its evaluations, Parker said the average SRI client has a security rating of five, but many have security ratings of two or three. "We try to move them up to six or seven — not eight or nine, that's too much," Parker said. "Security of six or seven is prudent and would reduce the loss from an attack."

Jack Bologna, who heads Computer Protection Systems, Inc., a corporate security firm in Plymouth,

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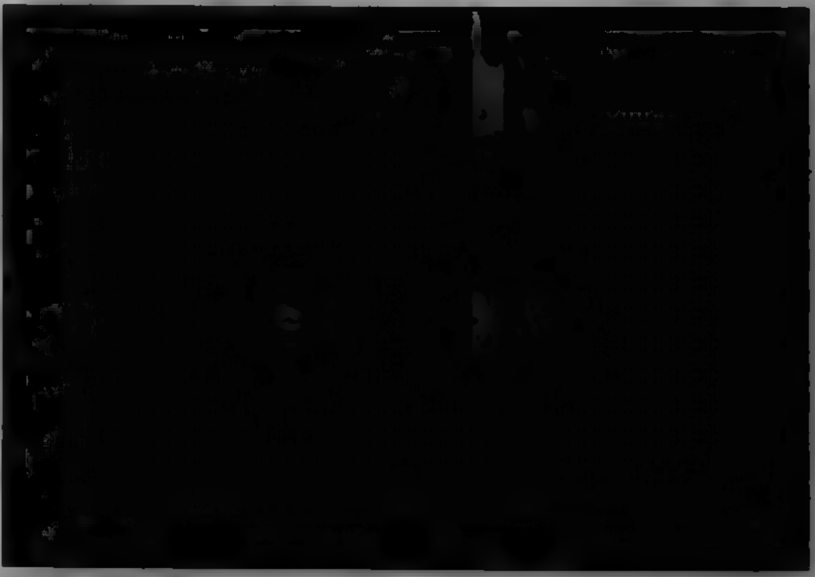

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Security specialists outline basics of protection plan

MENLO PARK, Calif. — The basics of physical security for data centers have not changed in many years, according to Donn B. Parker of SRI International, Inc., one of the world's leading authorities on computer security. Parker was project manager of a 1982 report on computer security prepared for the U.S. Department of Justice in which 82 controls in use at seven computer field sites were reviewed.

Physical security methods employed at well-run computer centers included the following:

- Housing computers in one room and peripherals in a different room.
- Low building profile.
- Secure building perimeter.
- Emergency preparedness.
- Security for sensitive areas during unattended periods.
- Designated areas where smoking and eating are prohibited.
- Minimizing traffic and access to work areas.
- Physical access barriers.
- Remote terminal security.
- Universal use of badges.
- Alternative power supply.

The report suggested that baselines of security can be established for each business, be it bank, insurance company or manufacturer. Security experts and consultants should be able to agree on the objectives of a security program. Computer security administrators and the management responsible for security expenditures should agree on a number of specific controls. "As computer-using organizations adopt the baseline approach for selection of controls, they will increasingly rely on the best security controls used most successfully by other organizations," the report said.

> *'The key-thief problem can only be solved by permanently fastening the key to the person — not a pleasant idea.'*
>
> — Donn B. Parker, SRI International, Inc.

In his book *Fighting Computer Crime*, published in 1983, Parker suggested that access controls allow only authorized persons into the computer room, which should be built with a raised floor and false ceiling in the safest part of a building. He suggests allowing only operators, security officers, maintenance engineers, system programmers and escorted visitors into the computer room. And he recommends more remote access aids to restrict the presence of people in the computer room.

Among the more exceptional types of physical security devices is the proximity release door opener. Authorized persons wear a badge with a radio frequency transmitter inside. When close enough to an electrically locked door, the signal automatically opens it. A scanner ensures that no one follows behind. A computer could check to see if the badge wearer is authorized to enter at that day and time. If the person failed to leave by an expected time, an alarm would sound.

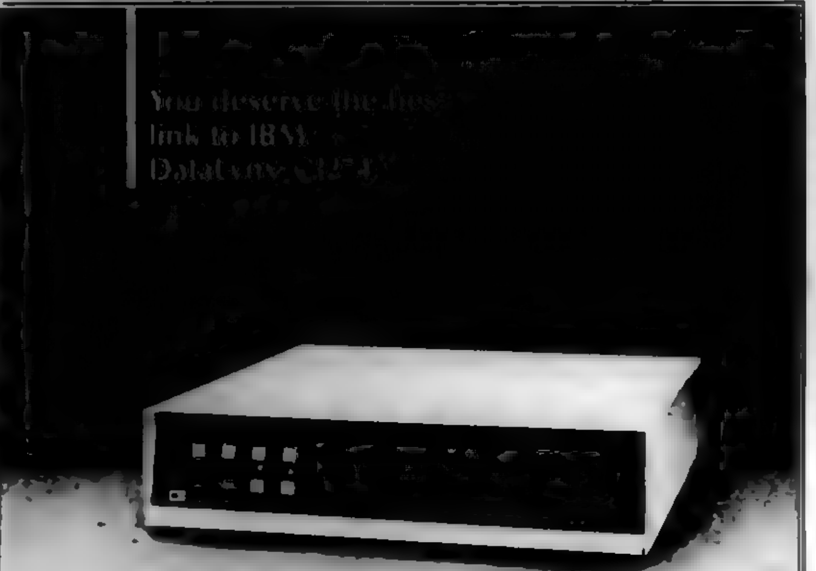
The method assumes the person entering is authorized to have the badge. "The key-thief problem can only be solved by permanently fastening the key to the person — not a pleasant idea," Parker stated. The author suggested that foolproof access control methods, probably those using physiological identifiers such as brain waves, will be perfected in the near future.

Total Assets Protection of Arlington, Texas, a company of computer security specialists and architectural and engineering consultants, has a systematic approach to serving its clients. Dick Bessenhoffer, vice-president of facilities design and planning for the firm, said a security evaluation begins at the property perimeter and works inside. Initial basics include fencing, alarms, cameras, lighting, a security force, patrols and local police cooperation. Next, doors, windows and location of data center are considered, then access control doors, alarm doors and motion detectors in certain areas. For sensitive areas with two sets of doors and a foyer, Total Assets recommends a "man trap," with access control devices on the inside and outside doors, augmented by closed-circuit television. The company also visits its clients' data centers at night, on the second or third shift, when employees are often less sensitive to security needs.

Companies should better coordinate data center security with their overall building security plans, suggested Oliver Wainwright, leader of the American Society for Industrial Security's Standing Committee on Physical Security. "I think you'll find a lack of coordination" between data processing staffs and building security staffs, Wainwright said. The committee focuses mainly on environmental controls such as temperature, plumbing and electrical systems; anti-intrusion methods such as indoor and outdoor perimeter devices and internal backup devices; and fire protection.

While the committee does not have broad, specific survey information on how well protected the Fortune 1,000 firms are, it did recently complete a survey of anti-intrusion hardware. Among the conclusions were that companies are moving toward more proprietary security systems that terminate in-house rather than at local police departments. The local police are being looked to more for backup, the survey showed. Of those responding, 41% said they would prefer to terminate alarms at the local police station, while 52% said they would prefer to terminate in-house.

Wainwright believes it is important for data centers to be protected with physical security systems. "Most data centers hold a great deal of intellectual property. If there is no protection, a company leaves itself open for a lot of liability," Wainwright said.



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Continued from page 17

Mich., estimated that 25% of Fortune 1,000 firms have no disaster recovery plans at all. Beyond that, he estimated that 25% to 50% of firms have inadequate plans. "They really don't believe there's a threat or else they're preoccupied with marketing and production issues and not physical security," he said.

Total Assets Protection's Bessenhoffer said most companies have inadequate physical security measures in place. "The major deficiency is that most of these people can't see beyond their noses. They're living on the fact that nobody has blown up their places or come in with a gun," he said.

Recommendations by the Georgetown University panel on how industry and government should respond to the threat of terrorism included providing tax write-offs for investments in risk reduction and reducing insurance costs for companies that invest in risk reduction.

Insurance aspect key

SRI judged the insurance premium aspect to be important. "We're strongly pushing that. The whole insurance industry has been a sleeping giant on this subject. It's never really understood just how fragile things have become," Parker said. "Once insurance companies set premiums based on the degree of security you have, it will become an important factor in how much a business will spend on physical protection."

That may take some time. According to Dean P. Felton, a vice-president at Marsh & McLennan Co. in New York, physical security is not directly reflected in insurance premiums. "I don't think any insurance person could say physical security in and of itself would be directly reflected in insurance rates. It would be reflected in the underwriter's attitude on whether to accept the risk."

The degree of physical security is considered when an insurance company is deciding to accept a risk, he said. A minimum standard of physical security is expected depending on the visibility of the business and its attractiveness as a target, Felton said. "That is not a formula-based approach, it's an emotional approach. You need that latitude because risks vary" he said.

Change in attitude

While he sees no momentum emerging for a change in attitude among underwriters to reflect degrees of physical security in premiums, he does see a change in the attitude of business. "There's an increasing sensitivity on a daily basis to the need for physical security at data centers," he said.

St. Paul Fire and Marine Co. of St. Paul, Minn., which in 1961 issued the first electronic data processing policy in the U.S., does recognize the value of physical security when setting premiums, according to Marr Haack, the firm's production manager of electronics and information technology. "The better risk is the more secure center," he said. A large data center with excellent security could pay premiums 25% to 50% less than the average large data center insured by St. Paul, Haack said.

Adding a caveat for DP centers, the FBI's Klein said, "If you look at terrorist groups throughout the world and note the fact they are becoming more sophisticated and that their targets seem to be ones that would have the greatest impact on American policy, it is certainly within the realm of feasibility that if terrorists could get to a company's computer, it would be a prime target."

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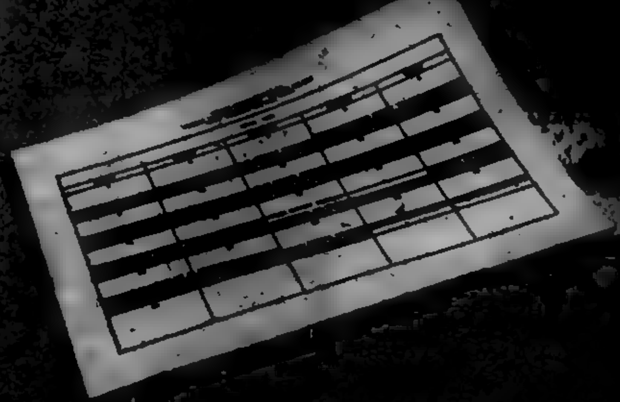

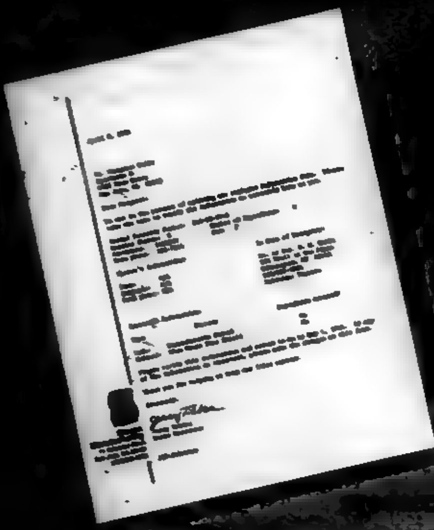

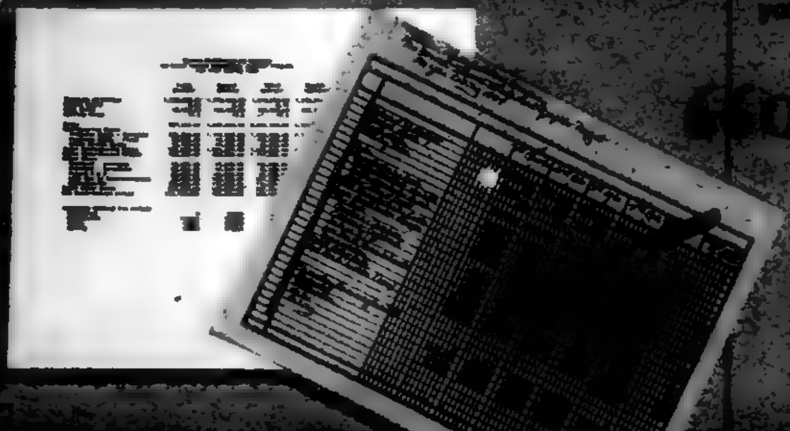

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Physical security system checks computer room access

MILWAUKEE — DP managers who need physical security cannot wait for the perfect system. Blue Cross/Blue Shield United of Wisconsin here and the Federal Reserve Bank of Chicago are using standard means to protect against unauthorized entry.

Blue Cross/Blue Shield United of Wisconsin has a multilevel physical security system that begins with perimeter security and carries into the computer room, according to Jordan D'Acquisto, security supervisor at the Milwaukee facility. All doors on the first floor are one way with no locks on the outside. Every door is checked by an alarm, except the main lobby entrance. At a security station in the lobby, visitors must sign in and be escorted by the person they are there to see.

All doors leading to the third-floor DP level are checked by an alarm, except for the elevator doors. Closed-circuit TV cameras with motion alarms monitor the DP floor, which is sectioned off. In the mainframe computer room, half the data center floor is completely enclosed in a room within a room. "If someone wants to sabotage our computer system, he would have to get into that secured area," D'Acquisto said. Six doors provide access to the main computer room, and each door has an alarm.

Access-card readers service the computer room doors. Employees have cards to get into assigned areas; some may have access to only one-half the computer room or to the tape library only.

Blue Cross/Blue Shield United has never experienced a serious attempt to damage its data center, D'Acquisto said. Unauthorized people have tried to walk into the building, "But they never really get past the first level of security," he said.

Minimum security required

To service government contracts such as Medicare, the Blue Cross data center is required by the federal government to have certain minimum security provisions. "The auditors tell us what we need and what we don't," D'Acquisto said.

The Privacy Act of 1974 required the government to institute certain minimum safeguards for protecting the integrity of medical records, according to Don Abramson of the Health Care Financing Administration, which administers the Medicare program. From these safeguards, certain minimum physical security standards emerged, along with data and operating security standards. "We had [more than] 100 Medicare contractors try to come up with standards over a period of years," Abramson said.

The minimum safeguards required include an authorization list of persons allowed to enter the computer room, tape library and terminal room; locks for all rooms with DP equipment; storage of sensitive data in secure areas during nonworking hours; a low-profile data center; and relocation of CPUs and sensitive data from potential hazard areas, such as kitchens and boiler rooms. The ideal location recommended for a data center should be a room with solid construction and windowless floor-to-ceiling walls. In the absence of that, companies should consider bars or alarms on the windows, metal doors, hinges on the inside of doors and access control for all doors, the government recommends.

To service government contracts such as Medicare, the Blue Cross data center is required by the federal government to have certain minimum security provisions.

Anyone entering protected areas of the Federal Reserve Bank of Chicago is required to wear a badge, according to George Coe, vice-president of the bank's Systems Communications Center. Access to tight security areas, such as the data center, is more controlled. Each control area has a sign-in desk, escorts are required for entry and TV monitors watch the entrances. The data center is located away from outside windows through which "someone could easily lob a grenade," Coe said.

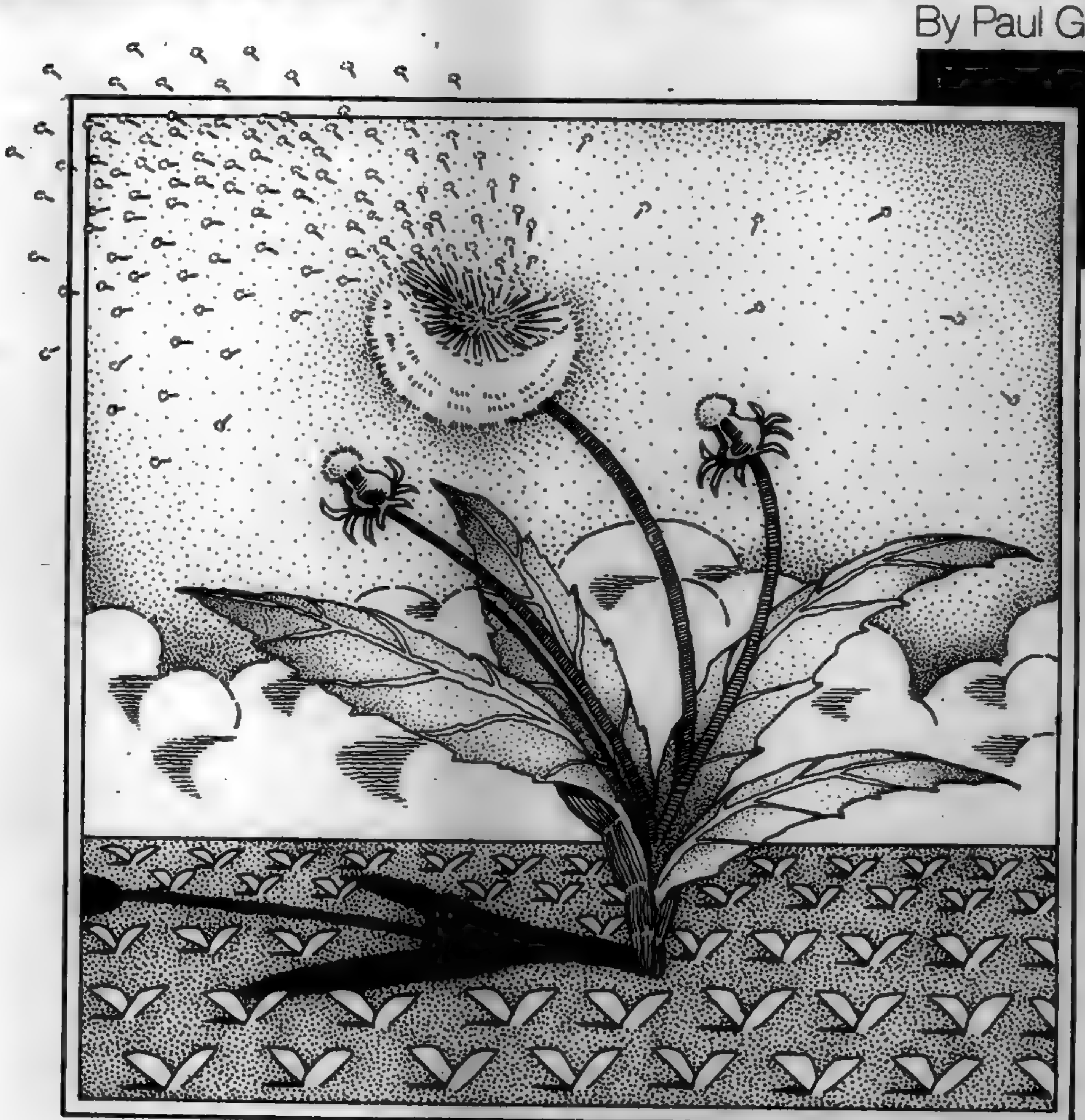
All Federal Reserve banks coordinate their security with local police, the Federal Bureau of Investigation and with the military in certain cases. "I don't think there's any question" strong physical security is needed, Coe said. "The critical assets for us to stay in business are largely vested in our computer facilities. We would be totally remiss if we left our vault doors open. Leaving the data center doors open would be tantamount to the same thing."

The Federal Reserve is also developing plans to relocate its facilities in the event of an incident that would "totally disable" the bank. The Disaster Relocation Center site will be the Reserve's most secure facility in Culpeper, Va., Coe said.

INDEPENDENT SOFTWARE VENDORS

SEEDS OF GROWTH

By Paul Gillin



When the National Jewish Hospital/National Asthma Center in Denver was evaluating general ledger software two years ago, it settled first on a product from McCormack & Dodge Corp. (M&D). But it ended up installing a general ledger from Cullinet Software, Inc.

For the hospital, which is a Cullinet IDMS user, the choice was obvious. "Once we found out that Cullinet had purchased the M&D product and redesigned it for IDMS, that decided it," said Jim Harbin, director of the hospital's computer resource center. "It would be hard for me to buy anything other than Cullinet now. The one-vendor umbrella is important to me."

National Jewish Hospital/National Asthma Center is one of an increasing number of user organizations that have virtually standardized on software from one or two vendors. "When you get into a big data base environment you really don't want to rock the boat," Harbin said. "With multiple packages it can take days to find out where a problem is. But if I have a problem, now I have one place to go [for help]."

Continued on page 24

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Continued from page 23

It was not that long ago that the large system software market was rigidly stratified. Some vendors specialized in systems and utilities software, a few offered data base management systems (DBMS), still others specialized in applications packages and others offered productivity aids such as application development tools and data dictionaries.

However, those lines have been erased in the last two years as the software industry has undergone a dramatic, and some say necessary, restructuring. In the last 18 months the industry's major players have been moving broadly and aggressively into new markets. That development should have users thinking more carefully about their purchasing decisions, experts agree.

The changes have affected virtually every major software firm (see accompanying chart). And the result has been a storm of new product activity that is unprecedented among the independents. "This has been a tremendous year of frenetic product announcements and tremendous management upheaval," said Ann Morley, senior software consultant at International Data Corp., a Framingham, Mass.-based research firm. "The industry has been hyperventilating for the last 18 months."

Software market nearly saturated

The changes are not necessarily driven solely by the needs of the user. For the first time in its history, the software market is reaching its saturation point. Vendors that have grown happily at 40% to 50% per year in comfortable markets are finding new opportunities scarcer to come by. According to Morley, "These companies are now of the size that the only way to maintain their growth is to move into new markets."

For the data base vendors, the focus has been on "total solutions" — providing everything from packaged applications to programmer-oriented development aids. "These vendors will no longer sell just data bases but add-ons in things like office automation, networks and information center tools," said Shaku Atre, president of Atre International Consultants, Inc., in Rye, N.Y. "Satellite products will bring almost 50% of the future revenues for these vendors."

Applications vendors, who lack the data base foundation that is clearly an advantage in the "total solution" concept, are expanding into vertical markets and offering data base-like development tools that let users customize their applications or even create new ones.

In addition, both types of vendors have been active in areas like micro-mainframe links, OA, networks and vertical market applications.

Average sales rising

The effects of this large-scale shift are already being seen in the rapid escalation of average sales figures for the major sellers. "We have gone from an average sale of $50,000 to $75,000 up to an average of $250,000 to $500,000," said Dennis Yablonsky, president of Cincom Systems, Inc., echoing the comments of other vendor representatives.

The trend generally bodes well for users. If a company can buy all of its software from one vendor, it follows that the packages will be better integrated and more easily maintainable. In addition, a user of four or five major packages can often wield greater clout with the vendor. "If I have five products, I expect to get more attentive service than a user who has one product," said Donald Landry, vice-president of the systems division at GC Services Corp., a Houston-based financial services firm.

But there are pitfalls as well. Putting all your data processing eggs into one basket will necessarily tie your DP shop more tightly into one vendor. Such a commitment makes a close study of the available options more imperative than ever before.

National Jewish Hospital's Harbin admitted that his close ties to Cullinet harbor some dangers. "Competition drives prices down and allows

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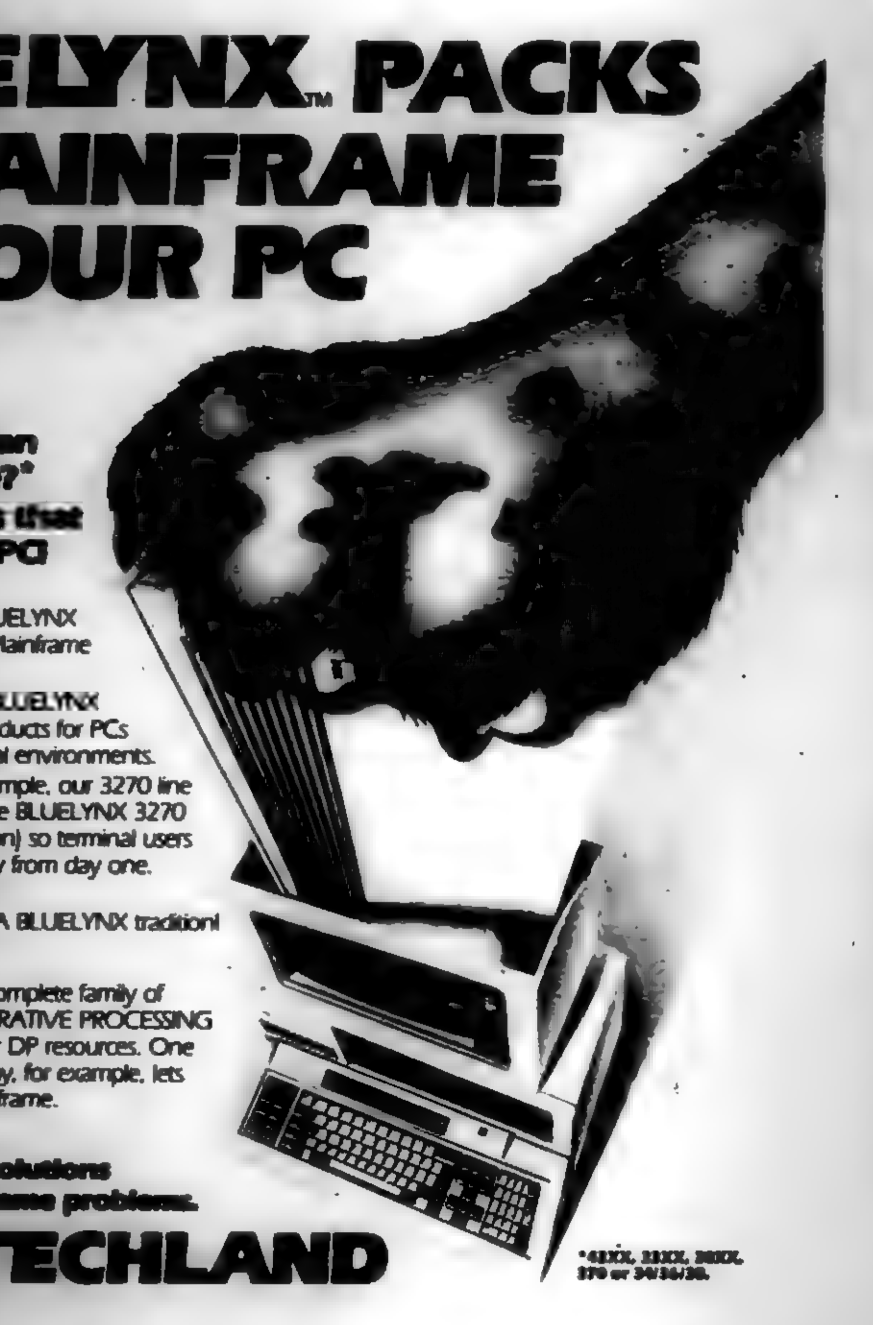

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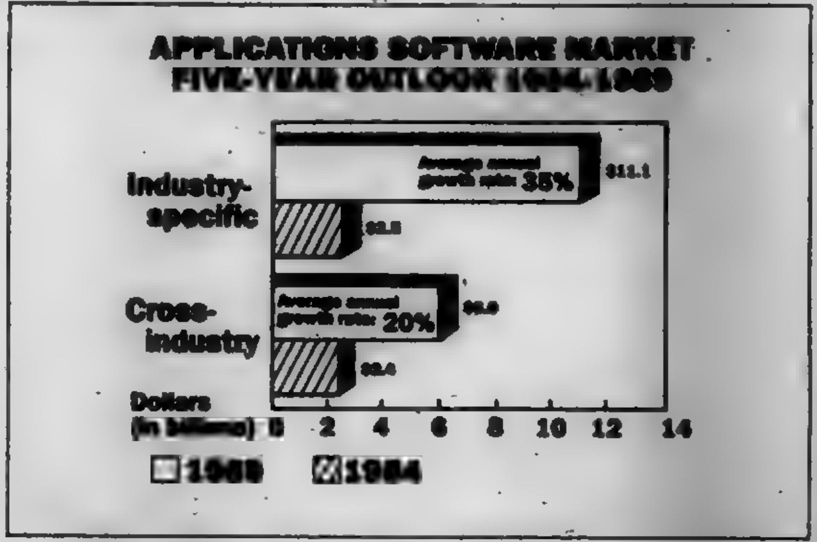

INPUT, INC. CHART

Continued from page 24

a [user] to negotiate," he said. "We don't have that option."

According to Jack Keen, vice-president and director of client programs at Input, Inc., a consulting and market research firm in Mountain View, Calif., "It's going to be extra important for the user to ask, 'Does this vendor have product expansion plans that are going to serve me for the long term?' "

Keen said the user should be looking at a number of new criteria, including the soundness of the vendor's management team, its R&D budget for strategic areas and its understanding of new markets. "If the vendor is uncertain about where it's going over the next several years, that should raise a warning flag," Keen said.

Users also need to examine their own needs more closely. Atre warned that because the data base vendors are now offering so many add-on products, "A $150,000 decision can easily add up to a $300,000 decision. For DP people it's like being a kid in a candy store," she said. "Each product may only cost $25,000. But they don't realize the costs associated with those products. For one thing, you have to train all those users."

However, the bottom line is that users will have a multitude of new offerings to choose from in coming years. The major new areas of activity blanket virtually the entire market.

Almost everybody who is anybody in the large-systems arena has announced a micro-mainframe link within the last two years. For some vendors, such as Management Science of America, Inc. (MSA) and Informatics General Corp., the technology has become a critical element to their chances for future success.

As a natural outgrowth of existing product lines, the links offer an almost guaranteed profit for the vendors. But because market pressures have been so intense in this area, the quality and features of the available options vary widely. For users who are leery about committing themselves to a particular vendor, one of the dozens of generic micro-mainframe links may be a better short-term solution.

It is clear, however, that micro-mainframe links are the doorway to the next major stage of data processing evolution — the distributed data base. "We'll see more of a move toward centralizing the data base on the mainframe with smaller versions on the micros and methods to link them together," Atre said.

With integration having recently become more than just a buzzword, vendors are scrambling to offer application development systems and information center software. The intention is to cut the development backlog by letting programmers code smaller applications more quickly and farming out requests for reports and queries to the end users. All the major data base vendors now offer application development aids.

"In the future the DBMS may become only a commodity. Application development, information centers

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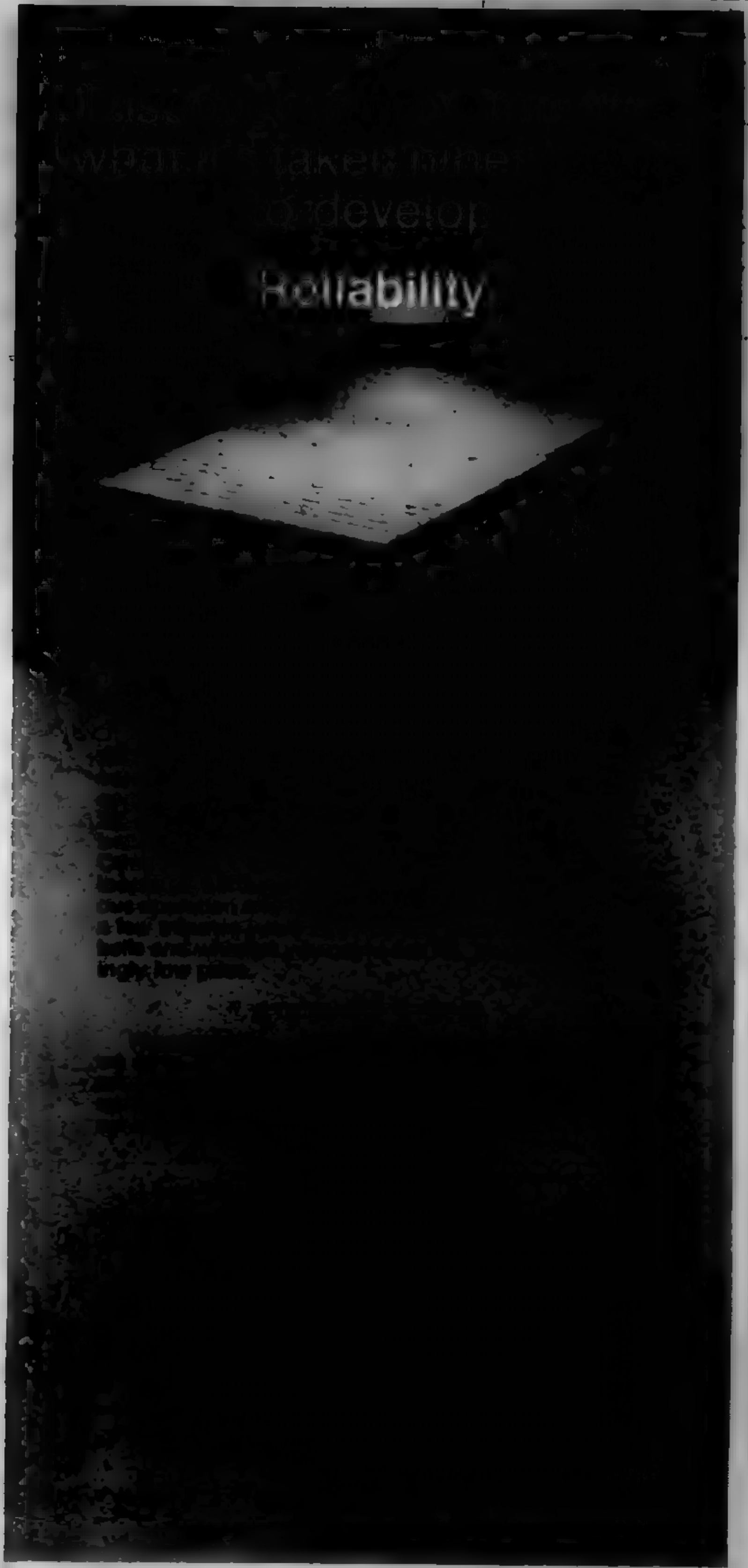

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INDEPENDENT SOFTWARE VENDORS

Continued from page 26

and [OA] tools may become the predominant factors by which people will select information management systems," said Adam Rin, vice-president of product planning and development at Computer Corp. of America, the data base vendor which entered all three of those markets this year.

Robert Goldman, president of Cullinet Software, Inc., added, "Our whole shift as a corporation has been toward addressing end-user requirements on the [micro] and on the mainframe."

More interesting has been the entry of application vendors into the data base-oriented application development market. Within the last 18 months M&D, MSA and Hogan Systems, Inc. have all introduced development aids. Software International Corp. plans to introduce a similar system next year. While those vendors lack the data base underpinning, they are clearly following the lead of the data base vendors in viewing programmer productivity as a hot area.

The effects will become apparent during 1985, according to Peter Lowber, senior market analyst at the Yankee Group, a Boston-based consulting firm. "I think we're going to finally see replacements for Cobol taken more seriously by DP," he said.

In the software industry, perhaps no move has been more dramatic in the last two years than the penetration of DBMS and systems software vendors into the packaged applications market.

Among the recent newcomers from the systems side are Cullinet, Cincom Systems and Computer Associates International, Inc. Applied Data Research, Inc. (ADR) has made a more tentative foray into applications through a joint development and marketing agreement with MSA. Software AG of North America, Inc. has agreements with 20 different applications vendors. Computer Corp. of America plans to announce an agreement soon.

The move seems a natural for these vendors. "Data base vendors are sitting in the driver's seat," Lowber said. "They have the foundation stuff to work all the way down to the applications level on the personal computer. Once you have the data base machinery, you can modify applications easily without having to go through and change every one."

Cullinet has made the most notable thrust into this area. With about 125 financial applications and over 160 manufacturing customers, the company now makes a quarter of its revenue from that market. Cullinet expects that percentage to double by 1987. The company also entered the banking market this year with the purchase of Bob White Software, Inc. and will probably move into the distribution area in 1985, according to Goldman.

Other vendors are setting less ambitious but still substantial goals. Cincom Systems forecasts a 15% to 25% share of revenues from applications in 1985. Computer Associates International expects applications revenues to total about $15 million, or less than 10%, by 1987.

These developments have clearly affected the strategies of the applications vendors, although they publicly downplay their significance. "We've always had a ton of competitive pressure on us," said Dennis Vohs, executive vice-president of MSA. "Companies are shifting their emphasis, but the competitive situation is not that different from what it has been."

Life in the fast lane tough for MSA

The most explosive segment of the software industry sputtered this year, and the largest independent took it on the chin. MSA, which had been the first software vendor to buy into the micro field when it acquired high-flying Peachtree Software, Inc. in 1981, announced in October that it would sell the retail side of that business. MSA said its technology-intensive mainframe strategies were simply incompatible with life in the fast lane of personal computer software.

Arguments aside, Peachtree's difficulties have caused the independents to take another look at the strategic role that micros will play. Most have decided to treat the software as an adjunct to, rather than a cornerstone of, their product lines.

Cullinet and others are instead planning to exploit the advantage of their mainframe experience to get into the market for dedicated workstations. Cincom Systems, for example, has plans to release both end-user and programmer workstations, probably based on the IBM Personal Computer AT/370, Yablonsky said.

The programmer workstations would include extracts of Cincom System's Mantis and TIS data base software. The user workstations would center around Cincom System's Series One Plus integrated software with programmed access to the Manage series of decision support software on the mainframe.

Opportunities created by growth

The market for general-purpose financial software is shrinking, but a new opening has appeared for applications geared to specific industries.

Over the next five years, Input is predicting a 35% annual growth rate for industry-specific applications, compared with 20% for cross-industry solutions. "There is an enormous restructuring going on in industries like discreet manufacturing, banking and finance, medicine and transportation as a result of deregulation and foreign competition," Keen said. "All this turmoil is creating opportunities."

The meteoric rise of vendors like Hogan (banking) and Shared Medical Systems, Inc. (medical) in industry-specific applications has not escaped the attention of the major independents. MSA, for example, has announced products or plans in the areas of purchasing, manufacturing and distribution. Cullinet already offers manufacturing software and acquired its way into banking this year. M&D is working on versions of its financial software for specific markets.

Perhaps the most interesting new approach has been that of Informatics General Corp. Informatics, which had admittedly overextended itself into nearly every segment of the software market for the last several years, reorganized this year. It divested itself of several businesses, including time-sharing, and threw itself into vertical markets.

"We are not trying to be all things to all people but rather all things to some people," said Ron Freeman, corporate vice-president of marketing. "We are going in on corporate verticals, targeting individual companies and treating them as industries." The company has set up separate divisions for applications and systems products and is targeting its efforts toward about 100 large companies, Freeman said. It is taking a departmental approach, looking to sell accounting software to the accounting department, law office applications to the corporate legal department and data base tools and micro-mainframe links to data processing.

"It's a very different business, and some companies grossly underestimate the difficulties of entering it," Keen said. "The people developing this software must have a good knowledge of the industry. Technical software people don't necessarily know how to deal with people on the user side. And applications software users require much more support from the vendor in terms of installation and training."

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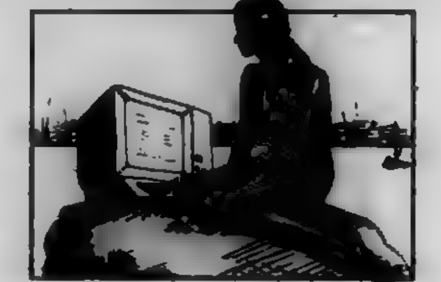

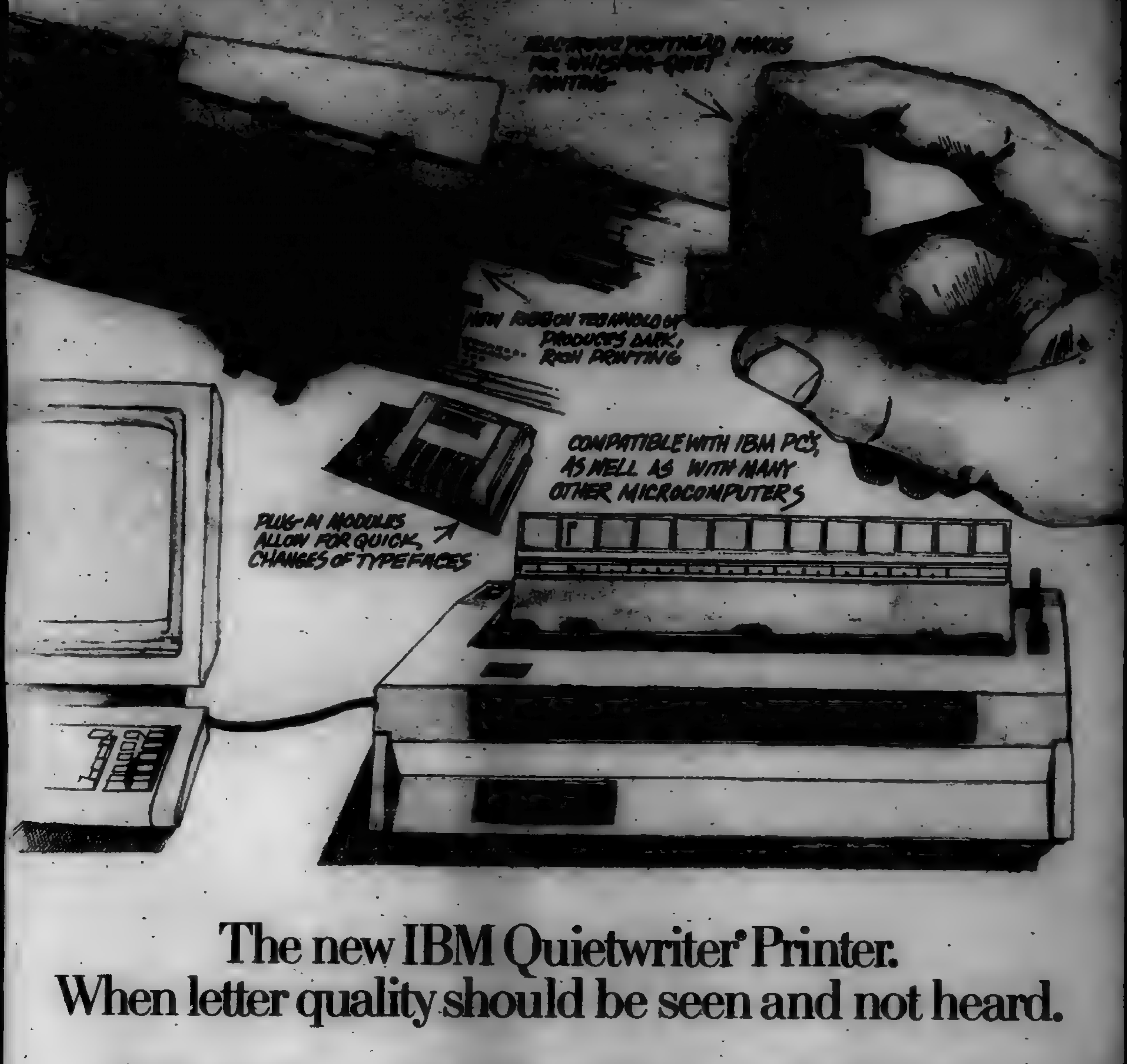
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Value of broad product line increases in purchasing

The breadth of a vendor's product line is becoming an increasingly important factor in software purchasing decisions, according to recent interviews with users. However, product functionality, vendor reputation and performance still top the list of considerations when purchasing software.

Although most users said their initial purchasing decisions would not hinge on other products offered by a vendor, they admitted that the issue can become more important the second time around.

"It's like politics. The incumbent is hard to replace," said Arnold Drouillard, manager of membership administration at Blue Cross/Blue Shield of Michigan in Detroit. "If I'm looking for a new package I'm going to go in the data center first and look at what [vendors' software] we've got already. I would say those vendors get an inside track."

Dick Lund, assistant vice-president of systems and programming at Wausau Insurance Companies in Wausau, Wis., said, "I think there will be a tremendous amount of fallout [in the industry] in the next few years. I would like to see us hooking up with one of the vendors who is going to survive."

Full product lines valuable

Nevertheless, Lund placed breadth of product line "fourth or fifth on the decision tree" behind financial stability of the vendor, ability to interface to existing software and fit between the product and the business need.

Most users agreed that the importance of a seller's other offerings depends upon the product they need. "If we were buying a financial package it would probably have an effect if one vendor had a set of related software," maintained Bobby Stewart, data processing manager for the city of Greensboro, N.C.

Drouillard added, "If I was looking for accounts receivable, I would be inclined to [take] a closer look [at] the company with a full product line."

Reformatting easier

However, one user dismissed the issue. "Years ago, interfacing [one product to another] used to be a problem. But because of coding flexibility today, it's just a matter of manipulating file formats to pass data," said Glenn Lukowicz, director of computer services at St. Luke's Hospital in New Bedford, Mass.

Lukowicz said the necessary reformatting programs should take a programmer no more than four hours to write.

St. Luke's is in the process of selecting Computer Associates International, Inc.'s (CAI) general ledger software over a general ledger package from Management Science America, Inc. (MSA).

According to Lukowicz, the CAI general ledger is a real-time package with good features and a much lower price than the MSA software. Even though the hospital already has two MSA software packages and does not have any other applications from CAI, Lukowicz said, "We have no worries about interfacing with MSA's payroll. We have already written mock interface programs to all of our home-grown applications in less than three hours."

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Emerging mainframe software areas merit attention

Most observers agree that the frantic pace of new activity in the mainframe software market cannot continue much longer. Rather, 1985 will be a year of consolidation. There are, however, specific areas that bear closer watching. Based on interviews with vendors and market watchers, here are some of the currently emerging technologies.

Distributed data base management, a buzzword that is several years old, is moving closer to reality. Data base vendors who have spent 1984 trying to attach micros to mainframes will turn more attention to designing data bases that can take advantage of the link.

Distributed data base promises to be the next major evolutionary step in data processing, many analysts agree. But it presents a whole host of potential problems in areas like backup and recovery, security and concurrent access. Data base management system (DBMS) users should be carefully monitoring their vendors' activities in the previously mentioned areas and preparing for the necessary major organizational changes.

Networks a hot topic

In line with that, networks appear to be a hot, new area of interest. Both Cincom Systems, Inc. and Computer Corp. of America entered the network arena this year. Cullinet Software, Inc., while it has not announced a networking product, has signed agreements with Digital Equipment Corp., Data General Corp. and Wang Laboratories, Inc. to provide access to Cullinet's Information Database from these machines. While the three software vendors are taking very different approaches to networking, the common thread is finding new ways to deliver computing power to the departmental user. The past year has also seen much activity in office automation networks. Products will become available in 1985 which will effectively allow diverse OA systems to exchange documents.

Application development aids for both programmers and users have been very successful this year. With the emergence of good IBM Vsam interfaces, it is no longer necessary to have a DBMS to use them. Complaints about performance are beginning to melt as these tools consistently demonstrate two- to ten-fold productivity improvements over Cobol. Many DP shops are beginning to standardize on them for everything but the largest projects.

Links enhanced in '85

Micro-mainframe links, although barely two years old, improved by leaps and bounds in 1984. Although actual sales have yet to match the products' publicity, it appears that the links will come into widespread use in 1985. The mainframe software vendors will stress tighter connections to their own micro software, while the independent link sellers will enhance ease-of-use and performance features. Vendors have also indicated they will try to offer an alternative to expensive coaxial cabling to achieve the hookup.

One of the newer developments is the concept of tying micros into departmental minicomputers with the mainframe serving as a data base management machine. Most experts agree that existing links will soon overburden the host if it continues to bear the brunt of the extract and reformatting burden.

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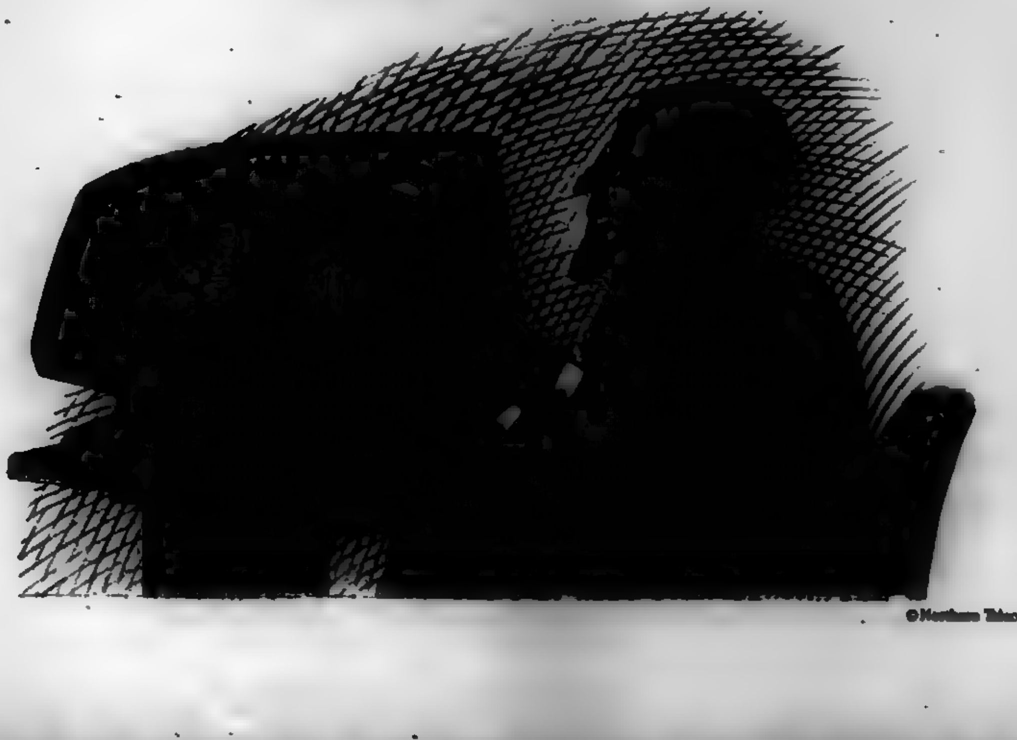

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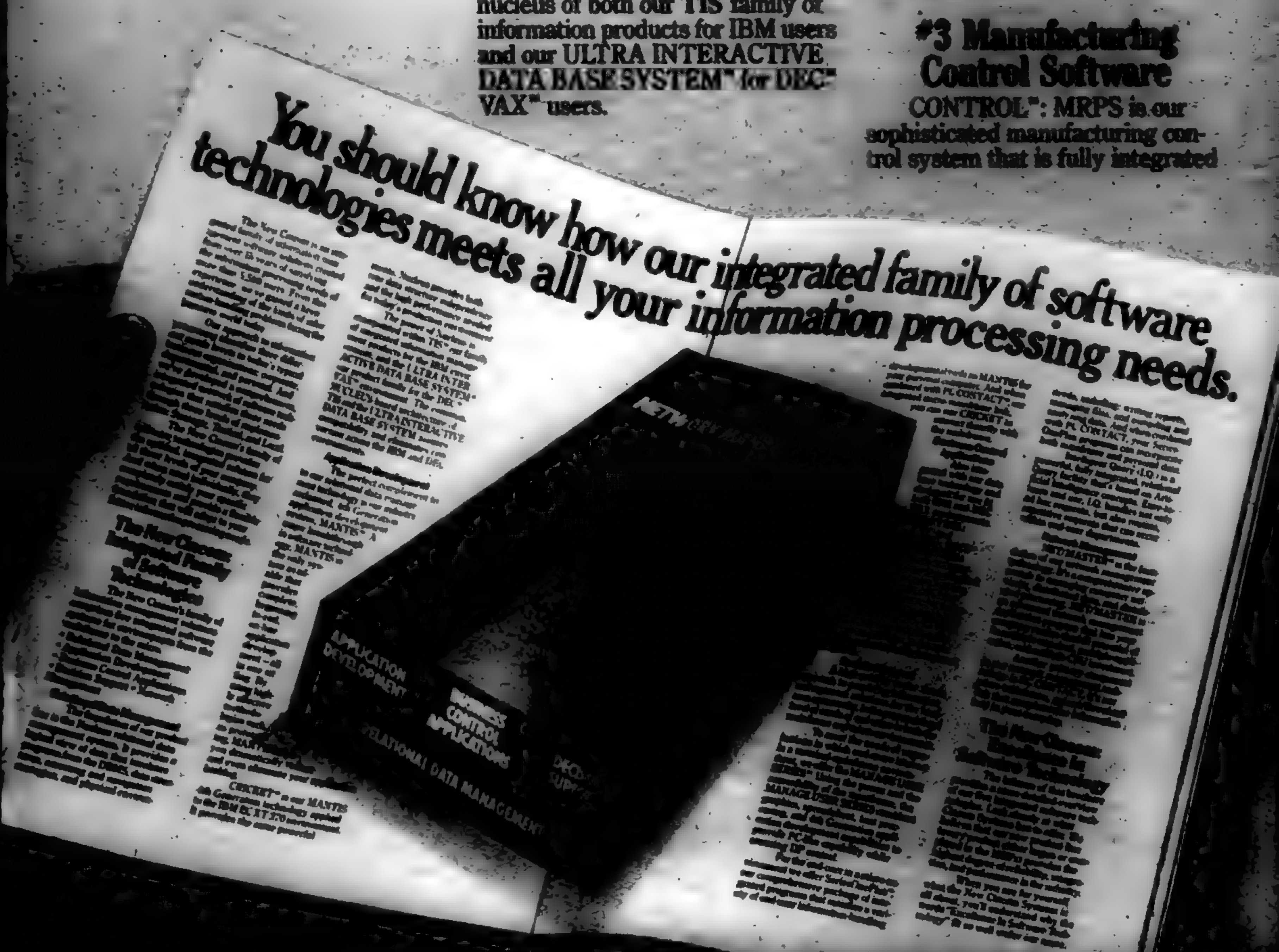

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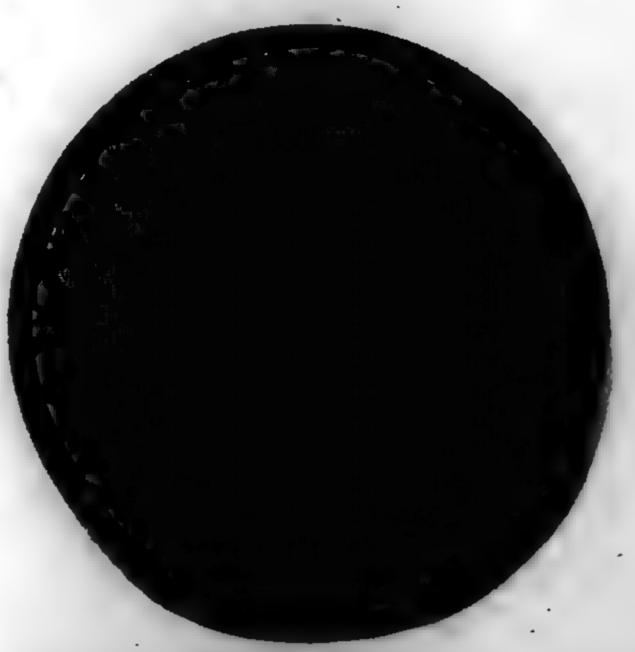
JOHN OWENS

As supply finally caught up with demand in 1984, bloody price wars hit the microcomputer arena. Many suppliers went belly-up, and CPU prices plummeted 25% or more. But although this colorful spectacle drew widespread attention, it produced only limited benefits for corporate personal computing budgets, vendors, users and consultants agreed.

In the past year, the cost of "the so-called typical configuration, if anything, has gone up," said Henry Kee, vice-president for personal computing at Chemical Bank.

And while what you get for your money in microcomputers continues to improve dramatically, few analysts expect overall expenditures per user to drop in 1985. Among the reasons:

- Companies are moving to standardize more powerful hardware with greater storage capacity.
- Prices for leading micro software packages are holding relatively steady.
- Corporate moves to give users better communications links and enhanced output devices will tend to keep spending level.

Beyond that, the high costs involved in full support are only now becoming clear in many companies and are not expected to diminish significantly. "If everyone takes a look at what service and support costs, compared to computers, there will be no willing buyers," one dealer commented.

Total costs of installing and fully supporting a personal computer within a corporation range upward from $6,000, depending on frills, analysts estimated.

By the time you add up all the pieces, each desktop machine in a Fortune 1,000 company carries an $8,000 price tag, said Cyril Yansouni, vice-president of Hewlett-Packard Co.'s personal computer group in Cupertino, Calif. Component prices keep sliding, "but what people spend isn't dropping," he said.

System prices generally "have been reduced about 10% to 11% annually in the U.S.," noted Chris Christiansen, senior analyst at the Yankee Group in Cambridge, Mass. But he pointed out that despite major cuts by IBM and other suppliers, "only certain products are being discounted heavily and a lot of high-end machines are coming into the market."

Christiansen placed annual costs of a networked personal computer with micro-to-

Continued on page 34

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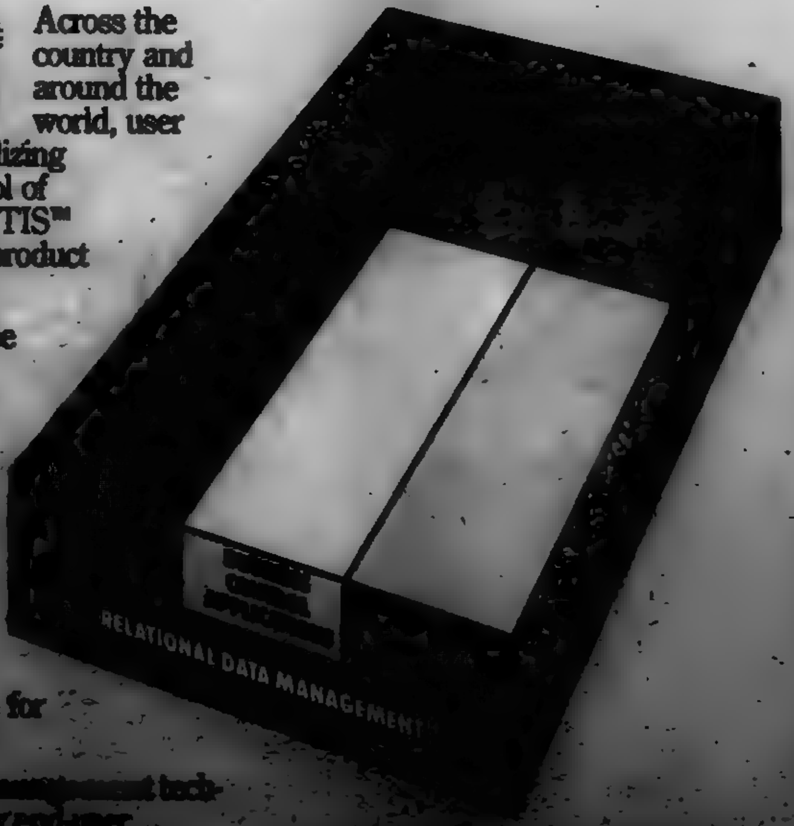

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Charlotte, North Carolina	January [illegible]
Chicago, Illinois	January 31, [illegible]
Cincinnati, Ohio	February [illegible]
Cleveland, Ohio	January [illegible]
Columbia, South Carolina	March [illegible]
Columbus, Ohio	March 7, [illegible]
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Denver, Colorado	February [illegible]
Detroit, Michigan	January [illegible]
Fort Wayne, Indiana	February 6, [illegible]
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Hartford, Connecticut	January [illegible]
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Houston, Texas	February 5, [illegible]
Houston, Texas	February [illegible]
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Kansas City, Kansas	March [illegible]
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Minneapolis, Minnesota	February [illegible]
Minneapolis, Minnesota	[illegible]
Mobile, Alabama	February [illegible]
Nashua, New Hampshire	January [illegible]
Nashville, Tennessee	February [illegible]
New Haven, Connecticut	January [illegible]

Continued from page 32

mainframe link (depreciated over three years and omitting support expenditures) at slightly over $10,000, and predicted that "the cost to put a machine on a desk will remain about the same."

Generally, in volume purchases, hardware discounts range around 20% and software discounts may run well over 30%, users said.

In 1984, list prices often had only a casual acquaintance with actual prices, as competition increased and many suppliers scrapped to make a deal.

Hardware

IBM last June finally slashed prices on its Personal Computer line, with system price tags dropping by up to 23%. As one example, a Personal Computer with 256K bytes of random-access memory and dual floppy drives (but no monitor) was repriced from $2,908 to $2,420.

While what you get for your money in microcomputers continues to improve dramatically, few expect overall expenditures per user to drop in 1985.

In August, aggressive pricing for the new Personal Computer AT pressured costs further, and in the fall, a Big Blue promotional campaign cut prices once again. At the low end, prices were further weakened by a nationwide street fight between IBM's PCjr and Apple Computer, Inc.'s Apple IIe and Apple IIc computers. Some retailers were offering a 256K-byte, dual-floppy Personal Computer with monitor at below $2,000.

Beginning in the summer, Personal Computer-compatible manufacturers dropped prices to follow IBM, and others outside the compatible camp followed as well. Even Digital Equipment Corp. eventually followed suit, although the pricing for the Rainbow series remains high by industry standards.

Apple's Macintosh, the hottest personal computer introduction of the year, also saw a price cut in September, from $2,495 to $2,195. Retail prices since have reached as low as $1,500.

So what's ahead in 1985?

"We'll see a fire sale," forecast George Colony, president of Forrester Research in Cambridge, Mass. Colony expected a basic IBM Personal Computer to cost around $1,500 early this year, with the IBM Personal Computer XT priced in the $3,000 range.

Once again the crystal ball is clouded by the rumored introduction of a new IBM machine — this one positioned between the basic Personal Computer and the AT. The most popular rumors dwell on the launch of an Intel Corp. 80186-based "Personal Computer 2" with a $2,000 price tag sometime before spring.

Some DP executives also predict significant purchases of laptop micros. "The full-function laptop unit will change the culture of how we do things," Kee predicted. To date, full-function laptops have carried a premium price tag — for example, costs of the Data General Corp. Data General/One begin at $2,895.

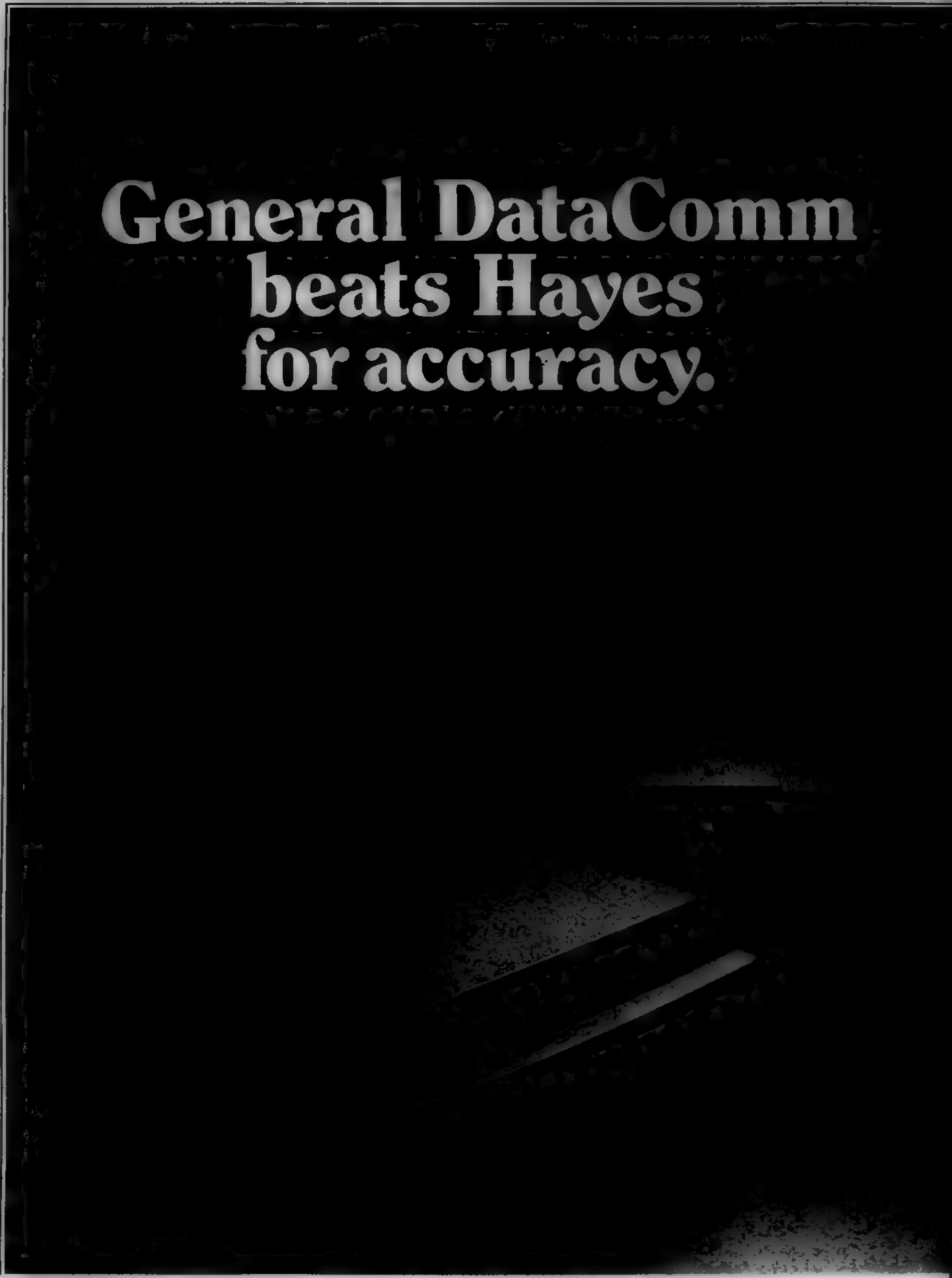
Software

Leading micro software applications such as Lotus Development Corp.'s 1-2-3 generally are maintaining their prices, although the real prices often are considerably below list. Less popular software often is priced far, far below.

"We're seeing the market begin to break into segments," said Andrew Langlois, assistant controller and former corporate MIS director at Moore McCormack Resources, Inc. in Stamford, Conn.

"Anyone in the Fortune 1,000 getting a high-end product with a high amount of productivity is not afraid to buy the functionality, because the company's going to get its value out of the software," Langlois said. But in smaller firms, "there's a lot of pressure from people who want to buy in the $75 to $150 range and know that it will be pretty decent."

Colony said that "the lead products can hold their prices," but once outside the handful of leading vendors, "the drop-off is very substantial."


General DataComm beats Hayes for accuracy.

MICRO PRICING

As in hardware, many vendors seek to hold the line by offering upgraded products. In October, Micropro International Corp. finally dropped the price of Wordstar from $495 to $350 but soon followed by introducing Wordstar 2000 at $495.

However, list prices are even weaker in software than in hardware. "Suppliers will continue to maintain artificially high list prices," Christiansen said. "You can buy Lotus' [1-2-3, normally $495] for $300 and [Lotus' Symphony, listed at $695] for $400, if you're willing to go mail order. There's no reason to pay full price for software."

'More software packages'

Chemical Bank's Kee commented that "software prices are down substantially — however, we're getting more software packages."

In addition to more applications, this year many firms expect to begin to buy microcomputer operating environments such as IBM's Topview.

While micro software typically is licensed on a single user, single machine basis, Christiansen and others see continuing pressure on this policy from large corporations.

Other forms of licensing

Users may want to sign a license for companywide operations or buy one package to run on both a desktop machine and laptop or deliver programs from a departmental computer such as the IBM System/36 or from a local-area network server.

There are signs that large software vendors are moving to address these concerns. Micropro, for example, is signing corporate licensing agreements, and Ashton-Tate has established networking pricing. But new policies need heavyweight backing, Christiansen suggested.

"IBM will have to step in to decide how to price and support and protect software across a network," he said.

Peripherals

To no one's surprise, microcomputer storage prices continue to slide as manufacturing volumes increase and technology improves. As one example, add-on 10M-byte hard disk drives now can be purchased for well below $1,000.

Colony predicted "a complete collapse in disk drive prices, mainly pushed by the 20M-byte drive" in IBM's Personal Computer AT. The move toward high-density microfloppy drives also should improve price/performance.

But users are likely to purchase greater capacity and end up spending at least as much as in earlier years.

> *Some DP executives predicted significant purchases of laptops. 'The full-function laptop unit will change the culture of how we do things.'*
>
> — Henry Kee, vice-president, personal computing, Chemical Bank.

Printer, plotter prices

Printer and plotter costs also dropped in 1984 as a huge array of products made its debut.

"Printer technology is moving very fast," Langlois noted. "There's a very sharp rise in what you can get for a given price."

However, once again these savings are being offset by turns toward increased performance, particularly in devices supporting enhanced graphics. Many firms are undecided on the overall budget impact of new types of high-end products, such as HP's $3,495 desktop Laserjet printer.

Communications

"The user is no longer satisfied with local processing; he wants corporate data," Kee said.

This crucial shift is changing the entire environment for personal computers in business, with strong impact on communications costs, both for installation and ongoing use.

Budgets vary widely, as each company develops its own system.

Modem costs

In basic asynchronous communications, modem prices continue to fall, with 300 bit/sec hardware/software packages selling for lit-

Continued on page 37

And we can prove it.

We put our 1200 bps modem to the critical test. We stacked it up against Hayes, one of the "smart" modems.

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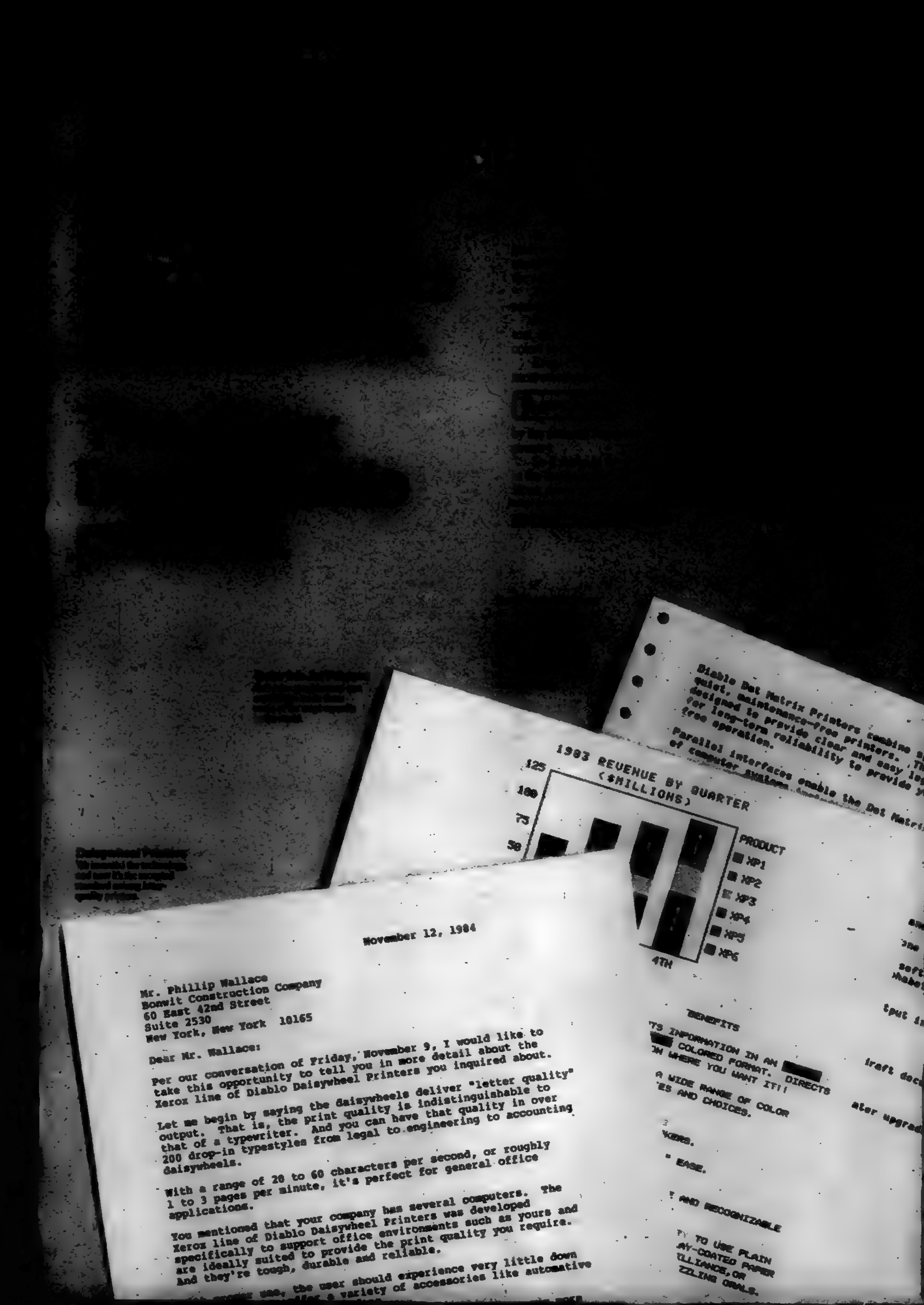

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Parallel interfaces enable the Dot Matri
of computer systems

November 12, 1984

Mr. Phillip Wallace
Bonwit Construction Company
60 East 42nd Street
Suite 2530
New York, New York 10165

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Per our conversation of Friday, November 9, I would like to take this opportunity to tell you in more detail about the Xerox line of Diablo Daisywheel Printers you inquired about.

Let me begin by saying the daisywheels deliver "letter quality" output. That is, the print quality is indistinguishable to that of a typewriter. And you can have that quality in over 200 drop-in typestyles from legal to engineering to accounting daisywheels.

With a range of 20 to 60 characters per second, or roughly 1 to 3 pages per minute, it's perfect for general office applications.

You mentioned that your company has several computers. The Xerox line of Diablo Daisywheel Printers was developed specifically to support office environments such as yours and are ideally suited to provide the print quality you require. And they're tough, durable and reliable.

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a variety of accessories like automative

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LLIANCE, OR
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MICRO PRICING

Continued from page 36

tle over $100 at retail and 1,200 bit/sec packages available for as little as $400, vendors said.

A wave of 2,400 bit/sec modems targeted at personal computers hit the market this fall, priced at $800 and up.

Local-area network connection prices also are moving down.

Card costs now run from $500 to $800 and will move toward the $300 to $700 range this year, said Joseph Hughes, marketing vice-president at Corvus Systems, Inc. in San Jose, Calif.

From $695 to $500

Colony predicted that the IBM PC Network's $695 hardware connection price tag "will erode fairly quickly to $500."

> *A large internal user group may solve many support problems. If you call Lotus Development Corp. with a question about 1-2-3, 'you can sit in a queue for 30 minutes and give up. . . . Within our home office, almost all use is 1-2-3-based," and hotshot users can answer most questions.*
>
> — Steve Keese, John Hancock Mutual Life Insurance Co., Boston.

However, others cautioned that hardware connection represents a relatively small slice of total network costs.

Moves toward increased storage capacities and additional software services may boost the net bills.

Support and training

With the early struggles to establish microcomputer acquisition and support policies behind them, many corporations now are getting a better grip on support requirements.

"But if you ask around, you get a variety of answers, none of which I'm comfortable with," the Yankee Group's Christiansen said. "For one thing, everyone does training differently."

Although both hardware and software products are becoming easier to use and reasonably helpful on-disk tutorials are appearing in increasing numbers, considerable training and hand-holding are still needed.

Training costs range from nothing (unpaid overtime) to more than $1,000 per trainee for external courses, users said.

In many organizations, support requirements are growing so large "that the cost per computer is no longer as it would seem," said Ralph Wagner, president of Microsource Financial, a Boston-based reseller to large firms.

Wagner pointed out that if a company that buys 100 personal computers then "opens up a support department with five people, that's at least $150,000 per year, and those computers are no longer economical."

Solution to support problems

On the other hand, the emergence of a large internal user group may solve many of the support problems that have crippled personal computers since birth.

If you call Lotus with a question about its 1-2-3 package, "you can sit in a queue for 30 minutes and give up," said Steve Keese, senior coordinator for office automation at John Hancock Mutual Life Insurance Co. in Boston.

But "within our home office, almost all use is 1-2-3-based," and hotshot users can answer most questions, Keese noted.

Overall maintenance charges

Overall hardware maintenance charges seem relatively limited, and handling repairs on a time-and-materials basis rather than a service contract saves money, according to DP managers.

"In a population of about 70 [personal computers], we have spent about $2,000 in the past year," Langlois said.

"A maintenance contract on those machines would have been about $16,000," he added.

Major vendors typically charge 12% to 15% of list price for an annual service contract, he said.

[illegible] needn't fear marrying the old and the new.

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DSP2430 Auto Dial and Logon modem.

- Includes all features of the DSP2420.
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- [illegible]

- User-friendly menu—easy to operate.

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922 Display Screen.

VT220 Display Screen.

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The new 922 is available now and priced to move now. And it's backed by a worldwide sales and support network.

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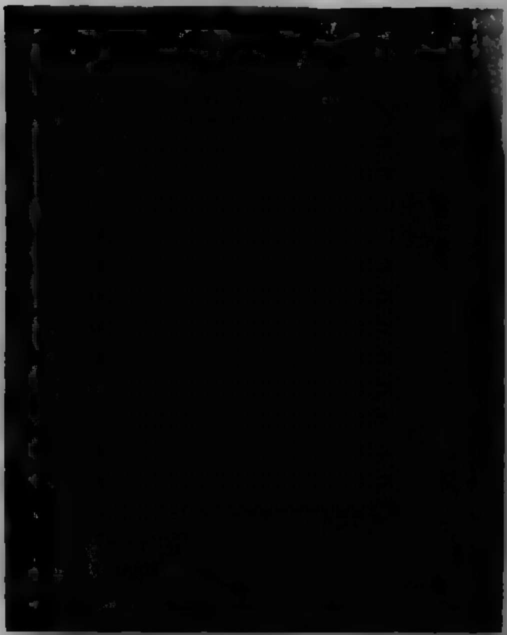

HOW MUCH IS ENOUGH?

By Tom Henkel

Long considered a mixture of scientific evaluation, old-fashioned horse sense and a little black magic, the task of capacity planning is on the brink of a major upheaval.

The skyrocketing demand for corporatewide processing power is threatening to upset the delicate balance that, in the past, has allowed DP executives to remain one step ahead of users' demands. As a result, many DP executives will be forced to alter significantly their approach — and dedication — to capacity planning.

The most troublesome issue facing capacity planning experts is how to accommodate the growing number of microcomputer and intelligent terminal users who want access to information stored in corporate mainframes.

Because few companies currently offer large numbers of micro users access to mainframe data, most capacity planning researchers agree that no one really knows what kinds of problems will crop up as DP operations become more complex. Clearly, as more users are given interactive access to mainframe-stored data, there will be a heavier strain on the system, its networking facilities and its software. But how devastating that impact will be remains largely theoretical.

The essence of any DP executive's job is to keep the company's computer system running and provide the resources to allow other departments to function smoothly. But to continue providing those services, many researchers now contend, the DP executive must look beyond the hardware in a raised-floor computer room and evaluate how microcomputers, controllers and networks will affect the overall corporate data resource.

For example, take the hypothetical case of a series of terminals in Dallas connected to a Boston-based IBM 3080 series mainframe via 4,800 bit/sec modems. The terminals are routed through Chicago, using IBM's

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Systems Network Architecture. According to a simulation package developed by BGS Systems, Inc. in Waltham, Mass., the addition of two microcomputers to the Dallas operation, each demanding large amounts of data (about 1M byte) from the Boston-based host, would increase the network response time from roughly five seconds to over 20 seconds.

While noting that the hypothetical example is not as accurate as working with an actual system configuration, Robert P. Goldberg, BGS' senior vice-president of technology, said the case is typical of the performance degradation that may occur when several micro users are linked to a host processor.

Goldberg claimed that many DP executives would face a nightmare if even a handful of microcomputer users was to request significant amounts of data from a host processor at the same time. For example, Goldberg said, it could take anywhere from 30 to 45 minutes to download 1M byte of data to a microcomputer.

A solution

To solve the problem, Goldberg said, the DP executive can take several courses of action, such as upgrading modems to accommodate a higher transmission speed or upgrading communications controllers or the host processor.

To evaluate those options, modeling packages, such as those developed by BGS, Candle Corp. in Los Angeles, Morino Associates, Inc. in Vienna, Va., and Boole & Babbage, Inc. in Sunnyvale, Calif., will become essential tools to capacity planners, Goldberg contended.

While Goldberg may display an understandable bias to modeling software, independent researchers seem to agree that modeling packages will become as essential to the capacity planner as spreadsheet programs have become to financial planners.

James Sprung, a group leader with Mitre Corp., an independent research organization in McLean, Va., said that the use of more effective methods to capture and evaluate computer performance data is an important part of capacity planning. But Sprung quickly added that good software packages are only part of the solution. The DP executive must also develop a keen understanding of the types of computer services that end-user departments really need and provide the technical assistance to help nontechnical users to use the system efficiently.

Noting that communications with end users has not been a traditional strong point for DP executives, Sprung said the onslaught of information-hungry end users may cause many DP executives to become very possessive of mainframe computer resources. The unfortunate result may be a DP department that develops services to suit the personal interests of the DP executive, while projects that would be more productive to the company as a whole are neglected.

Better communications with end users may also be a saving grace for DP executives charged with keeping an entire corporation's data resources operating smoothly. By explaining potential problems to users, the DP department can avert some problems before they happen, noted Shelly Weinberg, a senior staff member at IBM's Information Systems Management Institute in Los Angeles, an organization that operates classes geared toward aiding DP executives and other corporate managers to manage computer resources better.

BGS' Goldberg noted that if the microcomputer users in the hypothetical networking problem gave the DP department advance notice that they each needed 1M byte of data from the host, the response time degradation could probably be avoided. Goldberg suggested that it may be wise for corporations to set down a series of rules governing end-user host access.

But too many rules can drive users away from a system, noted John Murray, director of management information services for Rayovac Corp. in Madison, Wis. Murray contended that the DP department must be ready to accommodate the users' needs while at the same time trying to educate end users to use the system correctly.

Rayovac currently employs one full-time person to perform the capacity planning function and two others

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CAPACITY PLANNING

to man an information center. With six corporate microcomputers having access to the company's IBM mainframe, Rayovac until fairly recently evaluated only mainframe-generated reports to perform capacity planning, Murray said. Now, through an information center, DP department representatives are beginning to work with end users.

Small and medium-size companies can sometimes take a personal approach to training that is impractical in large corporations. Pittsburgh's Mellon Bank, ranked the 12th largest in the country, is now experimenting with a project to limit the number of people with direct access to the firm's IBM mainframes (two 3081s, a 3083 and a 3033-U) to conserve processor resources.

This experiment is being done through what capacity planner Ed Williams called "near-micros" — dumb terminals with the inbred ability to run microcomputer programs, such as spreadsheets. The near-micros, he said, have the ability to perform operations with mainframe data but do not have the ability to access that information directly. Information for use on the near-micros is requested by a microcomputer, typically located in a department manager's office. The mainframe data is loaded into the micro then funneled to the near-micros.

To augment the project, Williams said, Mellon Bank has developed an internal users group to allow users to share experiences. The group also serves as a vehicle to disseminate information about the system.

But Williams admitted that a larger capacity planning issue may be looming on Mellon Bank's horizon. In addition to providing internal DP services, Mellon also sells computer services to approximately 200 other banks. Currently, very few of the client banks have the ability to download Mellon data into intelligent terminals and microcomputers. But Williams believes it will only be a matter of time until more financial organizations demand the capability.

Noting that it may be much easier to get Mellon employees to cooperate with rules for operating the system than paying customers in outside organizations, Williams is concerned that contention for mainframe data could become a problem in the future. "The only thing that saves you is probability," Williams said, adding that the chances of a large percentage of the user base requesting mainframe data at exactly the same time is somewhat remote.

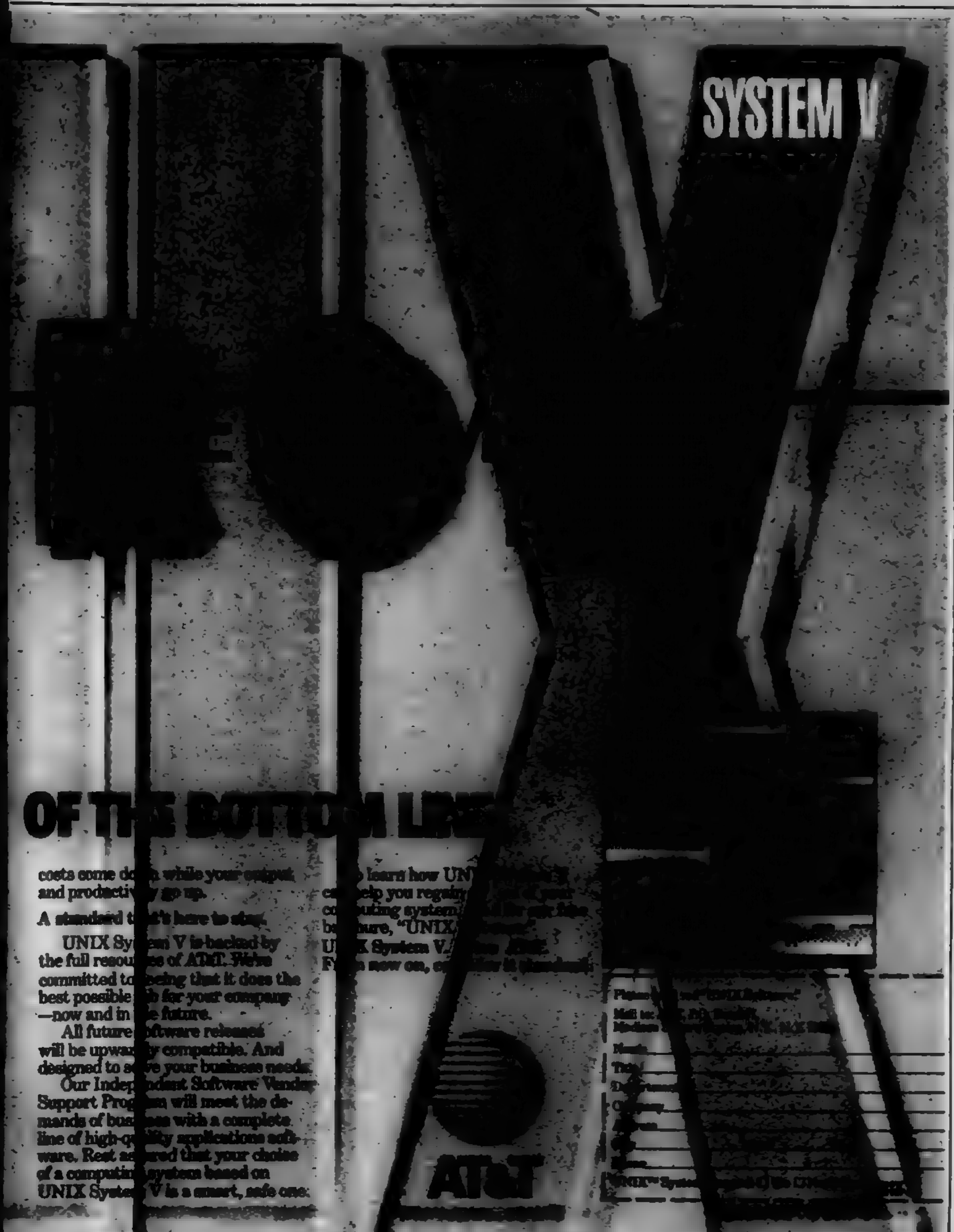
Currently gearing up its capacity planning effort to manage system resources better and possibly accommodate approximately 16 IBM Personal Computers is Peter, Howell & Heather, Inc. in Baltimore. According to senior business analyst Ryan Souther, the company is currently developing protocols [redacted] the company's Honeywell, Inc. DPS 8/70 mainframe.

"Right now ignorance is bliss," Souther said, noting that he has been working for the past six months with Honeywell's Soma performance monitoring package to compile weekly and long-term performance reports and performing regression analysis on the results. Souther admitted, however, that he has not performed any simulations to evaluate what impact the micros may have on the system.

The influence of systems [redacted] puter room currently seems to be having an impact only on a few companies. According to Phil Howard, editor and publisher of "EDP Performance Review," a newsletter published in Phoenix, only a few of the top Fortune 500 companies are trying to find new ways to do capacity planning accurately.

IBM's Weinberg said more than three-fourths of the users who attend the Information Systems Management Institute come from MVS shops. But Weinberg added that the attendees seem to be split between big 30 series [redacted]

"We're one to two years away from understanding this well enough," Weinberg said, adding that it will take at least that long before companies start connecting micros and intelligent terminals to host processors in significant enough numbers for researchers to develop any concrete solutions to the capacity planning issue. Until then, Weinberg admitted, there will be a great deal of uncertainty surrounding accurate capacity planning.



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Capacity planning key in growing role of DP execs

By Tom Henkel
CW Staff

The increasing demands for accurate capacity planning are tightly bundled into a changing role for DP executives in many corporations.

The demands of information-hungry users coupled with the financial benefits companies can reap with a finely tuned computer system has put the DP executive into a highly visible position.

Traditionally viewed as a poor performer when it comes to meeting deadlines, making accurate predictions and dealing with end users, most researchers agree the DP executive who fails to shape up under the corporate spotlight may find himself cast off into the darkness.

There is little disagreement among industry observers that the head of data processing will eventually wield as much power as the chief financial officer in many corporations. In some large companies, the head of DP is already considered a vital resource when making future corporate plans. In others, the DP chief is still excluded from key corporate decisions.

Compatibility a vital issue

For example, H. Alfred Colby, senior vice-president of information services at John Hancock Mutual Life Insurance Co. in Boston, recently noted that he is often called upon to analyze the viability of the DP center of a small company John Hancock is planning to acquire. Colby added that a few years ago, upper management did not give much consideration to whether the data center of a potential acquisition would fit in with John Hancock's existing configuration. Now, Colby said, management views that compatibility as a vital issue.

The capacity-planning issue appears to be one of the first significant challenges along the DP executive's path to increased power.

"Running out of capacity is the most severe problem an MIS department can have," noted John Murray, director of management information services for Rayovac Corp. in Madison, Wis.

Capacity planning an issue of control

Murray contends that effective capacity planning boils down to an issue of control. If the DP executive can manage to keep the corporate DP facility running on an even keel, he will undoubtedly be viewed as a dependable and vital member of the top management team. But if the DP executive fails, he may find himself being shunned by an upper management that feels that inviting the DP executive to help out with top-level decisions will only confuse the issue with technical jargon.

A poor job of capacity planning may also have lasting negative effects on the DP executive's career, as well as on top management's view of the DP department as a whole, noted Shelly Weinberg, a senior staff member of IBM's Information Management Institute in Los Angeles.

Weinberg noted that it takes a while to rebuild top managers' confidence in a DP executive's decision-making capabilities after a botched capacity-management decision leads to an unacceptable response time or undeliverable services.

To counter that possibility, Weinberg recommends the DP executive take several steps:

- Get top management involved in making key DP decisions. Rayovac's Murray agreed with the suggestion, but noted that many top executives are still quite intimidated by technology. Murray suggested the DP executive should get top executives involved without overburdening them with technical details.
- Focus on doing small tasks well. Weinberg suggests that DP executives who are just developing a capacity-management plan can often enjoy greater success by focusing on small tasks as opposed to embarking on a program that is overly ambitious.
- Capacity-management projects that are undertaken should be well measured and analyzed so that trends can be gleaned for future projects.
- Take steps to isolate the most rapidly changing aspects of a system from its vital bread-and-butter segments. "The world is changing so fast you are sometimes unable to make accurate predictions," Weinberg explained.

For example, he noted that a system used to support an information center should not, if possible, be used to support applications fundamental to the smooth operation of the business.

There do not appear to be any general rules governing how much manpower a company should devote to capacity planning.

Most users contacted had at least one full-time employee devoted to capacity planning. Most were also quick to point out that the scope of the operation can have a strong influence on the number of people needed.

Most experts note that even a part-time capacity planner is, in the long run, better than no planner at all. Most also contend that the use of commercially available capacity management tools make the capacity management job much easier.

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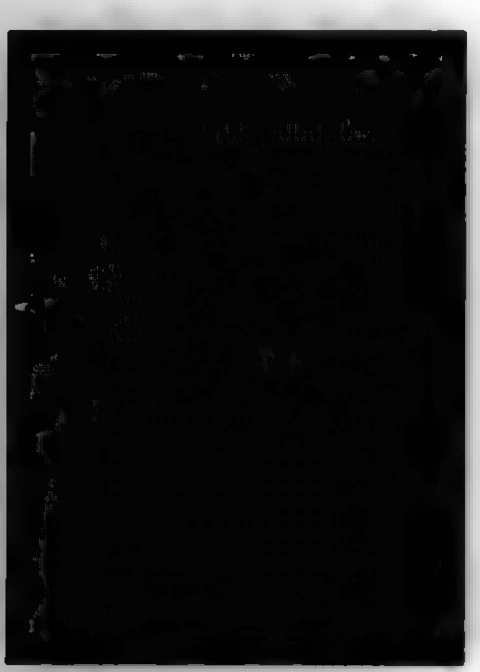

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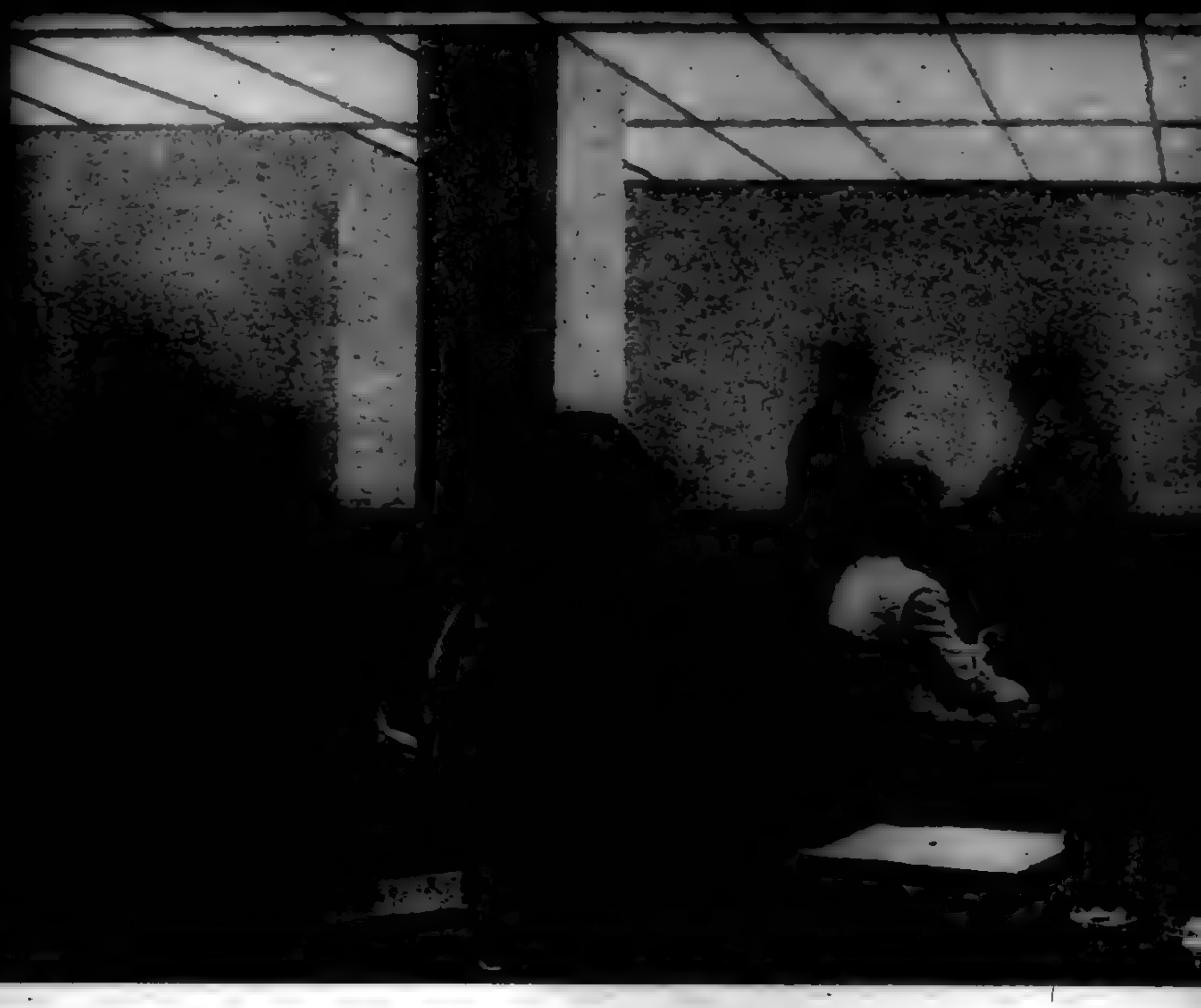

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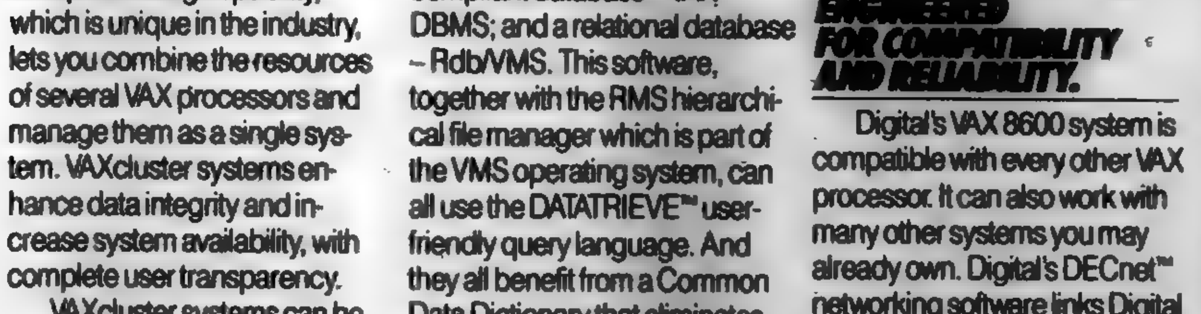
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TIME TO GET MOVING

By Mitch Betts

“I personally believe that representative government is alive and well and functioning the way it was intended to function — not very well. I really believe that our whole system of diffusion of powers was designed to build some impasse in the government and to make it difficult for the government to accumulate the necessary power to make major decisions.

“We are really a crisis-activated institution. And that . . . means we don't do anything unless there's a consensus out there that unless we do something, something very bad is going to happen. And that means we're almost inevitably behind the curve.”

— retiring U.S. Rep. Barber B. Conable Jr. (R-N.Y.), quoted in *Congressional Quarterly*.

Consider, for a moment, the following recent events:

■ Congress worked six years to produce a computer crime law that, in the end, was limited to breaches of the federal government's own computers. The provision was attached — in violation of House rules — to a catchall budget bill that was overdue. The Senate had never voted on the merits of the bill, never held hearings on it, and it is likely

Continued on page 61

NANCY McMILLAN

Congress to address array of computer issues in '85

A look at Congress' agenda for 1985 illustrates the broad range of computer-related policy issues that already have been identified by members of Congress and industry lobbyists:

- **The House and Senate judiciary committees** are expected to revisit the federal policy toward computer crime. After approving legislation in 1984 that outlaws unauthorized access to federal computers, the committees will hold hearings to study the expansion of that law to cover computers used in interstate commerce.
- **U.S. Sen. Patrick J. Leahy** (D-Vt.) wants to amend current wiretap law to make it illegal to intercept data communications without a warrant. U.S. Rep. Ron Wyden (D-W.Va.) wants to make it illegal to gain unauthorized access to computerized medical records.
- **The House Subcommittee on Transportation, Aviation and Materials**, chaired by U.S. Rep. Dan Glickman (D-Kan.), will monitor security procedures used for the federal government's computers.

Dan Quayle

- **Several legislators and trade associations** will push for curbs on illegal software copying.
- **The computer industry** will try to retain and obtain favorable tax benefits at the same time Congress tries to reduce the federal budget deficit, simplify the tax code and remove tax loopholes. Computer dealers and lessors want three-year, accelerated depreciation for computer equipment, and the electronics industry wants a 25% research tax credit and no change in the tax code's preferential treatment of long-term capital gains.
- **President Reagan's Commission on Industrial Competitiveness** will urge Congress to create a Cabinet-level Department of Science and Technology.
- **The House Ways and Means Committee** plans to hold oversight hearings about the Internal Revenue Service, including the IRS' extensive automation plans.
- **The House Subcommittee on Government Information, Justice and Agriculture**, chaired by U.S. Rep. Glenn English (D-Okla.), will monitor the electronic filing systems of the U.S. Securities and Exchange Commission, the U.S. Patent and Trademark Office and other federal agencies.
- **Congress will again grapple with the Export Administration Act** to determine which branch of the government will control exports of electronic equipment to Soviet bloc countries.
- **The House Subcommittee on Health and Safety** is expected to monitor the issue of health hazards from VDTs, including the study under way by the National Institute for Occupational Safety and Health.

To its credit, Congress is aware of the challenge it faces in monitoring and legislating on these and other issues, and reforms are being discussed. U.S. Sen. Dan Quayle (R-Ind.), for example, is leading the charge for reform of the Senate's committee system.

"We are spread too thin. We serve on too many committees and subcommittees," Quayle said in October. "It is not humanly possible to give proper attention to the 13, 15 or 17 committees and subcommittees that some of us serve on. . . . We do not have time to become experts in the areas we are most interested in."

Quayle's reforms would limit the number of panels on which a senator can serve and would encourage the use of a computerized scheduling system for committee meetings.

Also in the mood for reform is the House Science and Technology Committee, chaired by U.S. Rep. Don Fu-

Continued on page 51

Patrick J. Leahy

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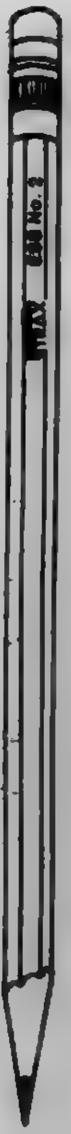

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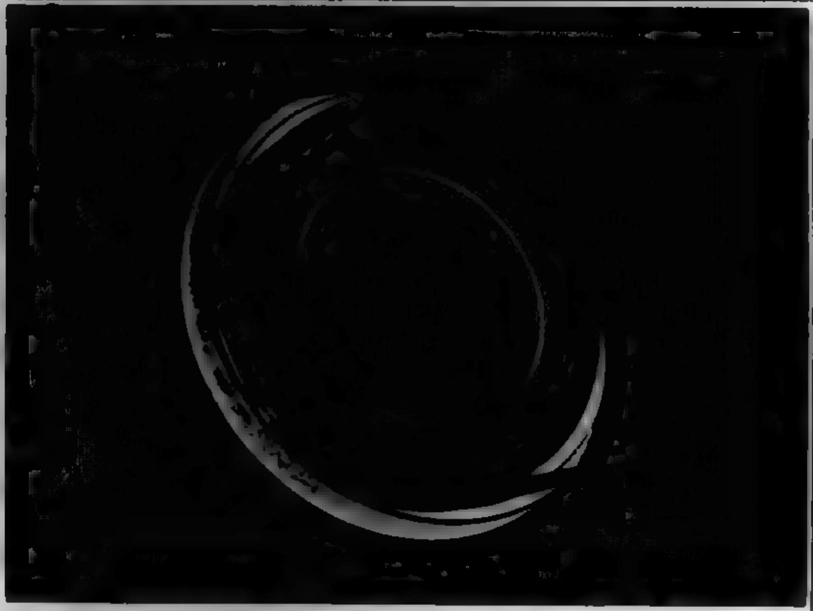

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Clearinghouse helps keep Congress focused on future

At the Congressional Clearinghouse on the Future, the mission is to help legislators look beyond their next election campaign by holding seminars and publishing reports that bring the thoughts of top futurists to the attention of legislators and their staffs.

Clearinghouse Director Lena Lupica said "We're definitely making headway," but admitted it is particularly difficult to overcome the "two-year mentality" of House members. "The first year they work on the budget, and the second year they're running for office. It's amazing they get anything done . . . considering the pressures that are on them."

But Lupica said the very existence of the clearinghouse — which, she noted, is funded out of Congress' office budget — shows that Congress recognizes the need to deal with America's high-tech issues. "A lot of members of Congress are interested in these issues and are trying to learn all they can," she said.

'Tons of questions'

Also optimistic is William R. Moroney, president of the Electronic Funds Transfer Association (EFTA), who said that many legislators and staff members are conversant about high-tech issues and are very eager to learn. "The experience level, as far as technology goes, seems to be improving in Congress," he said. "They ask tons of questions."

Likewise, Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association, commented, "I am more encouraged than discouraged about Congress." He cited the 1984 enactment of legislation encouraging joint research ventures as a sign that Congress is beginning to understand the high-tech marketplace.

Glickman

But the question remains whether the well-intentioned Congress can keep up with the rapid pace of technological change in the computer age without some changes. The consensus of the political analysts seems to be that Congress should strive to set broad goals on high-tech policy issues and then turn to outside technical advisors for help with the details.

"When Congress tries to legislate specific types of technology, I think it makes a big mistake. Congress should be in the business of setting goals," said the EFTA's Moroney. "Congress seems to be headed in that direction, and I think that's good."

The solution, according to U.S. Rep. Lee H. Hamilton (D-Ind.), is for Congress to "forge a better relationship with the scientific and engineering communities" and rely on the U.S. Office of Technology Assessment and other support groups to provide technical guidance for policy-making.

Hamilton

Therese Sheehy, manager of governmental affairs for the Data Processing Management Association (DPMA), said that an overworked Congress will increasingly need to rely on congressional support groups, think tanks, industry coalitions and blue-ribbon panels to cope with its high-tech agenda. The DPMA's computer crime committee is now drafting model legislation for consideration by federal and state lawmakers, she said.

In the computer crime area, experts have long supported the idea of creating a blue-ribbon commission to develop strategies for combating computer abuses. For example, in 1984 Rep. Dan Glickman's (D-Kan.) subcommittee recommended formation of a national commission on computer security and privacy on the grounds that "the breadth and multijurisdictional character of these issues prevent any single agency or congressional committee from dealing comprehensively with them."

According to another leading proponent of the commission idea, Robert P. Campbell, president of Advanced Information Management, Inc. of Woodbridge, Va., "It's time for Congress to catch up and legislatively stimulate a solution [to the computer crime problem]." Whatever the reforms, the computer community hopes it never sees another congressional session like last October's, when the computer crime bill was sliced up and glued to a budget resolution just before adjournment.

"I would hope we don't see a sharp turn toward that method," the DPMA's Sheehy said. "I'd like to see a more ponderous approach, considering the far-reaching effects of national legislation."

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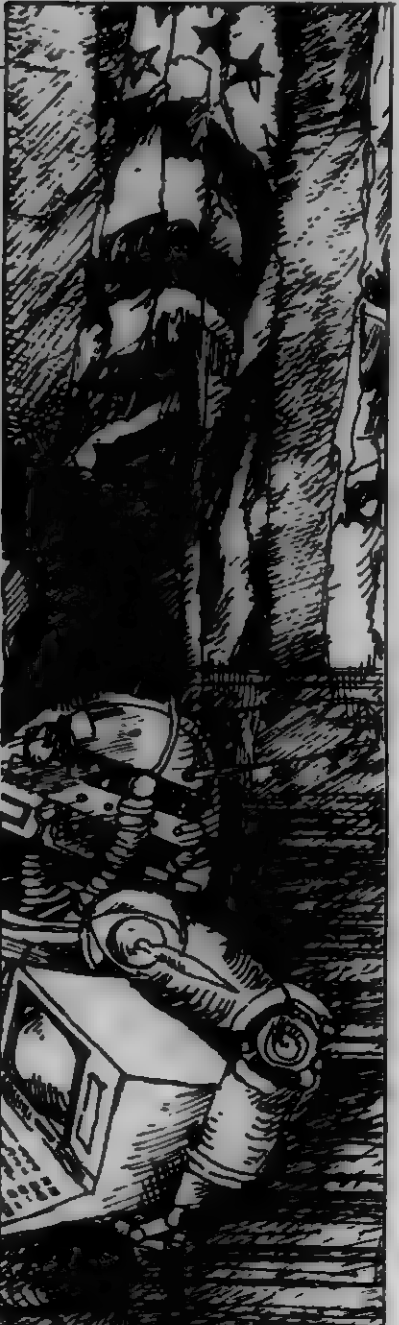
High-tech issues looming large on House agenda

In 1983, the Congressional Clearinghouse on the Future surveyed the committee staff members of the U.S. House of Representatives to find out what future issues they thought warranted congressional attention. The result was a publication called *The Future Agenda.*

The following computer-related issues were identified:

- **Armed Services.** Electronic weaponry raises questions about reliance on electronics vs. reliance on human judgment.
- **Banking, Finance and Urban Affairs:** Electronic funds transfers raise concerns about computer crime and privacy and the applicability of federal banking laws.
- **Education and Labor:** This committee will monitor the use of computers and telecommunications for education; educating and retraining the labor force for the service-oriented economy; and the effects of office automation on productivity, morale and employment.
- **Energy and Commerce:** Emerging issues of industrial robots include displacement of laborers and declining employee morale.
- **Foreign Affairs:** Transborder data flow issues should be the subject of debate, including the effect that data barriers have on multinational corporations.
- **House Administration:** This committee will monitor the use of computers by Congress and explore the use of teleconferencing for hearing testimony.
- **Judiciary:** The committee plans to study computer privacy issues, the applicability of the First Amendment to electronic media, the use of computers in the courthouse and computer crime.
- **Public Works and Transportation:** Electronic funds transfers, electronic mail, teleconferencing and personal computers may reduce the demand for traditional transportation services.
- **Science and Technology:** The committee will explore the roles that patent law, federal research funds, tax incentives and other government policies play in high-technology innovation.
- **Ways and Means:** The committee said it will investigate unfair trading practices in the international computer chip market.



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Continued from page 46

that only a few senators read the bill before it became federal law.

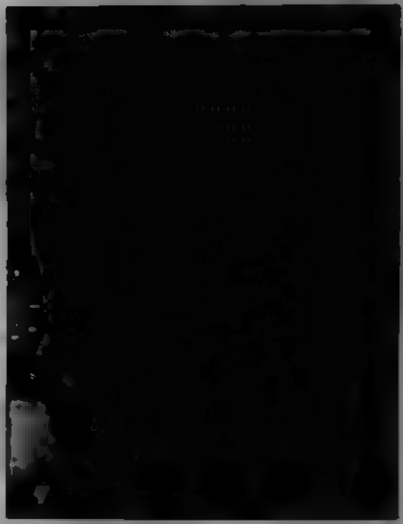
- For the last four years, Congress has failed to pass an authorization bill for the National Science Foundation because of jurisdictional squabbles between the Senate Committee on Commerce, Science and Transportation and the Committee on Labor and Human Resources.
- The House panel that has taken a lead role in studying computer security is the House Subcommittee on Transportation, Aviation and Materials, which seemingly has little jurisdiction over computers.

No doubt the U.S. Congress is a brave experiment in representative democracy. But it also is an institution that is facing an identity crisis brought on by paralyzing rules and procedures, proliferating committees, a heavy work load consisting of trivial duties rather than statesmanship and, more generally, the rapid pace of contemporary American life, according to several congressional observers.

"With too much work and too few resources, Congress will have to ignore many issues that need addressing," wrote William L. Renfro in the December issue of *The Futurist*. Renfro, a former congressional aide and now president of Washington, D.C.-based Policy Analysis Co., presented a gloomy assessment of Congress that concluded: "Thus, at a time when the country more than ever needs clear decisions on the complex questions of the next decade, Congress is increasingly unable to meet its responsibilities and is losing its strong central role as a decision-making body representing the people."

"Keeping up with technological change has become a formidable challenge for Congress," observed U.S. Rep. Lee H. Hamilton (D-Ind.) in mid-1984. "The job of keeping up is most difficult because members of Congress, most of whom have little technical background, are being asked not only to understand the workings of computers, satellites and the like, but also to make decisions on the regulation of these devices."

Hamilton noted that some laws written just four years ago are already outdated. "In many cases," he said, "information technology simply leapfrogs over these laws and renders them ineffective or irrelevant. Problems of copyright law, computer crime, national security and personal privacy have jumped to the top of the nation's agenda."



Ron Wyden

Continued from page 47

qua (D-Fla.).

The committee in 1984 convened a two-year Task Force on Science Policy to explore such issues as: the role of Congress in science policy-making; the impact of the information age on science; the need for Congress to strengthen its ability to judge the quality of research programs; and how to finance research programs.

Over the years, of course, Congress also has created a bevy of support groups to produce expert reports and advice on technical issues. These organizations include the General Accounting Office, the Office of Technology Assessment (OTA), the Congressional Budget Office, the Congressional Clearinghouse on the Future and the Congressional Research Service.

> *'We are spread too thin. We serve on too many committees and subcommittees . . . It is not humanly possible to give proper attention to the 13, 15 or 17 committees and subcommittees that some of us serve on.*
>
> —U.S. Sen. Dan Quayle (R-Ind.)

OTA, for example, produced a report on electronic banking in 1984 and will report in 1985 on a variety of computer topics, including the vulnerability of government computers to security breaches and VDT health issues.

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THE CHANGING LANDSCAPE

By Peter Bartolik

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The private branch exchange (PBX) industry in the U.S. has many of the characteristics of a hard-charging, high-growth market. This impression is heightened by the presence of some 40 equipment suppliers, the opportunities provided by the breakup of the Bell system and by IBM's acquisition of Rolm Corp. Yet for all its appearances, the projected revenue growth of the industry as a whole is remarkably low, which raises a question: Can the PBX industry support all the players?

Although the value of PBX shipments was projected to grow by 10% to $2.7 billion in 1984, according to International Data Corp. (IDC), a Framingham, Mass.-based market research firm, the compound growth rate through 1988 is expected to be only 6.5%.

The numbers are misleading in a variety of ways. The top three suppliers, AT&T, Northern Telecom, Inc. and Rolm, account for more than half of the total revenues, and much of the growth, in the market. Also, the market is quite segmented, with high-end systems and low-end systems projected by IDC and Hambrecht and Quist, Inc., another market research firm, to

[redacted]

EWING GALLOWAY

represent the fastest growing segments. The mid-range systems will experience low growth, according to IDC, or even decline, according to Hambrecht and Quist.

After accounting for the big three, there are 14 vendors with significant market shares (over 1% of the total) fighting for a piece of the remaining pie, according to market research firm Northern Business Information, Inc., in addition to a third tier of vendors that has yet to earn any significant share of the market.

Observers generally agree that there are too many second- and third-tier companies chasing too few dollars, and a shakeout is inevitable over the next few years as companies that cannot keep up with state-of-the-art products fall out of the race. That, however, has not deterred a number of start-up companies and a number of foreign companies from entering the U.S. market.

The reason for the low overall growth projections is relatively simple: Unlike computer users, PBX users do not need to update equipment every three years or so to stay with the leading edge. Nor do PBX users need to acquire additional machines to alleviate increasing backlogs of processing demand. Kenneth Oshman, Rolm president, once characterized the industry predicament in simple terms, saying, "The beauty of telecommunications systems is that everybody needs one. The problem is that they only need one."

The problem is that the market is relatively saturated, and much of the growth lies in tapping the replacement market. In effect, the business goals of many companies rest on the strategy of capturing a portion of AT&T's aging customer base while also offering highly targeted new products to first-time users.

But there are a number of strategies being employed by the companies currently in the market:

- Develop a broad line of products from low-end to high-end and focus development efforts on tying into office automation equipment;
- Focus on a particular size of PBX and try to establish a broad market;
- Target a vertical market such as hotels and motels or financial institutions;
- Tap into the vast resale market represented by the regional telephone holding companies spun off from the Bell system and interconnect companies.

According to Charles Robbins, an analyst with IDC, "even 1% of the market is substantial," and being small in the large scale of things is not necessarily a losing posture. With future revenue growth expected to depend more and more on enhancements to existing systems and add-on products for existing customers, an established customer base can provide steady revenue growth. Those who have most to fear, according to Robbins, are the smaller companies caught in a generalist, broad-based strategy and new start-up companies that have not been able to bring their products to market quickly enough.

Kevin Sara of Northern Business Information said that small companies can survive the shakeout of the industry by offering "very strong" products that address particular segments of the market. While vertical markets offer opportunities, companies can also carve out "large-size niches," according to Sara, by marketing sophisticated products such as large switching systems. Other companies may develop products "tuned for office automation," he added.

Despite the great expectations that generally have accompanied the Rolm/IBM merger, 1985 is not expected to bring vast changes to the PBX market. According to Robbins, 1985 is the year for the various companies to "deliver the products they have been promising."

Sara said he does expect Northern Telecom to announce products integrating its communications offerings with office automation technology. He also said that while Rolm may announce some low-end products during the year, it will take the company two or three years to develop major products and to bring them to market.

One factor that will greatly influence the industry over the next few years is the performance of AT&T in a deregulated environment. Sara said that companies may start dropping out of contention once AT&T "gets

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[illegible] your users. Your [illegible] reports [illegible] your [illegible]

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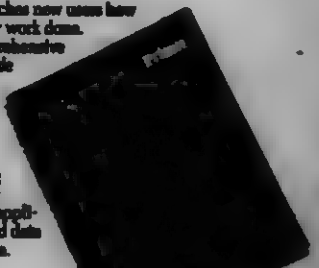

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Continued from page 53

its factories moving again." However, he noted, AT&T's market share has been deteriorating for some time and since deregulation AT&T has made "very little progress" overcoming manufacturing problems. "The more [AT&T's] situation deteriorates, the harder it will be to fulfill AT&T's large ambitions," Sara said.

A recent survey of 635 companies by The Market Information Center, Inc., Framingham, Mass., found very little loyalty to AT&T. According to Barry Gilbert, vice-president of the market research firm, the survey indicated that "Rolm has a good image created out there . . . [but] AT&T has nowhere to go but down."

While 42.2% of the respondents currently had AT&T PBX systems, compared to 24.4% with Rolm systems, when asked what system they would choose if they were to install a new PBX, 35.7% of 264 respondents indicated Rolm, 18.9% indicated Northern Telecom, and AT&T came in third at 16.8%.

An additional factor facing the PBX industry is foreign competition. Northern Business Information's 1984 ranking of the top 17 PBX suppliers included eight foreign suppliers. Topping the list of foreign suppliers after Canada's well established Northern Telecom was NEC Corp.

IBM, with the acquisition of Rolm, has quickly become a leading player in the industry. Analysts believe it will take two years before the merger produces major products to tie PBXs to IBM's overwhelming installed base of computers.

NEC has scored big by selling large systems through several of the regional holding companies formed by the AT&T divestiture; the company has also been promoting itself as an office systems supplier. The problem for NEC, according to IDC's Robbins, is establishing distribution channels that do not compete with each other. He noted that Northern Telecom recently dropped some distributors that were competing against the regional telephone holding companies that also sell Northern Telecom equipment.

Trends on the PBX front

Before the actual merger announcement from Rolm and IBM this past year, the big news on the PBX front was the growing trend of PBX dealers linking up with computer vendors on joint development projects and computer-PBX interface architectures. First came IBM's earlier minority ownership in Rolm, followed by a similar arrangement whereby Wang Laboratories, Inc. acquired a minority ownership share of Intecom, Inc. Intecom is a vendor of large PBX systems that has scored early in sales agreements with the divested Bell operating companies and has moved ahead to develop a niche in the sale of multitenant systems.

Robbins noted that most leading computer vendors have established agreements with leading PBX companies to develop interface architectures. That, according to Robbins, "is the battle for the office." This year, he said, there will be more PBXs integrating with local nets.

Intelligent file servers

While there has been occasional consideration of PBXs at the hub of local-area networks, Robbins does not see the PBX playing a central role in high-speed networks. However, he added, he expects to see PBX vendors develop equipment to serve as intelligent file servers in networks, and he predicted that Northern Telecom will soon come out with a system that will serve as a departmental file server.

Office automation and communications

The most obvious question facing the integration of OA and communications is what role IBM will play. Following a number of unsuccessful attempts to develop PBX-type equipment by itself and through joint developments, IBM, with the acquisition of Rolm, has quickly become a leading player in the industry. Analysts believe it will take two years before the merger produces major products to tie PBXs to IBM's overwhelming installed base.

Undoubtedly, however, the prestige of the IBM name will greatly enhance the image of Rolm, particularly as the roles of communications manager and management information systems manager grow closer.

According to Robbins, "A lot of companies looked at Rolm as a key player but were concerned about what kind of support they would get from Rolm. That will now be addressed over time by the money available from IBM."

Somewhat overlooked during the excitement generated by new PBX products is the aging base of the divested Bell operating companies' Centrex installations. Robbins said that the divested Bell operating companies have made a commitment to electronic Centrex and that some start-up companies are focusing on providing enhanced features to tie into electronic Centrex. However, the general feeling among analysts is that a majority of current Centrex customers will migrate toward PBX systems when they decide to update.

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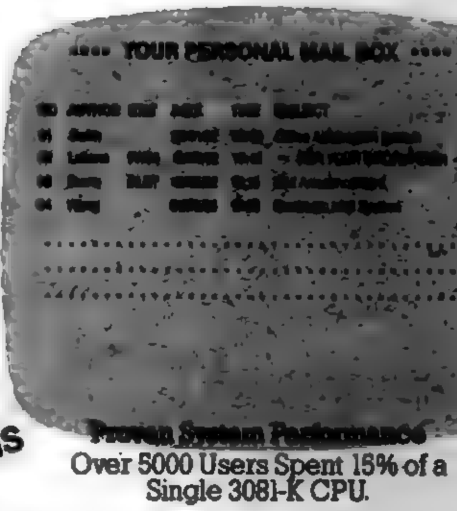

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Users willing to bypass AT&T PBXs for rivals

FRAMINGHAM, Mass. — A recent survey of more than 600 people who make decisions on the purchase of telecommunications equipment revealed strong interest in using private branch exchange (PBX) equipment manufactured by vendors other than AT&T.

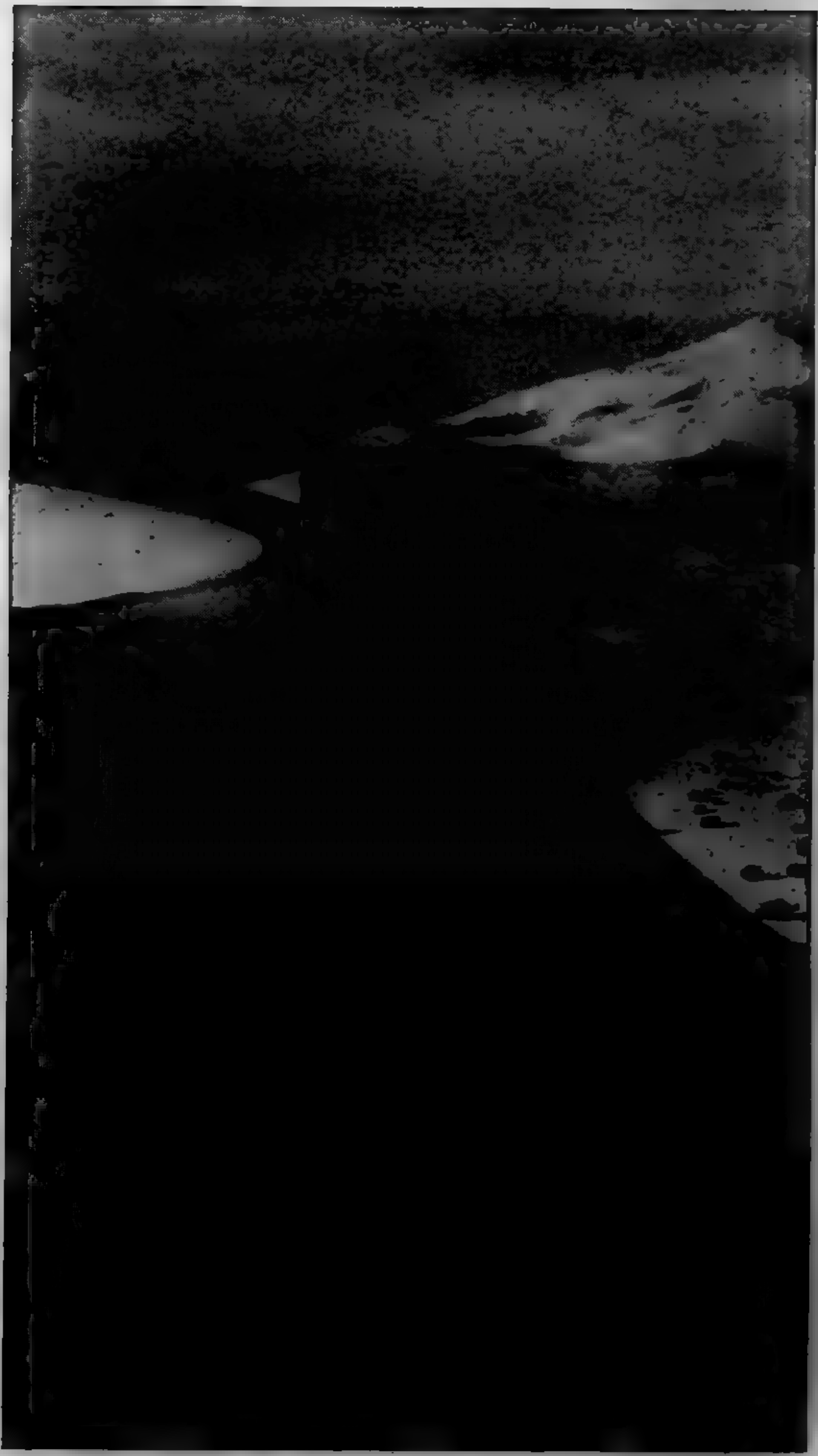
"There is not a lot of loyalty to AT&T [in the PBX market] like there is to IBM in the computer equipment market," noted Barry S. Gilbert, vice-president of the Market Information Center, Inc., based here, which recently published the survey.

"The PBX Market, A User Survey" polled 626 companies on their current PBX equipment and their future purchase plans. Not surprisingly, AT&T had the largest installed base among those users — 42.2% — with Rolm Corp. following at 24.4% and Northern Telecom, Inc. coming in third with 10%.

However, when asked if they would recommend their current PBX to other users, only 68% of AT&T PBX users said they would. Northern Telecom received a favorable response from 98% of its users, and Rolm received a 91% favorability rating.

Of 110 respondents who said they have definite plans to install new PBX systems within the next year, 28.2% said they would install Rolm systems, 20% said AT&T systems and 17% said Northern Telecom systems.

The survey also revealed that nearly 90% of new purchases will be digital systems and that 79% will be used in an integrated voice and data environment. Furthermore, 56% plan on integrating PBX equipment into local-area networks.



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A BRIDGE TOO FAR?

One of the largest users of data processing services, the banking industry, is undergoing great change. Once an industry burdened with restrictions on services, interest rates and geographical expansion, commercial and thrift banks are expanding, both in the types of products they can offer and in the places where they do business.

This year, bankers' eyes are focused on another aspect of deregulation: interstate banking, or the establishment of branches across state lines.

The U.S. Supreme Court is expected to decide whether or not it will hear a case on the validity of "regional compacts" established by several state legislatures in order to discourage takeovers by large institutions from outside their borders. This combines with a continuing congressional battle over interstate banking laws and a move by the comptroller of the currency in November giving 13 bank holding companies approval to open 29 banks in nine states, putting interstate banking in the forefront of banking issues.

Communications capabilities and flexibility within computer departments are prevalent among the concerns expressed by bankers when *Computerworld* posed the question: What will MIS departments need to supply their parent banks in order for them to compete in the new banking environment?

As the largest institution in New England and one of the parties in the case being presented to the Supreme Court,

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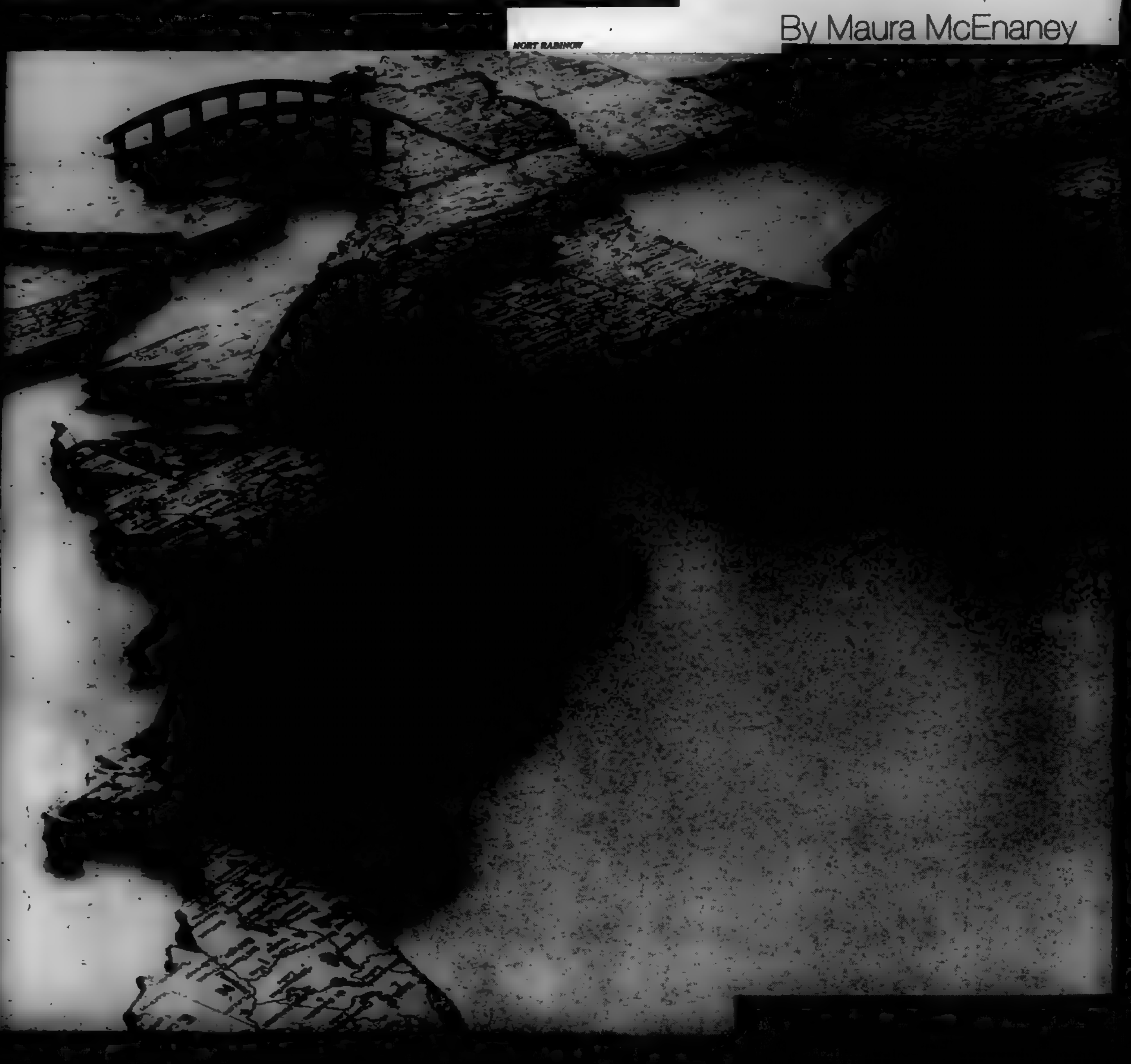
By Maura McEnaney

MORT RABINOW



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Continued from page 56

Bank of Boston has been an aggressor in the interstate banking market. The institution has a toehold in every one of the six New England states and received permission from the controller of the currency to start five bank branches in Florida.

"We see technology as a competitive weapon that will allow us to move out into the customer space but lock out the competition in the process," said William Synnott, senior vice-president at the Bank of Boston's Information Systems and Services Group. "Electronic banking is going to be the facilitator in interstate banking," Synnott said.

With two data centers, a worldwide communications network, a joint-venture automated teller network and a wide base of debit cards, Bank of Boston is out to illustrate what many bankers feel is the key to survival — providing less expensive services to a wider customer base.

According to Synnott, the bank is putting together a technical architecture that will be flexible enough to accommodate a variety of services, products and locations.

"A bank that has a worldwide telecommunications system in place is going to be in a much better position than those who have a splintered array," he said. Bank of Boston is also working to implement an electronic document transmission system that would provide access to multinational corporations. Through a local-area network in Europe, customers could sit down at a terminal, transmit a letter or document that would go directly to one of the institution's international nodes and then feed into a network in the U.S.

Providing processing services to other institutions is already a main part of the bank's business, but the bank will continue to make advances in that direction, Synnott said. "We run the railroad, and they pay us a fee to ride on it."

But connecting systems within an institution is not the only challenge facing banks today. Bancone in Columbus, Ohio, is the state's second largest holding company, with $8 billion in assets. In banking circles, the bank is considered to have a progressive attitude toward technology, with an extensive automated teller machine (ATM) and electronic funds transfer networks. The bank has also been a partner in several large mergers over the past few years.

John Fisher, Bancone senior vice-president, said mergers with other large institutions can create a problem as to what to do with two very different data centers. To date, there have been two approaches taken in the Ohio market, Fisher said.

Some holding companies have deferred commingling their data processing departments; others have moved quickly to provide centralized processing. Dealing with merged DP departments can be "gut tearing," he said, and future success depends on management's ability to cope with the experience.

According to Fisher, "I don't think DP departments can prepare for interstate banking, just react to the result of it." Nevertheless, he said, DP executives who have gone through large intrastate mergers are in a "better mental framework to deal with interstate banking."

Bank of Boston's Synnott agreed. "If you have 10 banks in 10 states, you have 10 different data centers. . . . If you were starting from scratch, it would be a lot easier."

In addition to these management requirements, like other institution leaders, Fisher said, "banks that have built large telecommunications installations will be better prepared than those who stay at home tending the store."

Given the array of expansion possibilities, exactly what to prepare for is a problem at some banks. "As a DP manager, you really don't know what's going to happen; you don't know what kind of a situation the parent is going to drive you into," said C. Thomas Cook, first vice-president of Security Pacific Automation Co. and former MIS director at First Interstate Bank in Los Angeles.

According to Cook, flexibility within bank DP departments is the main issue. "We really don't know what effect deregulation is going to have." If state barriers are broken down, institutions can get access to new markets either through blanketing ATMs, establishing loan centers or buying a franchise, he said. "Each

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> *Bank of Boston is putting together a technical architecture that will be flexible enough to accommodate a variety of services.*
> *The bank is working to implement an electronic document transmission system that would provide access to multinational corporations. Through a local-area network in Europe, customers could transmit a letter or document that would go directly to one of the institution's international nodes and then feed into a network in the U.S.*

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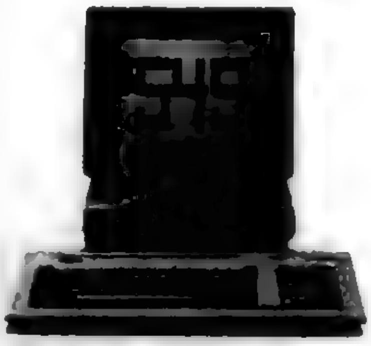

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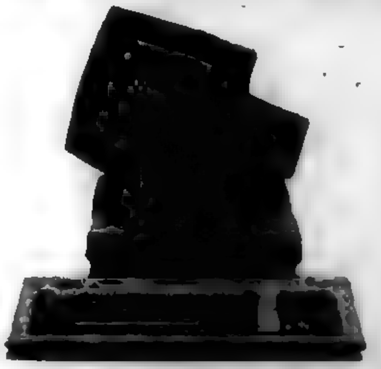

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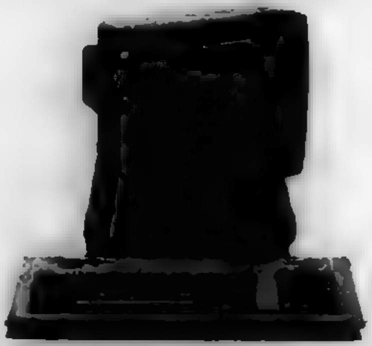

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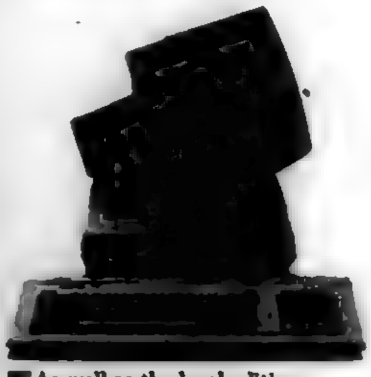

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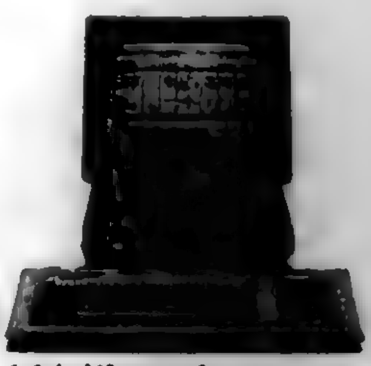

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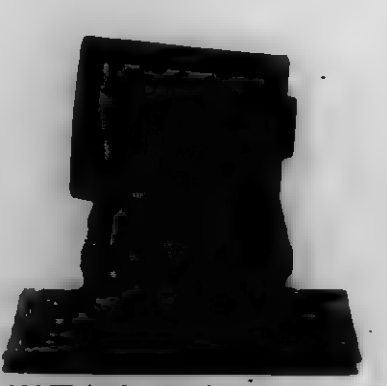

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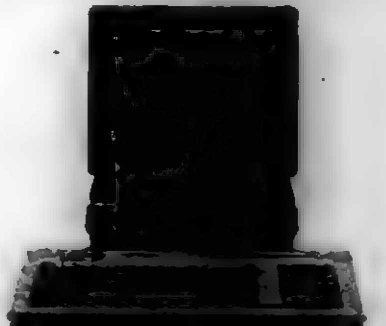

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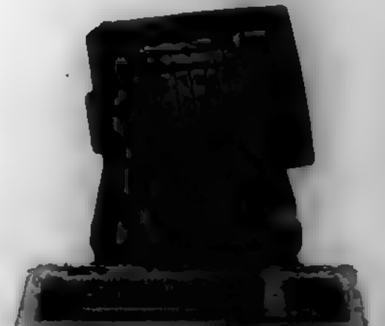

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Continued from page 58

brings with it a different technological solution. . . . You can't have a cookie-cutter solution to any of those, so, from state to state, it's going to be different."

One institution that has taken a slightly different approach toward interstate banking is First Interstate Bank. Through franchising, First Interstate has established more than 1,000 branches that employ 8,000 ATMs in 11 Western states.

In 1976, the bank embarked on a network tie-in that allows First Interstate's ATMs to communicate to six remote sites and then to a central data base site in El Segundo, Calif. "We built an interstate network early in the game, and that is our success," said Rick Higgins, executive vice-president in charge of research and development with First Interstate Services Co., the bank's DP subsidiary.

But according to Higgins, First Interstate too, is looking toward the future. "We took IBM Systems Network Architecture and built a network based on that methodology. That has been good to us," he said. However, First Interstate is looking to build gateways that will provide network access to more than just Interstate customers.

The bank has installed its own satellite dishes in five Western locations, and in Portland, Ore., the bank is experimenting with providing communications through a CATV network.

While First Interstate developed its communications architectures over time, Bankers Trust Co. in New York has plunged into things a bit more rapidly. Last May, Bankers Trust established a position to create and develop a strategic communications architectural environment to integrate systems through a common network.

Although the institution has sold most of its retail operations, it is concentrating heavily on providing financial services throughout the world. Carmine Vona, senior vice-president of the bank's technology department, is in charge of overseeing that project. According to Vona, today's banking systems must operate on a global level and be integrated within the institution at both high and low employee levels. "The thrust is no longer brick and mortar," Vona said. In order to establish a national banking position, "all we need is an intelligent terminal and a telephone line," he said.

Systems must also be able to handle a vast amount of reporting requirements levied in response to the industry's volatility and the failure of institutions like Continental Illinois and Seattle First in Washington, he said. "We are not going to be denied from entering new businesses because of a failure to meet reporting requirements," Vona said.

According to Vona, through the new network, Banker's Trust will have a standardized informational process that will allow it to keep track of customers doing different lines of business with the company. Bankers Trust is preparing "to jump onto any new opportunity that is either already available to us or provided to us through deregulation," he said.

"If there are customers in Florida that are interested in us, we intend to reach them and compete with the bank that has offices in Florida."

INTERSTATE BANKING

Deregulation leads banks to up DP equipment demands

While bankers are facing the problem of how to gear up their DP departments for deregulation, the new environment is putting additional pressures on vendors as well.

Over the next several years, vendors must respond to bankers' needs of providing more functions at less cost, according to C. Thomas Cook, first vice-president of Security Pacific Automation Co. in Los Angeles.

"All financial institutions will [pressure vendors] to bring in more function at less cost," he said. These demands, combined with the rapid changes in technology, will shorten the life cycle of the products, Cook maintained.

> ***Software development is moving slowly in the financial services industry. As a result, software houses and banks alike are willing to pay a tremendous premium for financial applications developers*** — **Kevin Scully, vice-president and division manager of financial systems at Logica, Inc.**

The incompatibility of systems and the specific software needs of institutions today require most banks to tailor software to suit their own needs. At Bank of Boston, the MIS department consists of 550 professionals working in systems development, communications and DP. "We have to write our own software," said William Sennett, senior vice-president, because the lack of standards provides no connection between the bank's IBM, Digital Equipment Corp. and Wang Laboratories, Inc. systems.

This need for specialization has opened the door for financial institutions to market products of their own. Last summer, Bankers Trust in New York established a marketing group for the bank's software products, time-sharing and information services. According to Carmine Vona, senior vice-president of the bank's technology department, the group will market Resources Management On-Line System, a foreign exchange trading module. The institution is also planning on releasing modules for liability management, government security training, money market instruments and municipal securities training.

According to Kevin Scully, vice-president and division manager of financial systems at Logica, Inc., an international computer software company that specializes in financial services, low-volume banks will continue to buy off-the-shelf software, but in the end they will pay the price for not coming up with the customized solutions developed by large institutions.

According to Scully, software development is moving slowly in the financial services industry. "The technology is there," but software isn't coming out fast enough to keep up with the demands of the marketplace, Scully said. As a result, software houses and banks alike are willing to pay a tremendous premium for financial applications developers, Scully said.

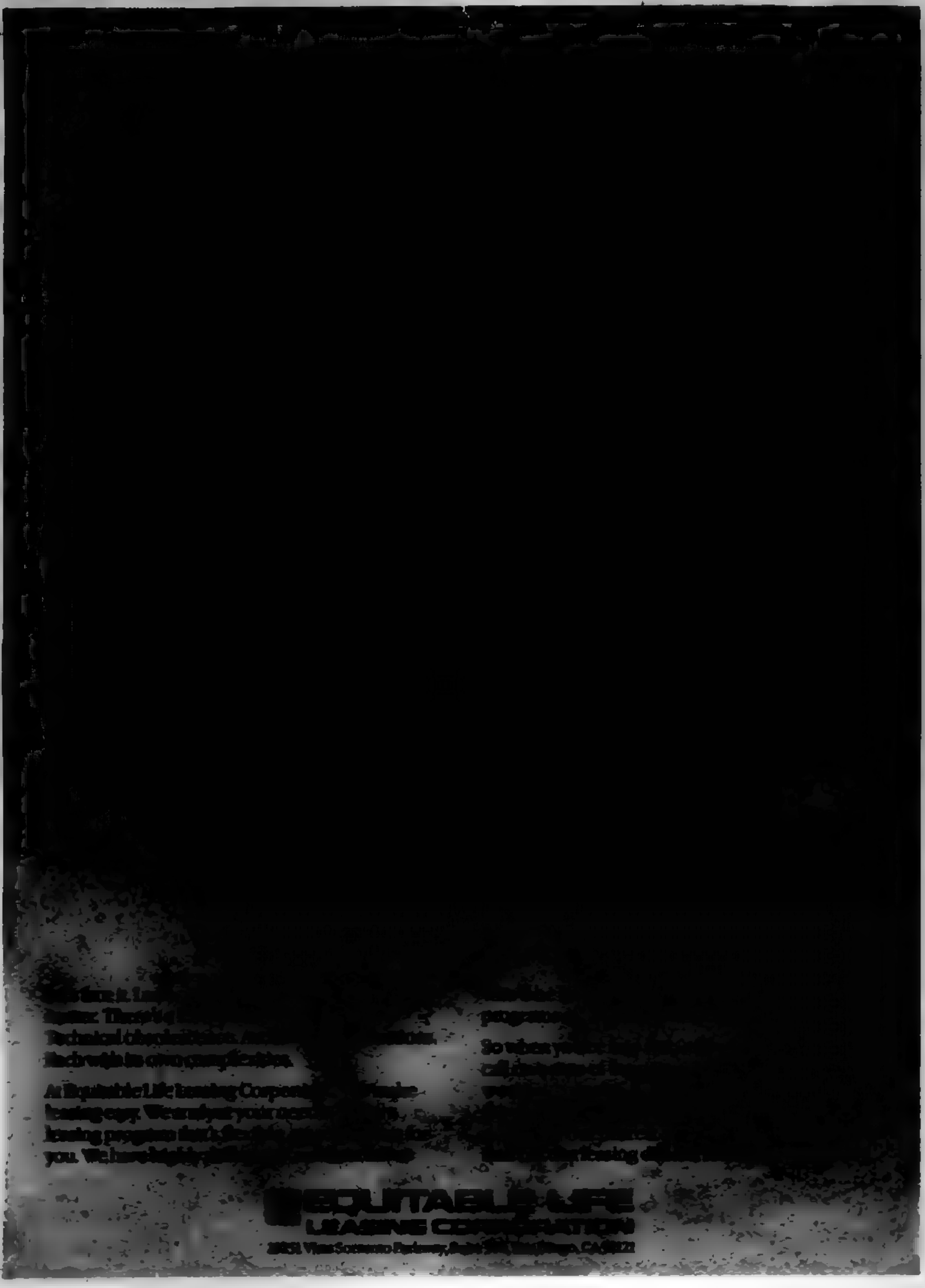
George L. McTavish, president of Dallas-based Hogan Systems, Inc., a financial software vendor, acknowledged that his company's biggest challenge was providing those products that keep banks competitive and seeing that they are implemented in a timely fashion.

Keeping up with technology should not be a piecemeal approach, according to Robert Metzler, vice-president systems development at First Computer Services, Inc., a DP subsidiary of First Union National Bank in Charlotte, N.C.

"We are seeing the industry reach a point where the demand for automated functions continues to accelerate and technology is advancing faster than it can be incorporated into many existing systems," Metzler said. "Systems and pieces of systems are upgraded and replaced on a regular basis."

To change that approach, Metzler suggests an automated approach to automation development, using computer-aided design and manufacturing. "We have provided the financial institutions with automated equipment, but we have not developed an automated function for those who are providing the automation.

"Only after the financial industry demands coherent automated systems designed by systems architects and built by a process supported by an integrated set of automated tools, will we be able to rise above piecemeal, inefficient and costly systems," he said.



DRESSED FOR SUCCESS

By John Gallant

Beyond the bright searchlights of science,
Out of sight of the windows of sense,
Old riddles still bid us defiance,
Old questions of Why and Whence.'
— William Cecil Dampier-Whetham

Trying to predict the large systems software products IBM will announce in 1985 or attempting to divine the software strategies the blue giant will advance in the upcoming year is like trying to solve a modern-day riddle as baffling as the ancient conundrum posed by the Sphinx.

Just as the Sphinx sat soundlessly contemplating the shifting desert sands, IBM reflects on the changing fortunes of the computer industry from its lofty position, weaving the stratagems that ensure its dominance over that realm. IBM's public pronouncements regarding its future intentions are few, and its pilots are close-mouthed about the corporate ship's course. Those who attempt to foretell the computer colossus' moves do so at their own risk. Experts can appear as uninformed as the common man when IBM changes tack, seemingly without warning.

In an industry characterized by a handful of moderately large companies and a multitude of smaller, fledgling firms and

Continued on page 62

IBM'S SOFTWARE STRATEGIES

TYPES OF PACKAGED SOFTWARE BY PROCESSOR SIZE
U.S. VENDORS, WORLDWIDE REVENUES
(Dollars in millions)

	1983				1988			
	System/ Utility	Application Tools	Application Software	Total Packages	System/ Utility	Application Tools	Application Software	Total Packages
Independents								
Large-Scale System	195	420	740	1,355	1,055	2,555	3,265	6,875
Medium-Scale System	255	580	980	1,815	1,510	5,520	7,295	14,325
Micro System	115	295	330	740	985	4,475	4,700	10,160
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hardware Manufacturers								
Large-Scale System	815	340	115	1,270	3,975	1,700	290	5,965
Medium-Scale System	1,335	735	295	2,365	6,760	3,940	1,090	11,790
Micro System	230	235	105	570	2,515	2,090	675	5,280
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

IDC CHART

Continued from page 61

niche-dwellers, IBM is the Goliath of the software world. According to International Data Corp. (IDC), a Framingham, Mass.-based market research firm, IBM's software revenues for 1983 were $2.4 billion. New York-based investment firm E. F. Hutton & Co.'s Michael Geran, vice-president of research, put that figure closer to $2.6 billion, an amount that dwarfs the revenues of even the largest independent software supplier.

"IBM is obviously the dominant company in software," said Harry Edelson, managing partner of Edelson Technology Partners, a venture capital firm located in Saddle Brook, N.J. "The whole world is based on IBM software. There are really no other big companies in software. There are a lot of DBMS and applications companies, but no real giants. Every one of them has gone for a niche based on IBM's hardware and software. Software is the key to the future, and IBM holds that key."

Some say the riddle of IBM's software strategy is as simple as the following:

Q. Where can a $40 billion company go?

A. Anywhere it wants.

But according to others, that interpretation is overly broad and belies IBM's real position in the increasingly complex large systems software marketplace. Despite its size, analysts say, IBM is faced with some very real constraints and problems — which even the smallest software companies experience — in maneuvering the software straits.

What are those constraints? For one, observers say, IBM is locked into an evolutionary migration path that precludes, or at least hampers, the introduction of technologically innovative software products. Since the customer upheavals surrounding the announcement of its 360 series mainframes in the mid-1960s, IBM has followed this evolutionary track in most of the product areas in which it competes.

No software surprises from IBM

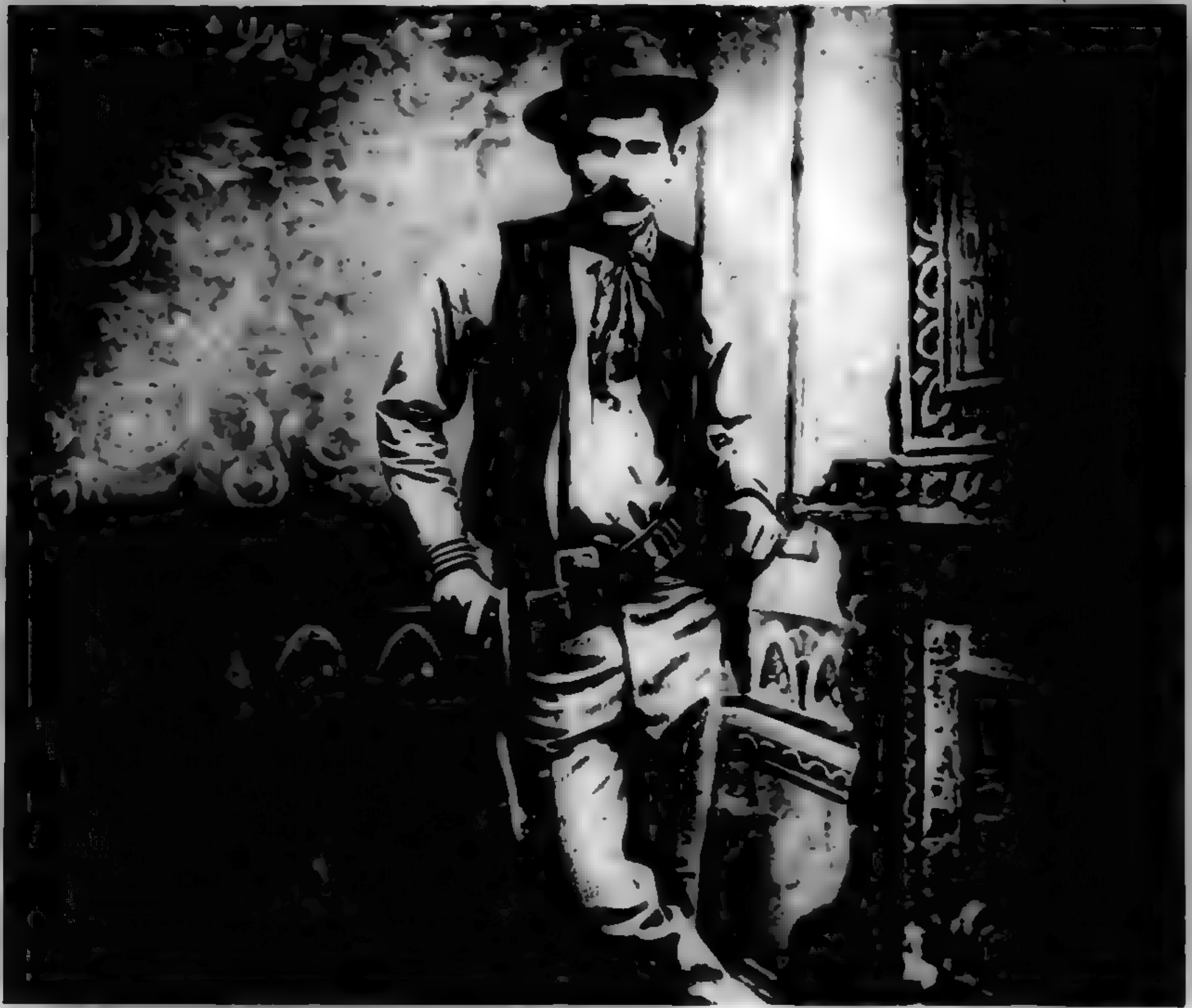
"I do not think you will see any surprises in software next year from IBM," E. F. Hutton's Geran said. "IBM is locked into an evolutionary course that started more than 20 years ago. It just keeps adding layers of functionality to its existing software. That, by its very nature, inhibits innovation. IBM cannot set the clock back to time zero. The company is also limited in what it can do by the size and disparity of its user base.

"For the independent suppliers," he continued, "I would not predict any major threats from IBM in the short term. If they can follow the evolutionary course, they can stay current with or move ahead of IBM."

Dennis Vohs, executive vice-president of Management Science America, Inc. (MSA), an Atlanta-based supplier of large systems applications software, echoed Geran's comments.

"IBM has a couple of problems in the area of software," he said. "It tries to develop software that fits the entire spectrum of users, but it still has to provide things for its top users, who have problems far more complex than others. As a result of solving problems for the big guys, IBM does not make software that is easy for the little guys to use. When

Continued on page 72



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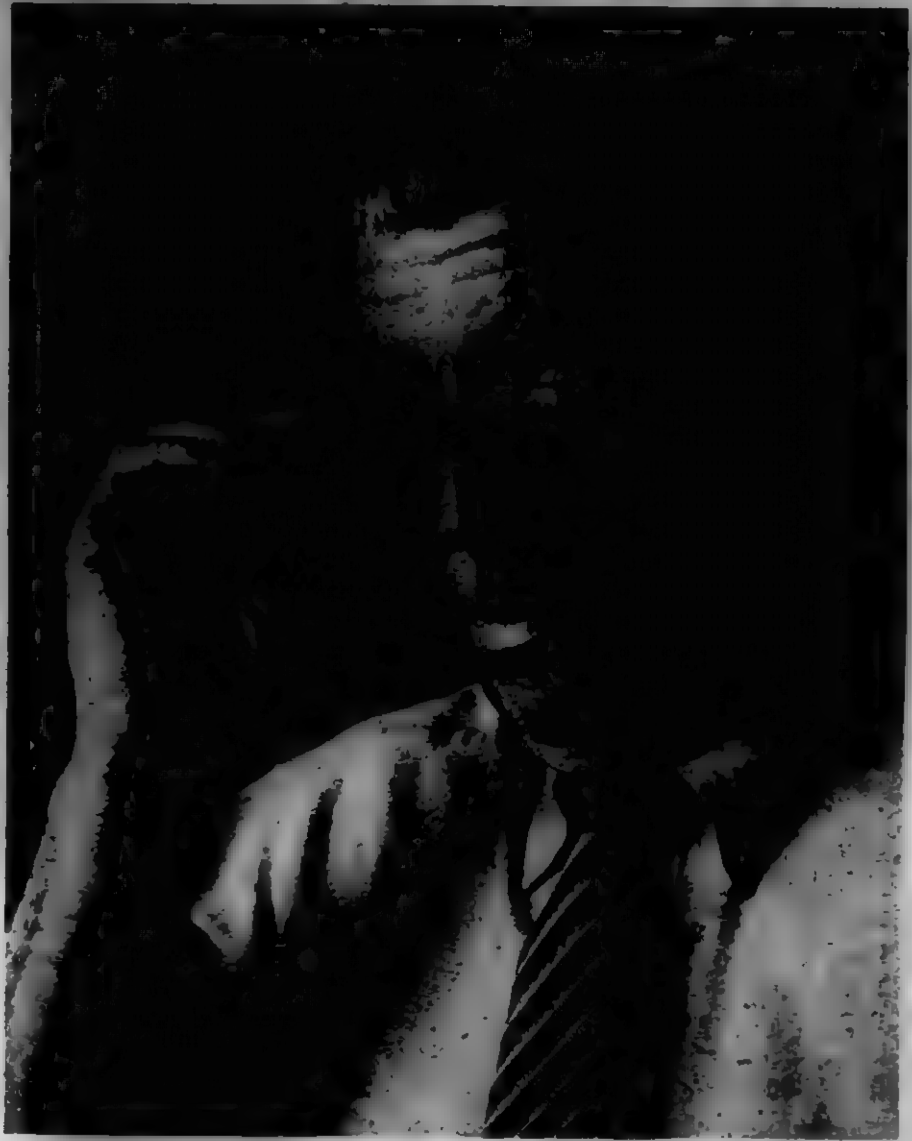

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IBM software revenues, package prices expected to rise

While it may be risky to predict the market areas in which IBM will make its presence felt more strongly next year or to foretell the actual products Big Blue will announce, two things seem certain about IBM and software.

One is that software will play an increasingly important part in the revenue growth of the world's No. 1 computer maker (see chart page 72). Another is that IBM's software prices will continue to rise — perhaps dramatically.

According to Francis Gens, director of information systems research for the Yankee Group, a Boston-based market research firm, IBM's software revenue made up 4.9% of its total revenue in 1982, a figure that rose to 5.7% of IBM's $40 billion total revenue in 1983.

He said IBM's software revenue would be nearly 6.5% of the total in 1984 and is expected to grow to 8% of total revenues by year-end 1985. By the decade's end, he added, software will represent between 15% and 20% of IBM's total revenues.

Gens' estimates are conservative in comparison with other predictions. According to Robert Djurdjevic, president of Annex Research, a market research firm located in Phoenix, IBM's software revenues will represent between 7% and 10% of the company's total revenue for 1984 alone, a figure that translates into software revenues of between $3.2 million and $4.8 billion.

'A sizable portion of the total'

"By the end of 1985," Djurdjevic said, "software will represent a very sizable portion of the total. That growth within the total is significant when you consider that IBM's business as a whole is growing [currently] by about 15% a year."

"Unquestionably, IBM is looking to software for increased revenue," Gens noted. "IBM is risking financial stability by converting a large portion of its hardware base from lease to purchase. Historically, that leased base helped IBM flatten out the highs and the lows in its revenue picture. To offset that shift, IBM is, in effect, building up a large rental base in software. Software revenues will not totally offset that hardware shift, but they will mitigate it somewhat."

Combined with the lease/purchase shift, IBM is confronted with falling hardware prices that increase its reliance on software revenues. To ensure that software revenues continue to grow, analysts said, IBM must both sell more software and increase the price of its software products.

Will get firms to buy more software

"I think [IBM] sees software revenue becoming as much as 40% to 50% of total revenues 10 years from now," said Martin Goetz, president of Applied Data Research, Inc., a Princeton, N.J.-based supplier of systems software. "[IBM] will move to get companies to buy more software. The amount of software data processing departments currently buy is quite discretionary."

The upward pricing strategy is a more worrisome trend as far as users are concerned. "Software prices are going to go up, and they are going to go up dramatically. I believe that IBM's stated goal is that, by 1988, it wants its software revenue to equal its mainframe revenue," said Marc Butlein, vice-president of Gartner Group, Inc., a market research firm in Stamford, Conn. "If you look at the implications of that statement, it suggests that IBM will have to increase software revenues by about 50% a year."

According to Djurdjevic, IBM has very nearly done just that. Between 1980 and 1984, he said, IBM's software revenue has grown at a 49.8% compound annual rate in the U.S. To maintain that type of growth, Djurdjevic predicted that IBM will raise software prices between 30% and 50% during the next two years. He said also that IBM will increase the frequency of new releases for existing software products, with each release marked by a higher price tag.

"All IBM has to do is look at the price of, say, its Cobol compiler or its Cobol runtime library, figure out how many installations use the products and raise the price $5 a month," said Philip Dorn, president of N.Y.-based Dorn Computer Consultants, Inc. "It does not take much in terms of price increases to come up with some substantial revenue because of IBM's incredible user base.".

Value pricing

According to Butlein, IBM may also begin to advance a newly formulated pricing strategy that could have a dramatic effect on users — value pricing. "Value pricing means that every time a user logs on to the software, you pay the vendor something. The more you use a product, the more you pay. . . . the net effect is that the user will wind up paying more money."

Thus, analysts said, IBM's software strategies for 1985 clearly will be formulated in light of the computer giant's bottom-line requirements.

Djurdjevic noted, "Unlike other companies that develop a product first and then build a business plan around it, the business plan comes first at IBM."

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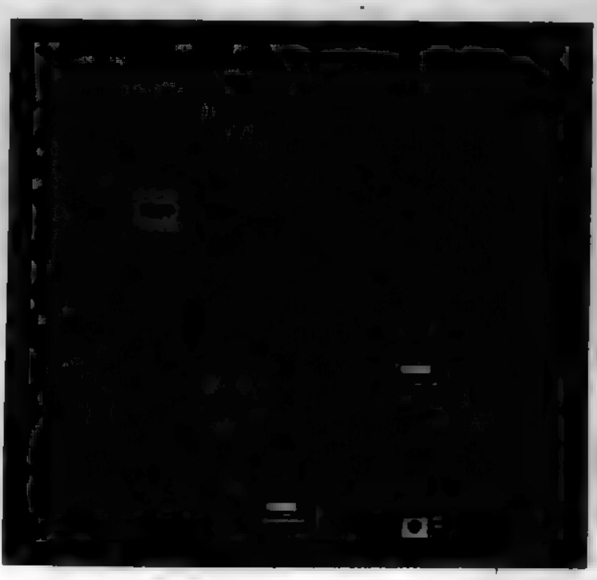

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XA guiding course of IBM operating systems, software

It appears that IBM's moves in the operating systems and systems software areas can be summed up in two words: Extended Architecture (XA). According to analysts interviewed by *Computerworld*, 1985 will see IBM continuing to emphasize the flagship of its operating systems line — MVS/XA — and perhaps introducing an XA version of its increasingly popular VM operating system. In addition, Big Blue may announce new releases of its systems software, designed to utilize the 31-bit addressing space that XA provides.

"I do not expect anything to happen with plain [MVS/SP]. It will be functionally stabilized fairly soon," said Philip Dorn, president of N.Y.-based Dorn Computer Consultants, Inc. "Eventually, everyone will have to be MVS/XA customers because the next generations of machines will be XA machines. I would guess that by the end of 1985, 60% to 70% of all MVS shops will have migrated up to XA."

Major releases each year

According to Robert Djurdjevic, a computer industry analyst and president of Annex Research, a market research firm located in Phoenix, users of MVS/XA can expect at least two major releases of that operating system each year until the end of the decade, with each release accompanied by a price increase. Most analysts predicted that IBM's soon-to-be-released high-end processors — code-named Sierra — will likely boast new functions that only MVS/XA users will be able to utilize. That, observers said, represents another of IBM's strategies for encouraging upward conversions from other operating systems.

"I think there will also be new systems software coming out from IBM, including compilers and perhaps a data base management system that takes advantage of XA's additional memory and address space," said Martin Goetz, president of Applied Data Research, Inc., a Princeton, N.J.-based supplier of systems software. "I think IBM will force users to upgrade through improved software that only works with XA. Also, IBM traditionally comes out with newer [peripheral] devices that only the top operating system will support."

But in light of the rumored introduction of the Sierra line, most observers said IBM will probably be content to leave MVS/XA itself unchanged for the coming year.

"Next year is complicated," said Harry Edelson, managing partner of Edelson Technology Partners, a venture capital firm in Saddle Brook, N.J. "With the Sierra line to be introduced, you could see some major shifts in IBM's revenue base. It is doubtful that you will see new wrinkles in [operating systems] software in light of that. You probably won't see much of a software thrust until . . . the machines are delivered."

One operating systems software thrust that analysts said is overdue from IBM is the introduction of an XA version of VM, a strong interactive environment that continues to win adherents in the user community. VM/XA would allow users to use the 31-bit addressing space of XA and help them overcome virtual memory constraints.

According to Shaku Atre, president of Rye, N.Y.-based Atre International Consultants, Inc., VM is rapidly becoming a strategic product for IBM. "I think IBM is moving more forcefully in the VM area in order to satisfy the information center type of environments. Most of the announcements you will see in the MVS/XA area you will also see in the VM arena. VM has been sidetracked for years, but I think IBM has realized that VM is a much better interactive processing system than just MVS with TSO."

"When is VM/XA going to appear?," Dorn asked. "I will tell you that a lot of users have [complained] about that one. It is long overdue. I personally do not understand what problem IBM is having with VM/XA. It is obviously a critical system for [IBM] today."

Debut of 31-bit systems software

In addition to the possible introduction of VM/XA, a number of IBM observers said the industry giant will make available 31-bit versions of important systems software. According to Francis Gens, director of information systems research for the Boston-based market research firm the Yankee Group, IBM started down that path with the introduction of subsystems such as its Network Communications Control Facility and Vtam for MVS/XA.

"In terms of software," Gens said, "1985 will be the year of virtual storage constraint relief. XA allowed users to address memory over the 16M-byte line, but much of the systems software is still limited to that line. It is possible that IBM will announce 31-bit versions of subsystems such as CICS and IMS and other software that will be able to operate above the 16M-byte line."

What will be the fate of IBM's third major operating system — DOS/VSE — in the coming months? Analysts seemed to feel that IBM would love to kill off DOS/VSE and support only two major operating systems — if it only could.

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IBM'S SOFTWARE STRATEGIES

IBM to play hardball with applications software?

"If you had asked me a year ago what IBM would be doing in applications, I would have said 'nothing special.' But all the announcements of IBM's microcomputer software this year have caused me to scratch my head and think maybe the game is going to change. I never thought IBM would get into micro software, but it sure did. That is not a precursor to getting into the mainframe applications area, but I am not as sure as I was that IBM will continue to do nothing," said Philip Dorn, president of N.Y.-based Dorn Computer Consultants, Inc.

As with Dorn, many IBM watchers are puzzled by Big Blue's strategy in the increasingly lucrative large systems applications market. With the exception of some very widely installed packages, such as its Copics and Mapics manufacturing software, IBM has not played a big part in the evolution of applications software.

Because developing applications requires massive resources and because most of the widely installed packages supplied by the independents have enjoyed years of fine tuning, many analysts said IBM would have a difficult time making its presence felt in that market.

Despite concessions, insiders uneasy

In addition, observers said, IBM would probably not be able to overcome the huge conversion problem involved in trying to edge out existing installed products. And, they noted, applications tied to IBM's aging IMS or fledgling DB 2 data base management system (DBMS) would be unlikely to meet with widespread user approval. Despite the sense that IBM has conceded the applications market, for the most part, to the independents, insiders share Dorn's uneasiness. If the ubiquitous blue force were to rear its head in the applications arena, could it turn the tide on the independents?

"I think IBM has conceded the market for the time being, but I do not know that it has decided to concede it forever. IBM has stated that its corporate objective is to be a big factor in every single market, and applications software is certainly a sizable market," said Dennis Vohs, executive vice-president of Management Science America, Inc., an Atlanta-based supplier of large systems applications software.

"IBM has had its hands full with systems software," said Francis Gens, director of information systems research for the Yankee Group, a Boston-based market research firm. "That software has faced the least competition, and it has great price flexibility and the strongest hold on users. In light of that, I think it unlikely that you will see any major moves from IBM in this area."

One area into which a number of observers said IBM may move next year is scientific and engineering applications. "I think next year we will continue to see improvements in the applications areas where IBM is strong, such as manufacturing, and we will see the introduction of products targeted to the scientific area," said Michael Geran, vice-president of research for New York-based investors E. F. Hutton & Co.

Analysts were split over whether IBM would choose to enter the applications arena by acquiring marketing rights to third-party software or even purchasing outright one of the independent suppliers. IBM has exhibited a growing inclination to do just that, as evidenced by its acquisition of Rolm Corp., its interest in Sytek, Inc. and its marketing arrangements with Artificial Intelligence Corp. and Comshare, Inc.

Independents have head start

"IBM really does not have the expertise to write a major application," said Marc Butlein, vice-president of Gartner Group, Inc., a market research firm in Stamford, Conn. "If you were going to supply an application, would you start from scratch or would you go out and buy someone else's product? . . . I think the independents have too much of a head start, and the expertise is with the independents."

The Yankee Group's Gens echoed Butlein's sentiments. "IBM will be encouraging more deals with the independent applications vendors," he said. "In nonstrategic areas, IBM is depending more heavily on outside companies. The larger IBM becomes, the more difficult growth becomes."

But Dorn disagreed. "An acquisition? Well, that would get IBM in with both feet, wouldn't it? On the other hand, most of the independents have produced software that works in multiple environments. Could IBM be a software vendor dealing with all those other subsystems that are not its own? That is hard to figure," he said.

Observers said that any move by IBM into applications would probably have to be preceded by some attempt on Big Blue's part to shore up its sagging DBMS house, considering that the DBMS is quickly becoming the core component in most vendors' applications strategies.

Explained Vohs, "To have a big share of the market to go after and reduce the amount of expense that goes into development, IBM is going to want to get a pretty dominant share of the DBMS market, which it slipped in this year."

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IBM sliding, independents climbing in DBMS market

To say that IBM is losing ground in the data base management system (DBMS) arena is technically correct, but the statement belies IBM's dominance in that market segment. According to "IBM Software Environment," a report from Framingham, Mass.-based International Data Corp., a market research firm, IBM's IMS product and its relational offspring DB 2 account for some 60% of the installed DBMS base today.

But IBM is slipping. Independents are slowly gaining market share against the aging, hierarchical IMS and the nonproduction-quality DB 2. Thus, many analysts ponder what IBM's strategy will be in the upcoming year in this critical market.

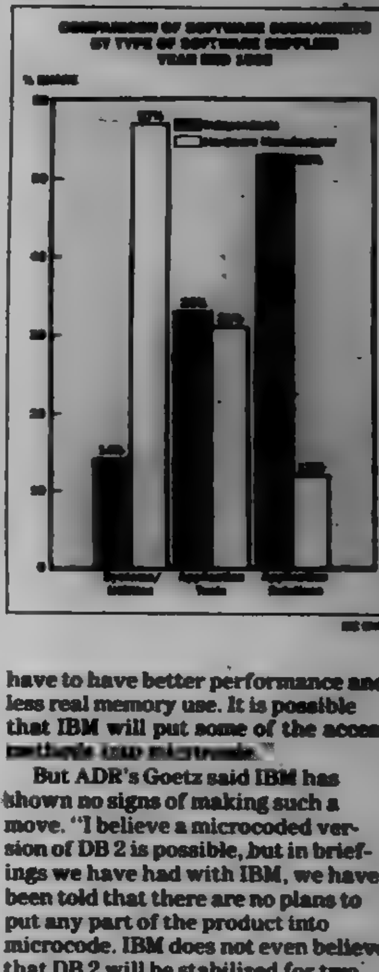
"I think IBM is trying to make DB 2 a more production-oriented DBMS," said Martin Goetz, president of Applied Data Research, Inc. (ADR), a Princeton, N.J.-based supplier of systems software. "DB 2 is currently thought of as a system to [redacted] experience with the product, to the extent that the company can improve its performance, I am sure it will."

"I am not convinced of how serious IBM is with the DB 2 strategy," said Philip Dorn, president of New York-based Dorn Computer Consultants, Inc. "It is an important product, but I cannot find a clear line on IBM's software strategies in a lot of areas, and this is one. The only strategy I can see is the one IBM announced publicly, which is a side-by-side arrangement. You are essentially running two logical machines, an IMS machine and a DB 2 machine with some crisscrossing."

[redacted] follow a side-by-side strategy of improving the performance characteristics of DB 2 while continuing to [redacted] to IMS. IMS must be supported, they said, because of its huge user base and the massive investment in software IBM's clients have made during the product's 14-year lifetime.

One possible solution to DB 2's performance problems, insiders said, might be found in upcoming hardware announcements. Some analysts [redacted] DB 2 will be one of the features [redacted] the next logical step," said Michael Geran, vice-president of research for [redacted] E. F. Hutton & Co. "IBM wants to, and has to, improve the functional [redacted] lity of DB2, and one way to do that is through microcode. I do not think IBM is worried about opening up DB 2 to the [plug-compatible manufacturers]. PCMs are no longer an issue in the computer industry; their market share is just too small."

Shaku Atre, president of Rye, N.Y.-based Atre International Consultants, Inc., agreed. "I think performance is the No. 1 feature IBM has to improve with DB 2. To make anything production-quality, you have to have better performance and less real memory use. It is possible that IBM will put some of the access [redacted]



But ADR's Goetz said IBM has shown no signs of making such a move. "I believe a microcoded version of DB 2 is possible, but in briefings we have had with IBM, we have been told that there are no plans to put any part of the product into microcode. IBM does not even believe that DB 2 will be stabilized for two or three years."

One move that analysts said is possible is the introduction of a fourth-generation-language-based application development facility and related programmer productivity tools. IBM's Development Management System (DMS) and its Application Development Facility (ADF) are recognized as less than cutting edge technologies, and IBM may attempt to boost its fortunes in that growing market by announcing a more advanced system based on one of its DBMS.

"IBM does not have a good fourth-generation application development language," Goetz said. "IBM's DMS and ADF are very poor products. The company has a very large group of people in Dallas working on the development of a fourth-generation system."

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IBM'S SOFTWARE STRATEGIES

Continued from page 61

IBM builds software, it takes in the whole market spectrum, which makes it very difficult for IBM to satisfy an individual user."

Also, Vohs said, IBM's sheer size can sometimes limit its mobility. That represents an important limitation considering that timing is often a critical factor in the success of a software product. "It takes IBM an inordinate amount of time to run a potential product by all the people who have to review it. The software, for example, may have to be reviewed by the disk people, the 4300 series people and the IMS [data base management system] people. The product has to be compatible in all those environments. Other software companies, being much smaller, can be more versatile in introducing new technology."

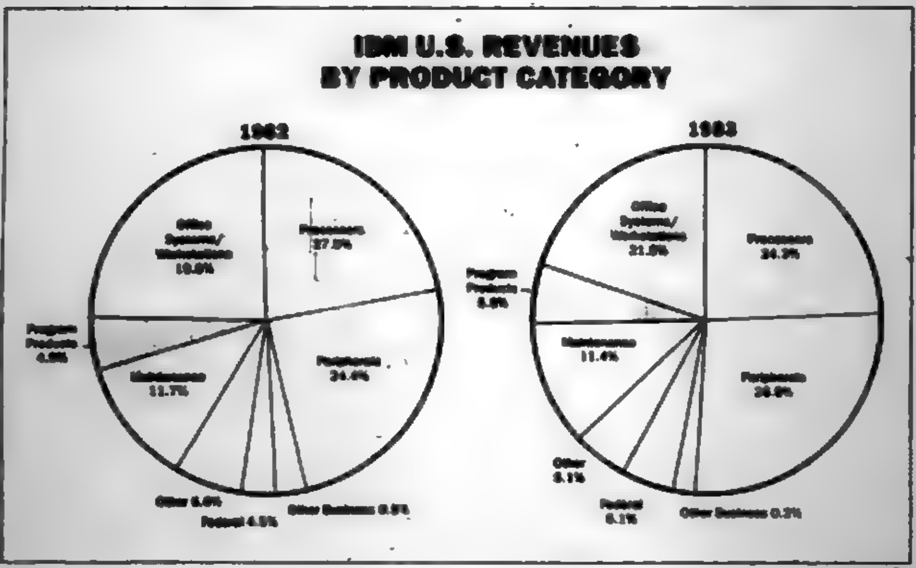
And despite its aura of invincibility, IBM's resources are not limitless. Even Big Blue must target its limited technical manpower and its finite — albeit massive — research and development budget toward those market areas in which it can compete most effectively.

That assignment of resources, many analysts said, explains why IBM has dominated some sectors of the large systems software arena, such as operating systems and systems software, and why it has been less successful in others, such as prepackaged applications.

"IBM's technical manpower is limited, as with all companies, so it concentrates on the areas in which it does well," Geran said. "It has been a case of diversion of resources. IBM has so many things going at once that it has not really had time to focus on areas such as applications. Thus, IBM selectively concedes portions of the [software] market to the independents who can then gain ground in those areas."

"IBM has too many things on its plate," said Marc Butlein, vice-president of Gartner Group, Inc., a market research firm located in Stamford, Conn. "For example, IBM has about 500 people who rewrite and support the VM [operating system] alone. That is one hell of an investment. IBM has only so many resources, and it wants to leverage them where it can."

Such internal constraints make it reasonably clear that, despite impressions to the contrary, IBM cannot stride at will in all niches of the large systems software market — at least not all at once. Thus, in the absence of a public statement of intent, outsiders are left to peer into a rather foggy crystal ball to predict where IBM will move in the coming year.



IDC chart

Observers see IBM continuing support of SNA

Observers expect to see little in the realm of important announcements in Systems Network Architecture (SNA) and communications software for the upcoming year. They said IBM will continue to strengthen its commitment to SNA and to centralization and the reliance on mainframe processors in a distributed environment that SNA makes possible. Analysts said IBM may announce network management products, and they said users can expect enhancements to IBM's existing communications software.

"I think IBM is definitely interested in tying everything in to the host," said Dennis Vohs, executive vice-president of Management Science America, Inc., an Atlanta-based supplier of large systems applications software. "SNA is addressing that strategy. IBM is saying, 'Use your mainframe system as your storage.' "

A number of observers said they believe IBM is growing receptive to the need to accommodate evolving worldwide communications standards, such as the Open Systems Interconnect and X.25.

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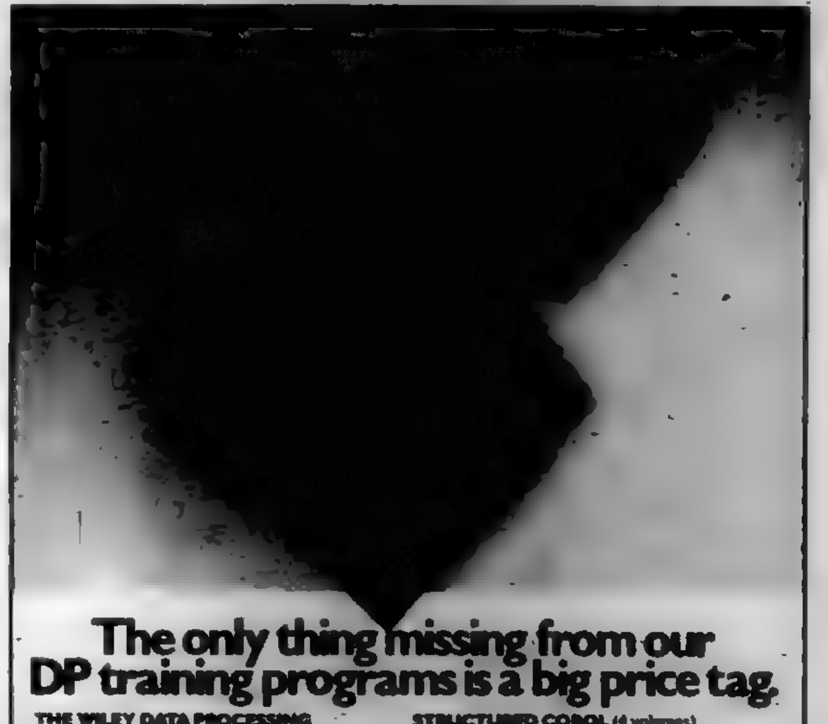

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WHAT'S ON YOUR MIND?

By George Harrar [illegible]

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In the blank space below or on a separate sheet of paper, respond in up to 200 words to as many of the following statements as you wish.

[illegible]

1. **The further I keep end users away from the mainframe data base, the better.**

2. **The spread of micros threatens the control and authority of the DP department.**

3. **Cobol is an out-of-date language, but we're sticking with it.**

4. **Vendors keep announcing micro-to-mainframe links, but I haven't found one available right now that works for my company.**

5. **Hackers are just kids playing with computers. Any system that can't keep them out deserves to be infiltrated.**

6. **Senior management still treats DP as a back-room service.**

7. **Unix is a language kept alive only by vendor and media hype.**

We might run your responses in future *Computerworlds*. If you'd like your name and company affiliation withheld from publication, just say so.

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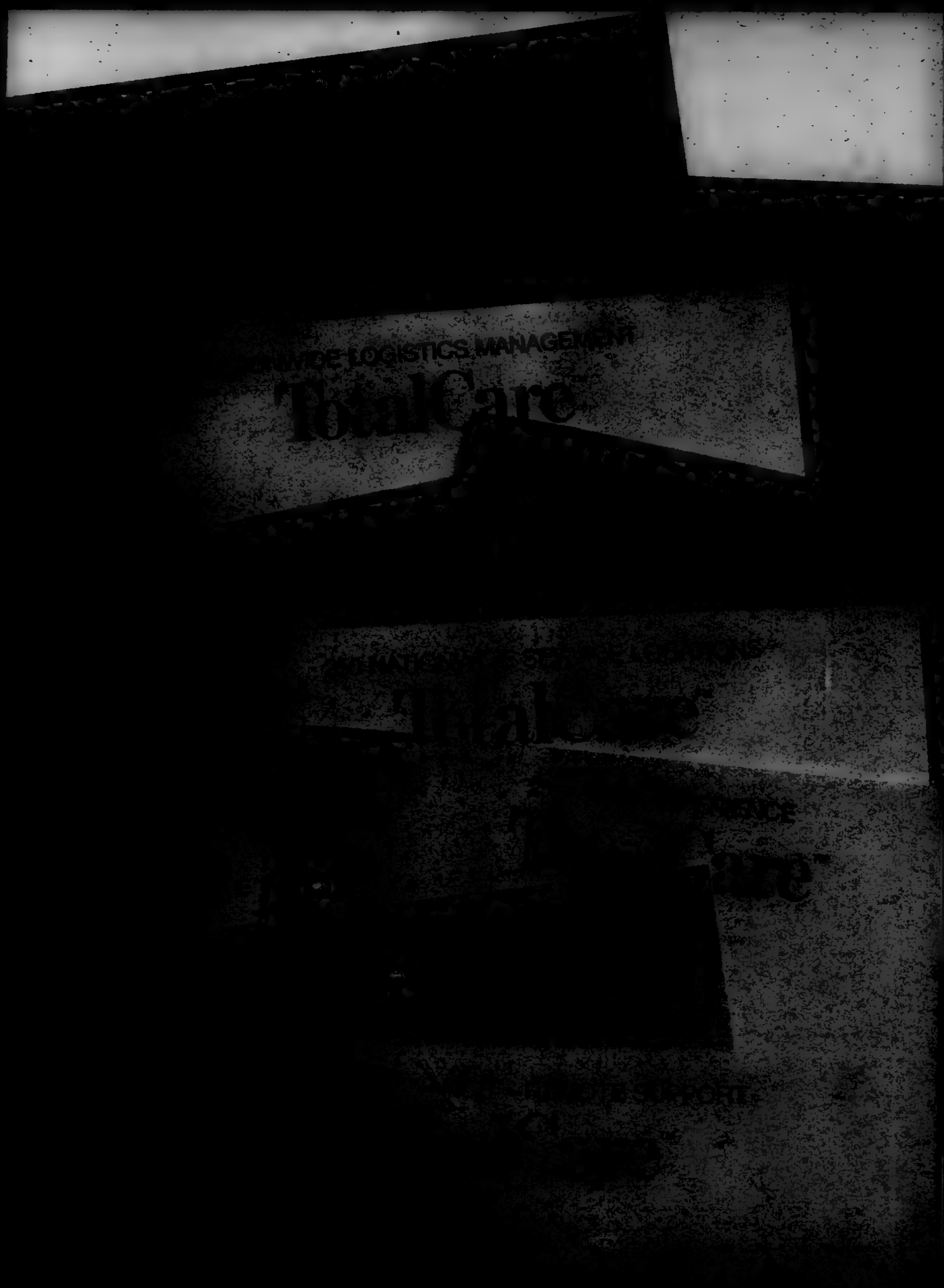
What topics would you like to see covered in greater depth in *Computerworld*? (more software product evaluations, for instance, or management issues, technology updates, etc.)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TOOLS OF THE TRADE

By Paul Korzeniowski

Six years ago, corporate pilgrims were lured from a land of calculators and mainframe-produced, green-line paper reports to a new world of microcomputers. There, the pioneers discovered an abundance of white-collar riches.

Electronic spreadsheets swiftly manipulated rows and columns of numbers and allowed managers to examine a number of hypothetical budgets.

With a data base manager, an administrator could store records of department purchases and quickly find the name of the typewriter ribbon supplier. Word processing software allowed even the one-finger typist to compose a memo for his supervisor. Using communications software, a stock analyst could capture stock market information and insert it into his spreadsheet.

As word spread of the riches the new world offered, many joined the pioneers. Others were content with the calculators and mainframe tools.

Today, the pioneers are further extending the microcomputer software frontier. Classes of software that do not fall under the mantle of the four traditional applications are being explored. These applications consist of project management, presentation graphics, outline processing, desktop managers and "mindware."

The explorers are few. But many companies are still attempting to convince workers to supplement the green-line reports and calculators.

While some question what riches the new frontier offers, others are convinced that its benefits are so great that old-world hard-liners will be lured to the new world.

Project management

For years, mainframe project management software has been available. Slowly, it is moving into the microcomputer arena. Project management packages allow a user to break a project, whether it be building a hotel or developing an application, into a series of steps. Each step's cost, deadline and necessary resources (material and personnel) are entered into a micro.

Using critical path analysis or Gantt chart techniques, the software illustrates a project's progress and monitors resources and costs.

Although microcomputer project management packages have been available for a few years, they have yet to gain a foothold in most corporations. "We have some interest in project management packages," Ron Goldfarb, manager of office automation at Pratt & Whitney Aircraft Group in Hartford, Conn., said. "I expect it to increase as these packages get better."

First-generation project management packages were limited by storage space (most run in 256K bytes of random-access memory) and by the weak processing power of the IBM Personal Computer. "Most packages did little other than automate a manual task," according to James Haner, an indepedent microcomputer consultant with Dynacomp in Palmdale, Calif.

"The user did not gain the ability to perform 'what-if' calculations that make microcomputer packages useful." Other limitations are the packages' slow printing speeds, less than adequate documentation and non-user-friendly features.

Some of these limitations are being overcome. "There has been a fundamental change in project management packages," said Richard Strauss, vice-president, products at Corporate Software, Inc., a Waltham, Mass., software distributor. "At first, packages only tracked one project at a time. Now, there are packages that monitor a number of people and a number of projects. That capability is what most managers require."

But even with initial limitations overcome, it is not clear how many people will buy project management packages. "There is a big market for project management," Strauss claimed. "Now, it is used primarily by the MIS manager and has yet to hit other markets."

Robert Lefkowits, director of microcomputer system software research at Infocorp in Cupertino, Calif., disagreed, "Project management is still a solution looking for a problem. It has been available on mainframes for 15 years and it hasn't been popular. Some people use it but most do not have the discipline or the need for it."

Presentation graphics is another emerging software category that has been available for a few years. With Lotus Development Corp.'s 1-2-3 came the ability to transform a spreadsheet budget into a chart or graph. "We had been pushing presentation graphics for two years without much success," Goldfarb said. "It is only recently that

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Micro managers lament missing links

While software manufacturers have been busily developing new categories of software such as outline processing and "mindware," microcomputer managers continue to search for a complete micro-to-mainframe link.

"Despite all the hype, we are still missing the complete link that would allow a user to access data regardless of where it resides and easily insert it into a package like [Lotus Development Corp.'s] 1-2-3," noted Ron Goldfarb, manager of office automation at Pratt & Whitney Aircraft Group in Hartford, Conn.

The absence of this link has prevented many corporations from effectively integrating mainframe and microcomputer data.

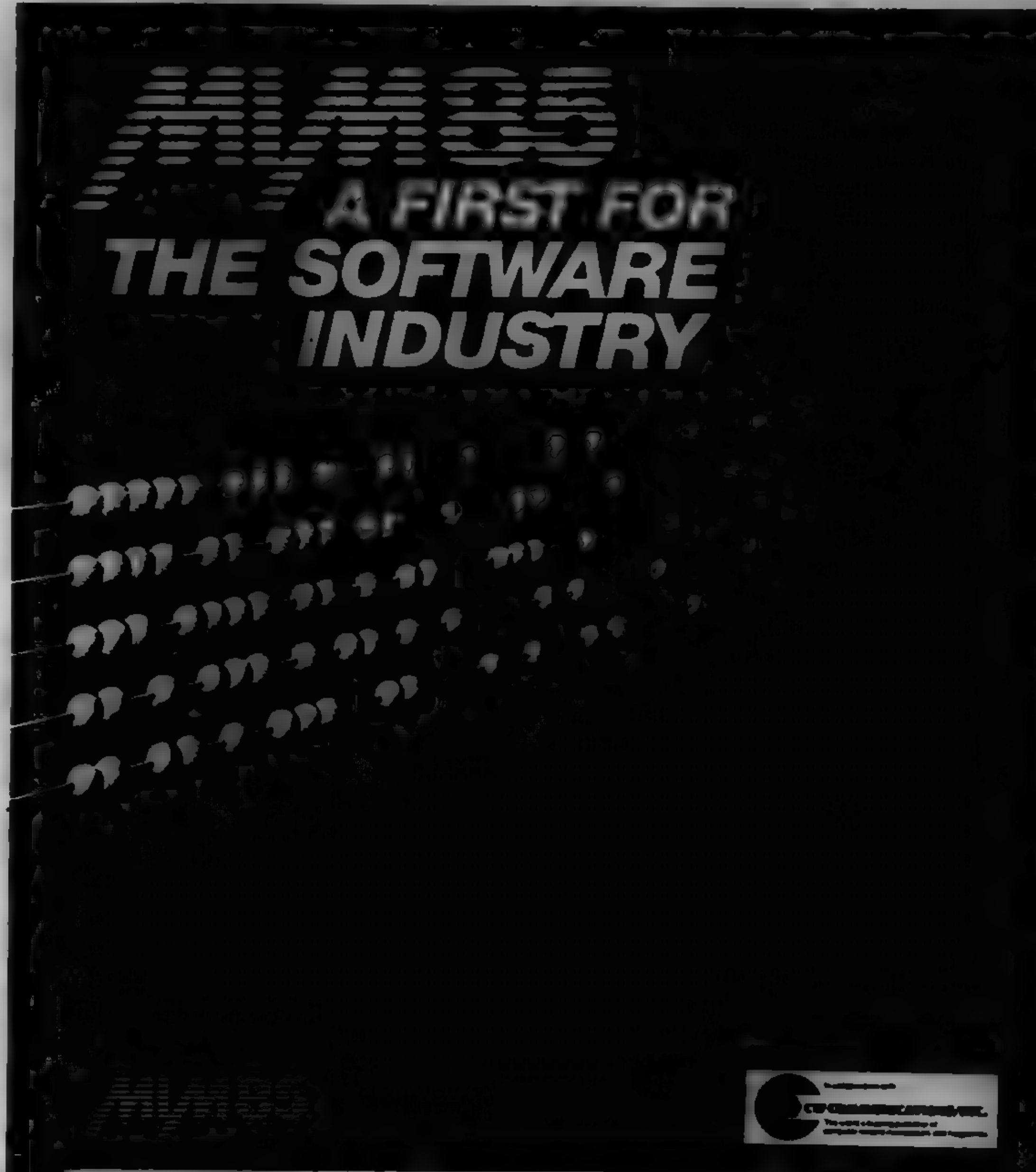
'Little true downloading'

"There is little true downloading taking place," maintained Alan Gross, technical planning specialist at New York-based Smith Barney Harris Upham Co.

"It is just too difficult. What companies do is take summary data from mainframe reports and load it into microcomputer applications. The microcomputer does not complete any ad hoc analysis or determine what data should be extracted from the mainframe."

Advances have been made, however. "The physical connection is there," Gross noted. "What is lacking are better tools for formatting data into and out of a utility like Software Arts, Inc.'s Data Interchange Format."

Goldfarb noted, "A product like [Information Builders, Inc.] Focus works well with PC Focus, but it doesn't work with many other packages. The user does not want a link for each package."



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MICRO SOFTWARE

Continued from page 77

demand has increased. We just completed a survey of our users and presentation graphics was one item they were very interested in."

For interest to continue to mushroom, hurdles have to be overcome. "Current presentation output is just not high quality," Lefkowits maintained. "Most systems are good for in-house use. But we are having 300 analysts at a conference and would not think of using a microcomputer package for that presentation."

The chief problem with microcomputers is the lack of powerful output devices. Rather than working with microcomputer devices, many companies turn to dedicated presentation-quality output devices. "We have our graphics work done in-house with our typesetter," stated Steven Machlis, microcomputer consultant in the reasearch and development group at Goldman Sachs & Co. in New York.

A slew of new devices is being introduced to increase microcomputer output quality and flexibility. Some products transform a photograph into computer input and others allow a computer to replace a facsimile machine. The device that user firms seem most interested in transforms a screen or a report into a slide.

These machines may perk interest in presentation-quality output. "I think that demand for packages that produce simple bar and pie charts will remain the same in 1985," Maureen Fleming, manager of software research at market research firm International Resource Development in Norwalk, Conn., predicted. "But I think that [the] new products [that] work with image-processing devices will experience a boom."

With an outline processor, a user constructs a hierarachy of ideas and is able to randomly move items so that relationships may become clear. The concept of the package is difficult to grasp. Dave Winer, president of Living Videotex, Inc. in Mountain View, Calif., was unable to describe succinctly Videotex' Thinktank and urged potential users to play with it before trying to determine exactly how it worked.

Outline processing is one of the key features that Ashton-Tate has touted for its Framework package. The company has stated that people work in outline rather than spreadsheet fashion.

Therefore, spreadsheet users may not find outline processing helpful. "Our users are number crunchers and need spreadsheet facilities rather than idea processing," Machlis claimed. "Outline processing is just not relevant to financial workers. With a package like Framework, there is not enough memory to store calculations and work with the outline processor."

Rather than forging a new category of software, outline processing may merge with word processing. "There is a huge market for outline processors tied to word processors," Fleming said. "An outline processor can be sold, like a spelling checker, as a utility."

While outline processors can be used to attempt to order one's thoughts, desktop managers unclutter one's desk. Most packages provide notepad, Rolodex, calculator and automatic telephone dailing facilities. Rather than working as a stand-alone application, they run in background and are available at the touch of a keystroke.

"There is a big market for desktop software," Fleming said.

Strauss disagreed. "Desktop organizers are nice gadgets, but they are not very useful," he said.

Mindware is a loosely defined category of software that sharpens personal skills. "Unlike other packages that allow one to delegate work to a subordinate, mindware cannot be delegated," William Zachmann, vice-president at International Data Corp., a Framingham, Mass., market research firm, said.

The reason that mindware cannot be delegated is that its output depends on the user's input. For example, Human Edge Software Corp.'s The Sales Edge asks a user a number of questions about himself and his perception of a potential client. The software then produces a printout coaching the person on the best approach for the client.

Other packages claim to help sharpen managerial, decision-making and sales skills.

Zachmann predicted that mindware will be one of the most dynamic areas of innovation between now and the end of the 1980s.

Other analysts do not deem mindware capabilities significant. "For a number of reasons, I don't think that these packages will be popular," Strauss suggested. "Usually, these packages have to be approved by a worker's supervisor, and I do not think that most workers are going to ask their boss for a package that teaches them how to do their job. Also, most people do not have the time to learn how to use these packages. Few people believe that a computer can do their job better than they can."

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LATE FOR DINNER

By David Olmos

'Japan's prime target today is the DP industry. Domination of the semiconductor market in the U.S. is only a part of an overall strategy that intends to gain control of the computer industry in this country. Clearly, IBM and every other computer manufacturer in the U.S. are under attack.'

— Charles E. Sporck, president of National Semiconductor Corp., in remarks to a Los Angeles gathering of securities analysts, as quoted in *Computerworld*, March 27, 1978.

For years, there have been dire warnings that Japan will one day come to dominate the U.S. computer industry much as it has the steel, automobile and consumer electronics industries. Japan's computer companies, often reaping the benefits of American technology, have, in fact, made great strides in a short time, rapidly narrowing the huge technological lead the U.S. enjoyed in the 1960s.

Although Japanese companies have had considerable success selling semiconductors, storage devices and other peripheral equipment in the

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U.S., their efforts to crack the microcomputer and large-systems markets have fallen short of many peoples' expectations.

The Japanese share of the $40 billion American computer market, the world's largest, rose to 5% in 1983 from 3% in 1982, according to U.S. Department of Commerce figures. Looked at another way, IBM Japan still does as much business in Japan as all the Japanese companies combined do in the U.S. That recent gain in market share, however, came as Japanese imports of computers, peripherals and subassemblies to the U.S. last year rose 65% to $1.8 billion, creating a bilateral trade deficit of nearly $1 billion.

In general, the Japanese have not done that well in penetrating markets outside the Pacific Basin. Outside that region, they have captured about 10% of the information processing market. American computer firms still control about 75% of the computer market in noncommunist countries, according to International Data Corp. (IDC), a Framingham, Mass., market research firm.

Race for supremacy has just begun

Although the Japanese have definitely made their presence felt in certain segments of the American market, their overall progress has resembled more the slow and steady tortoise than the speedy hare that some experts had expected a few years back. But, then, some would say the race for computer supremacy has just begun.

"The Japanese are here today, but it's not in the way we all thought they'd be," said Matt Meehan, a computer industry analyst with Salomon Brothers, Inc. in New York. "They're here in the sense that they're supplying a lot of the peripherals. When you open up the guts of a computer, you see that a lot of it is Japanese-made."

With some exceptions, Japanese companies have been unsuccessful in marketing computer systems under their own brand names in the U.S. Most of their success has come through relatively less profitable original equipment manufacturing agreements or joint ventures with American firms. One such partnership is that between National Advanced Systems, Inc. (NAS) and Hitachi Ltd., in which NAS markets Hitachi's large-scale computers in the U.S.

If Japanese technology has caught up or surpassed American technology in many areas, then why haven't the Japanese been more of a force in the U.S. market? According to interviews with industry analysts, representatives of U.S. and Japanese computer manufacturers and others, the explanations include weaknesses in Japanese software, lack of American distribution channels, unfavorable market-entry conditions and cultural differences.

The list is long of U.S. manufacturers of IBM plug-compatible mainframes that have fallen by the wayside trying to compete against IBM's technical and marketing muscle: Magnuson Computer Systems, Inc., Storage Technology Corp., Spartacus Computers, Inc. and Trilogy Systems Corp. As their ranks have thinned, some U.S. manufacturers such as Amdahl Corp., NAS and Honeywell, Inc. have looked to the Far East for help in battling Big Blue.

Japan's three largest mainframe producers — NEC Corp., Fujitsu Ltd. and Hitachi — have all formed alliances with U.S. distributors to market their large systems. NEC has teamed up with Honeywell, Inc., Fujitsu with Amdahl and Hitachi with NAS.

'Japanese not copying anymore'

This increase in joint-venture activity is a clear sign of the growing sophistication of Japanese technology, said John Alic, a researcher in the U.S. Congress' Office of Technology Assessment and project director of the agency's 1983 study on international competition in the electronics industry. "The Japanese clearly are not just copying anymore," he said.

The NEC/Honeywell deal helps illustrate how things have changed in the computer industry. More than 20 years ago, NEC started selling Honeywell mainframes in Japan. NEC eventually began building its own hardware; today, its S-1000 mainframe is able to outperform Honeywell's top-of-the line system by some 40%.

The U.S.-Japan partnerships have advantages for both parties. The American companies gain access to Japanese hardware that, according to most accounts, is at least as fast and reliable as IBM's. This allows U.S. firms to stay in the race with IBM and hold on to their large-system customers without incurring huge development costs of their own. The Japanese, on the other hand, are able to expand their worldwide installed base and gain a greater presence and recognition in the U.S.

Ed Shimbo, chief operating officer of NEC Systems Laboratory, Inc., the market research arm of Boxboro, Mass.-based NEC Information Systems, Inc., said the requirements of his company and Honeywell "just fit each other." "NEC has hardware, but we don't have any software in the U.S., and we also don't have any sales or maintenance channels here," he said.

To date, however, these alliances have failed to wrest much market share from IBM. "It's pretty clear they are not a major participant in that area by any stretch of the imagination," noted Jack Hart, director of Pacific operations with IDC.

According to IDC figures for 1983, the total U.S. installed base of Amdahl/Fujitsu and NAS/Hitachi mainframes was 880. That compares with

Continued on page 82

The Goal News

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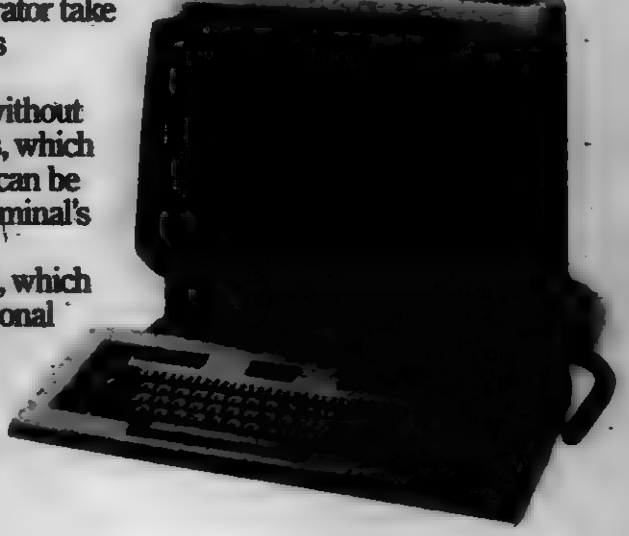

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Continued from page 80

8,800 mainframe installations throughout the U.S., 5,700 of which are IBM's.

But the American Electronics Association (AEA), the Palo Alto, Calif., trade association, views the Japanese advances in the mainframe market in another light. Ralph Thompson, the association's executive vice-president, believes the Japanese presence in the mainframe market is significant when cast in terms of bilateral trade, a subject of much concern to the AEA. "I think you'd be shocked to find that we've moved into, if not parity, then a negative" bilateral trade balance in the mainframe area, he said.

Nevertheless, some analysts believe the Japanese companies, helped by the sales and service arms of their U.S. partners, will continue to provide competition for IBM. "[The Japanese] are the only ones who are going to be able to compete against IBM in the IBM mainframe business," Salomon Brothers' Meehan said. "And they'll probably do decently in the supercomputer business, but that's a niche market."

Tiny market or not, the Japanese efforts in supercomputers have been viewed with concern by American computer companies and the American government.

This concern has been prompted largely by the significant military applications of supercomputers. Supercomputers also are being increasingly used for scientific and technical applications.

Japan's national supercomputer program has as its reported goal the development, by 1989, of a machine that would be anywhere from 100 to 1,000 times faster than the fastest American supercomputer that now exists — the Cray Research, Inc. XMP machine. Fujitsu recently became, through an agreement with Amdahl, the first Japanese company to begin marketing its supercomputers in the U.S.

The microcomputer market was one area in which the Japanese were expected to repeat the winning strategies they used to dominate the consumer electronics markets. It was only a matter of time, some predicted, before the legendary ability of Japanese manufacturers to turn out smaller, faster, cheaper and more reliable products would erase U.S. supremacy in this area.

Japanese micro invasion

But the Japanese micro invasion hasn't happened — at least not yet. Japanese vendors have captured only a 5% share of the U.S personal computer market, according to Future Computing, Inc. a Richardson, Texas, market research firm.

However, when Japan's 36% share of the U.S. peripherals market is taken into account, Japan comes in with a 22% share of the total U.S. personal computer and peripherals market.

Much of the Japanese success in this area has been in home computers and portable computers rather than in business systems.

Among the commonly cited explanations for Japan's less-than-glittering performance in personal computers are a lack of software, inadequate avenues of distribution and a general failure to understand the American market.

Asked to compare his company's success in televisions, videocassette recorders and stereo equipment with personal computers, Kazuya Hanazuka, a spokesman for Hitachi Ltd. in New York, said: "In the other areas, it didn't require any software for us to be successful."

But some suggest that software may only be a temporary Achilles' heel for the Japanese. Hanzuka noted, for example, that Hitachi has more than 20 software houses in Japan that are developing programs for personal computers, robotics and other applications.

"It is almost unknown to American companies, but almost every week a new Japanese software house announces that they will export software from Japan to the U.S.," said John Stern, senior representative in the AEA's Tokyo office, which opened this year.

"While [noncustomized] Japanese software is not as deep or broad as U.S. software," Stern added, "in certain areas it's very good and fully competitive."

Some observers suggested that the Japanese companies are taking a cautious approach, waiting for the dust to settle in the micro shakeout.

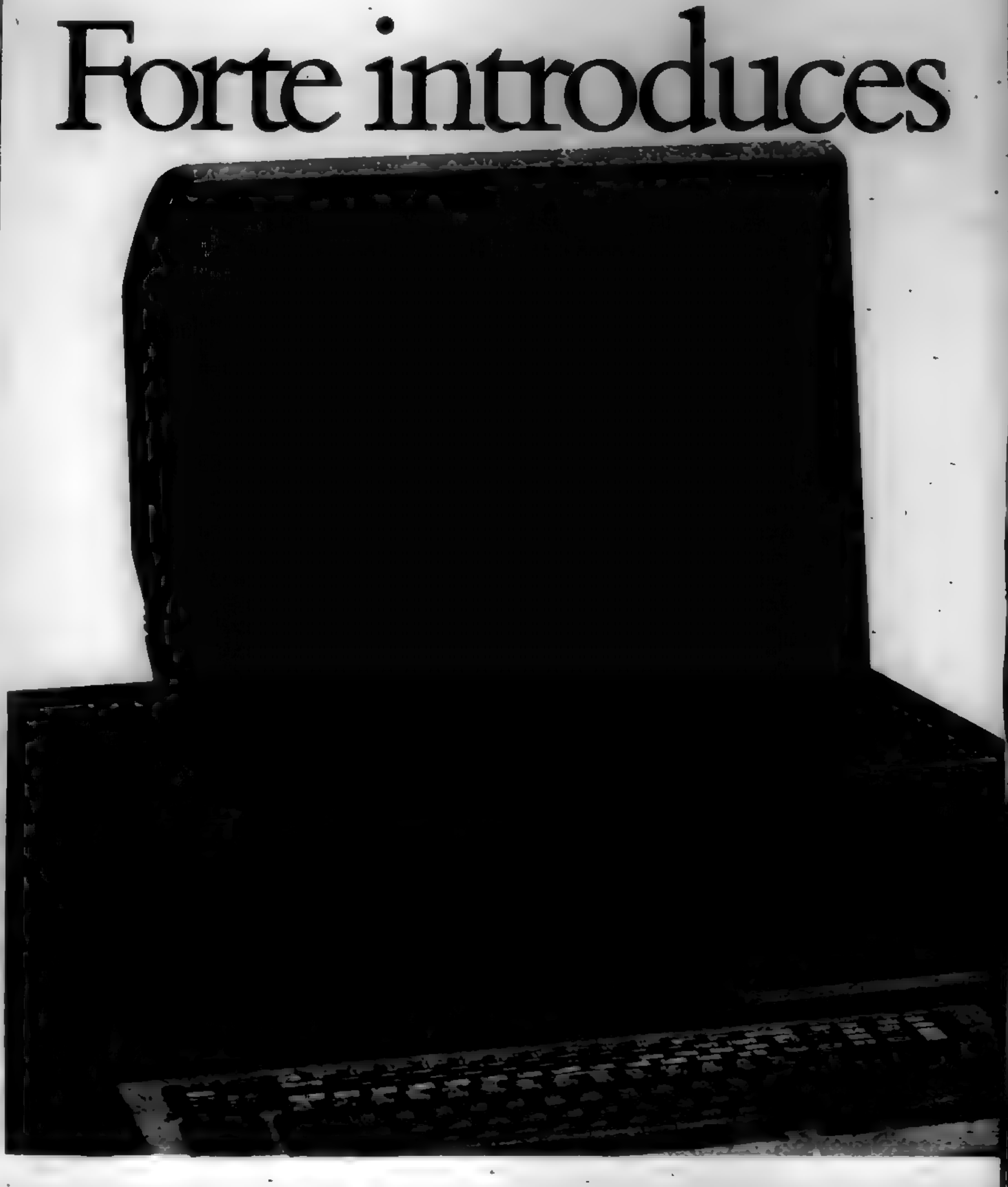
"Every textbook or Harvard Business School case says this: The Japanese wait until the market matures, until there's stabilization, and they can move in and make things smaller, better, faster, cheaper," said the Salomon Brothers' Meehan. "We haven't gotten to that point yet, and I don't know if we'll ever get to it."

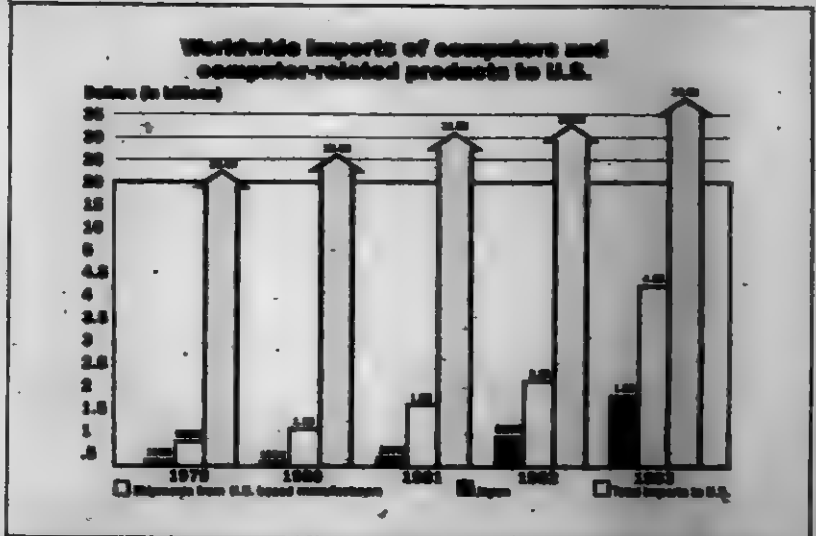
Weak marketing strategy

Marketing is cited as another weakness in Japan's personal computer strategy. "I don't know of any Japanese companies that are starting from a marketing-oriented approach, a customer approach," noted Leslie Latham, a former U.S. marketing executive for microcomputers at a leading Japanese electronics company. "They still have not learned that the reason why companies such as IBM have been successful is not because they have a superior product, but because they have been concerned with the customers' needs."

For that reason, some Japanese companies have again sought out American partners to provide sales and service. Mitsubishi Electric Co., for example, has signed private-label agreements with both Sperry Corp. and Leading Edge Corp. to market its IBM Personal Computer-compatible business computer in the U.S.

One company representative contended, however, that the Japanese have not failed in the personal com-





These figures include U.S. shipments of computing equipment from U.S.-based manufacturers. Also included in these figures is equipment shipped by U.S.-based subsidiaries of foreign vendors. (CW chart; U.S. Department of Commerce data)

puter area, but instead have been patiently following a carefully planned business strategy. Ed Schaider, director of marketing for Fujitsu's Professional Microsystems Division, which sells the Micro 16 business computer in the U.S., explained his company's strategy for entering the American market. He said the company waited for the market to mature, identified a specific segment of that market, provided a "very high-quality" product and an "unusually high level of vertical integration.

"Fujitsu will continue to watch the U.S. marketplace," Schaider said, "and as it matures, you'll find Fujitsu."

No one can say for sure when or if the Japanese will make a major move into the microcomputer market — or what niches within that market they will target. But one thing is certain: It's too early for American companies to relax.

"These are huge companies with tremendous resources, and they're going to be around for awhile," noted Peter Teige, a Dataquest analyst. "They don't need to take any drastic measures to move into the U.S. market. . . . In the next several years, they will keep the pressure on and try and make something happen. Their track record in everything else seems to indicate they could successfully do that."

If there is one area in which the warnings of Charles Sporck, National Semiconductor Corp.'s president and chief executive officer, have come to pass, it is in semiconductors.

"The Japanese are doing very well. They are making steady market-share incursions," said Michael Gumport, an analyst with Paine Webber, Inc. in New York.

The Japanese share of the U.S. semiconductor market has been growing steadily. According to the Semiconductor Industry Association, a San Jose, Calif., trade association, the Japanese will have close to 14% of the U.S. market in 1984, up from 13% in 1983 and 10% in 1982. Gumport , however, said his data shows the Japanese market share will hit 16% to 19% in 1984.

Worldwide, the Japanese are said to have captured about half of the 64K-bit random-access memory (RAM) market and most of the emerging 256K-bit dynamic-RAM market so far. Gumport said the Japanese should have about 40% of the world market for 1984, up from 34% two years ago.

The U.S. trade deficit with Japan in integrated circuits ballooned from $327 million in 1982 to $481 million in 1983. Commerce department figures show that the U.S. imported $681 million in integrated circuits from Japan in 1983, compared with $446 million in 1982. U.S. exports to Japan totaled $200 million, up from $119 million the year earlier.

U.S.-Japan tensions cooling

The trade battle between U.S. and Japanese manufacturers has been one of the hottest in the computer industry. Yet despite the U.S.' negative trade balance and continuing complaints from American companies that Japan is not allowing access to its domestic market, tensions overall seem to have cooled.

Sheridan Tatsuno, an analyst with Dataquest, attributed the easing trade tensions to the growing internationalism of the industry. U.S. and Japanese vendors have set up chipmaking plants in each other's countries, in Europe and elsewhere. Moreover, U.S. and Japanese cross-licensing and second-sourcing agreements are on the rise. "It's gotten to the point now that if you don't have a partner, you don't survive."

The change Tatsuno refers to is evident in the 1983 agreement between Oki Electric Industry Co. and National Semiconductor Corp., a company for which such a deal would have been unlikely several years ago. National Semi signed a second-source pact with Oki under which the U.S. firm manufactures 64K-bit RAM chips based on Oki designs.

"It's pretty simple," Tatsuno reasoned. "If you have a [foreign] partner, it's not nice to bash their country."

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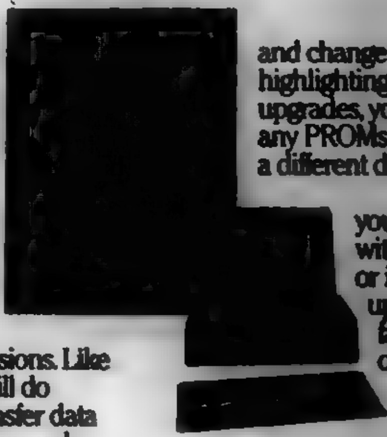

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While mulling over a computer system change a few years back, National Can Corp.'s chairman and chief executive officer raised a question: Should we buy from an American company whose products are partially made by a foreign firm and whose ownership is part foreign?

National Can had already seen one U.S.-Japanese partnership turn sour. The company was using a TRW-Fujitsu Co. TFC-8510 series computer, when Fujitsu Ltd. bought out TRW Corp.'s share of the venture and pulled the series from the market.

Despite some concerns, the Chicago can manufacturer eventually decided to purchase a system from Amdahl Corp., a company in which Fujitsu, Japan's No. 1 computer maker, has nearly a 50% interest. Fujitsu makes almost half of Amdahl's 580-series machine and also markets its own supercomputers through the American company.

Donald Brungard, MIS director at National Can, said he would prefer to buy from a vendor whose products are primarily American-made. But "when push comes to shove," he explained, the company will deal with a foreign vendor if the price/performance criteria are right.

"At our company," Brungard said, "costs are so important that what we say is, 'Let's go look at the market, find the best technology and see what the prices are. If there are no dramatic differences in technology, then it doesn't matter where it comes from.'

"In the Amdahl system, we were buying such additional horsepower that we could demonstrate it would last at least one year longer and . . . would mean a substantial savings above and beyond IBM, for instance," he said.

Other MIS managers, who in recent interviews were asked their thoughts on Japanese equipment, offered views similar to those expressed by National Can.

> *'We really don't care who it's made by as long as we get a good box that will perform well.'*
> — Glenn Broom, MIS director, Acme Boot Co.

"We really don't care who it's made by as long as we get a good box that will perform well," said Glenn Broom, MIS director for Acme Boot Co. in Clarkesville, Tenn. Acme Boot has an Amdahl 470V/5-11 system. Broom said some of the components of the Amdahl system are made by Fujitsu.

The computer center at the Federal Bureau of Investigation includes systems from a variety of vendors, including IBM and National Advanced Systems, Inc. (NAS), a Mountain View, Calif., company that markets computers made by Japan's Hitachi Ltd.

"My personal feelings are that it doesn't matter to us whether [the computers] are from an American or foreign company," said Kier T. Boyd, deputy assistant director of the FBI's Technical Services Division. "We're very satisfied with our NAS systems."

Henry Kee, vice-president for personal computing at Chemical Bank in New York, said he has not seriously considered the business computer offerings of Japanese vendors because of what he called their lack of software and inability to integrate with other office system products.

Kee claimed the Japanese have been too late in responding to the rapid changes in the American micro market. "If you look at some of the CP/M [operating system] machines offered today by many of the Japanese manufacturers," he said, "they are very high-quality, excellent for the dollar, but no one cares anymore."

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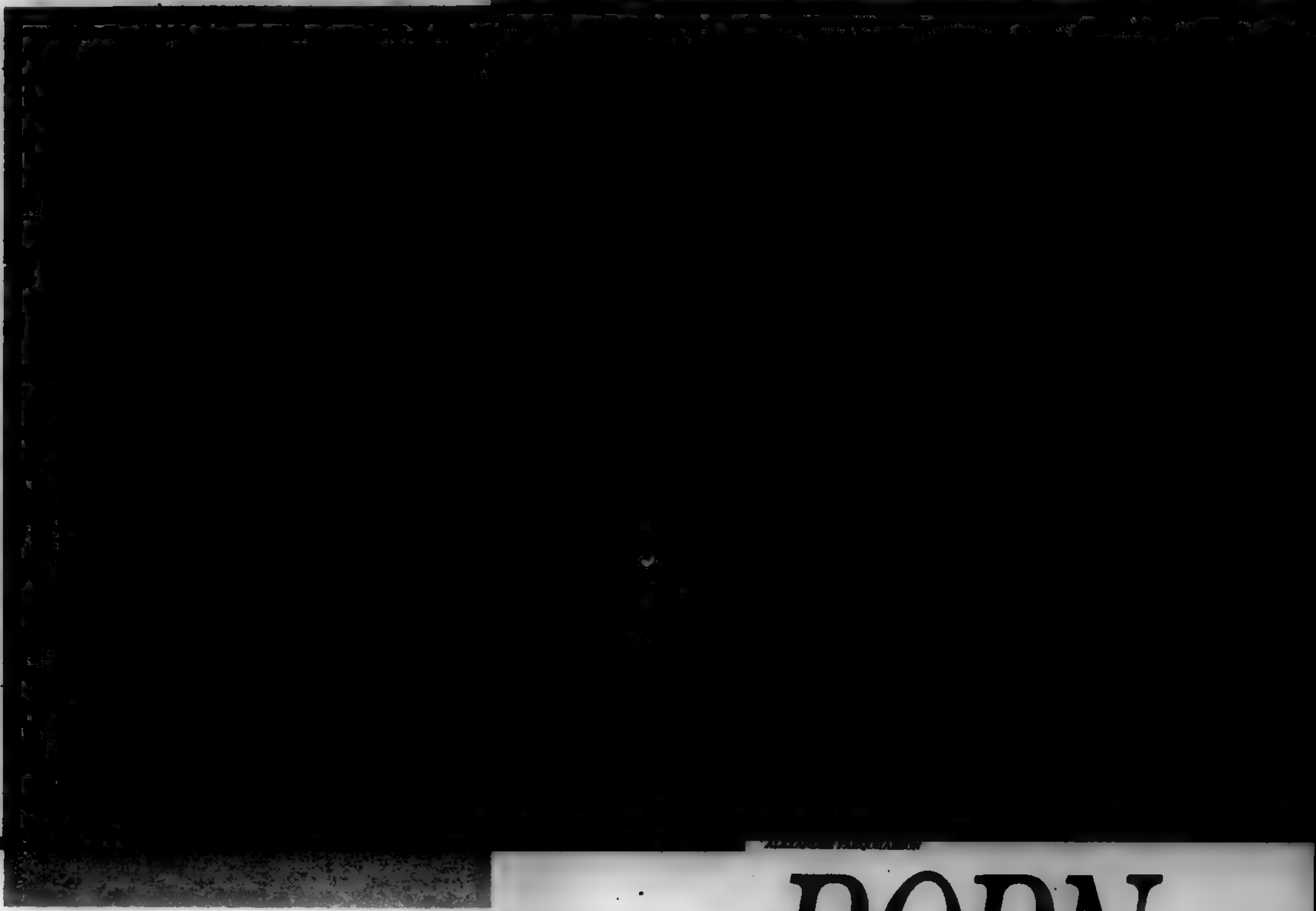

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BORN AGAIN

By James Connolly

The title is manager, as in business executive, administrator or director. Telecom is just that manager's specialty.

Certainly, the telecommunications manager of 1985 needs experience with — and an understanding of — communications. But the successful telecommunications manager will be one who optimizes management skills such as analysis, planning, human relations, marketing and accounting — not the one who sells an ability to reroute a private line.

"This isn't the techie manager anymore," observed Gary R. King, manager of telecommunications for Gillette Co. in Boston. King, other telecommunications managers and consultants spoke of how the role and the makeup of the telecommunications manager are changing in American business.

They spoke of the demands that the breakup of AT&T, the integration of voice and data communications, the emergence of new equipment and service vendors, a population explosion of personal computers and technical breakthroughs have placed on the telecommunications manager.

"In general, the telecommunications manager of the future is going to be a very new type of animal, a very different

Continued on page 86

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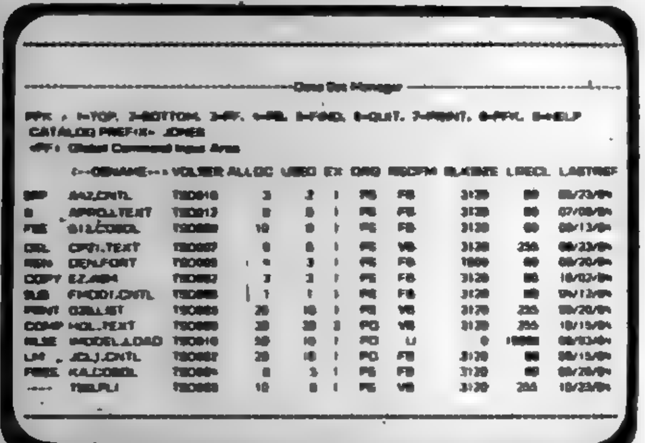

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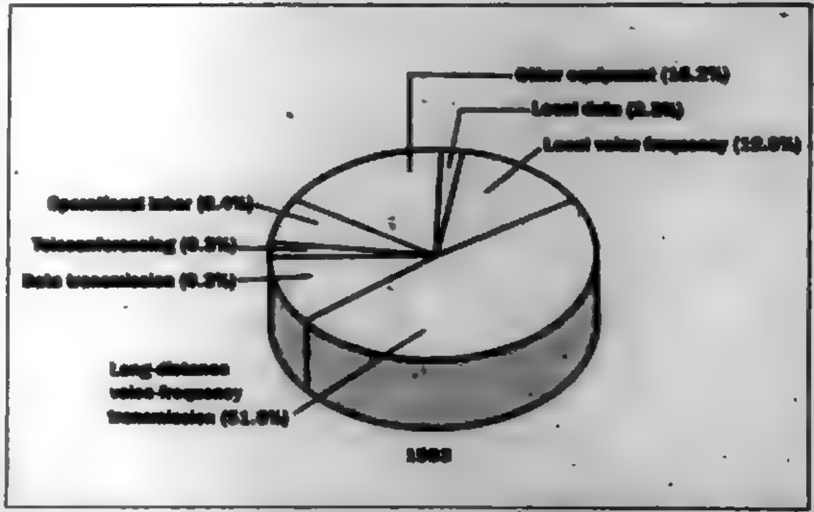

NETWORK EQUIPMENT TECHNOLOGIES CHART

Long-distance voice communications costs still eat up the largest portion (51.6%) of a telecommunications manager's budget, according to a survey of 200 large organizations.

Continued from page 85

person. The [focus] is shifting to a definite business manager emphasis. That should be complemented by a fair amount of technical expertise but at the conceptual level rather than at the bits and bytes level," King noted.

While many organizations do not have someone carrying the title of telecommunications manager, many do have an executive who fits into that general role — a person responsible for buying private branch exchanges and protocol converters, coordinating a nationwide network of private lines, planning for corporate headquarter local-area networks and cutting communications costs.

That person must be able to judge new technology and assess the risks and benefits for a multinational corporation.

That person may have climbed the ladder in telephony or MIS or may have come from the administrative side of the corporate structure.

The titles may vary, but the essential assignment remains the same — to let the terminal access the mainframe, the mainframe talk to the micro and the boss' telephone in Dallas reach out to touch the district manager in Coeur d'Alene, France.

"What I see as really helpful are basic administrative, management skills with experience in design and system analysis and a good mathematical facility. A good number of things that we are doing depend on analysis and statistics. A degree in electrical engineering would be helpful, but I know very few people who have that," said Seth Lewis, project manager for voice communications at Home Insurance Co. of New York.

"There is much more involvement in the data network as it becomes more widespread and more sophisticated. It used to be that if someone wanted a line from New York to Los Angeles, you just called to order it, and a few weeks later it was in. You can't do that any more. Since the AT&T breakup, it isn't that simple. The transmission vendors have proliferated extremely rapidly in the last year or two, and it is tough to keep up-to-date with the tariffs and with what you can or can't do," Lewis added. Lewis' responsibilities include coordinating headquarters voice communications, as well as purchasing and planning field office communications equipment and purchasing data communications equipment for headquarters.

Personal computers mean increasing demand for ports to mainframes and for the ability to communicate with other personal computers, said Frank Haddon, a senior engineer for Southern California Transit in Los Angeles.

"I think everyone is aware that there is a continuing acceleration of the business. Things are happening at a faster rate. I don't see any easing of that, at least not completely, for 10 to 15 years downstream when the technology might start to level off," Haddon said.

"Telecommunications is coming out of the closet," King added. "It is no longer going to be a cost center and an expense to be put up with. In some companies, it is even going to be a strategic asset."

Running a communications department now calls for a proactive approach, observed Chuck Hlavac, telecommunications manager for Crowley Maritime Corp. of San Francisco.

"At some large companies, they have 19 or 20 people doing nothing but planning. They are looking three years ahead. In the past, it was always a reactive situation. You want to be able to get a handle on things so you can control them," Hlavac said. He said that he hopes his planning can save $250,000 in a department with a $4 million budget.

King added, "The next three to five years essentially will be an era of opportunity for the telecommunications managers to make their mark, and I think that those who work for corporations that use telecommunications as an asset will be integrated into the decision-making process and will contribute to the businesses' strategic planning."

But that type of manager may be hard for a company to find, which translates to a comfortable financial position for those who qualify.

Managers and consultants estimated that a telecommunications manager's salary ranges from $40,000 to $100,000, depending on the size and location of the company and its degree of reliance on telecommunications. A Fortune 500 firm that is heavily dependent on communications and located in a costly city such as New York would pay the highest.

There also is room for career growth.

"I think you will see the telecommunications manager moving up the ladder in organizations very consistently now. You will see them having

Continued on page 90

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Self-education a job for communications managers

Vendors, trade journals and seminars are the key means for telecommunications managers to learn about and to stay on top of what is happening in their field.

But each of those sources provides only one more bit of information that goes into the decision-making process when a telecommunications manager is shopping for a product or setting a policy. The information process is largely one of self-education, according to telecommunications managers.

"I was out of data communications for several years, so it was a problem for me when I took this job. You lose track of things. I was forced to grow, to learn more in the data communications area," said Chuck Hlavac, telecommunications manager for Crowley Maritime Corp. in San Francisco.

Hlavac noted that IBM's Systems Network Architecture/Synchronous Data Link Control protocol and AT&T's Digital Data Service had largely developed during the seven years he worked on voice communications for another company. Hlavac recently invited a data communications specialist to address a class that he teaches in Golden Gate University's graduate telecommunications program. "I sat in the back of the room and learned in my own class," he said.

Several managers noted that vendor sales representatives are helpful not only in promoting their own products but in helping managers understand concepts and communications issues.

They also said they and their staffs attend career training seminars, which may be held in their own facilities for a group of employees or at conference centers with staff members from a dozen or more companies in attendence.

One consultant who teaches communications seminars to people entering the field from both the telephony and DP ends of the business said his biggest challenge is making traditional DP workers understand that communications is bringing DP out of the computer room.

"We have to get them thinking in terms of a network, the communications cloud out there, instead of a box," said Ben Chillemi, of Zatyko Associates in Tustin, Calif., which runs seminars for Data-Tech Institute of Nutley, N.J.

Meanwhile, several managers said graduate school-level training is missing, with few colleges offering degrees in telecommunications.

"I'm amazed that the universities seem to have almost totally neglected telecommunications as a field. I think it may be because they see it as too application-specific," said Frank Haddon, senior engineer for Southern California Rapid Transit.

Hlavac noted that even the existing programs, such as those at Golden Gate, New York University, the University of Colorado and George Washington University, tend to approach the field from different angles. He said some schools may take engineering-oriented tracks and others management tracks. Those different approaches lead to sharp inconsistencies in how much potential managers know about the varied aspects of telecommunications.

No consensus on favoring voice vs. data

Who gets ahead in telecommunications? The voice specialist? The data specialist? Neither?

There was no consensus among telecommunications managers and consultants interviewed by *Computerworld*, but all agreed that the telecommunications manager of the future will approach the information exchange process as a single entity — not as voice or data communications — and will think in terms of what is best for the organization, not a single department.

"The guy who was a programmer and is now the MIS manager, just trying to hold his bits and bytes together — he's in trouble," said Ben Chillemi, a Tustin, Calif., consultant. "From the seminars I teach, the guys who have a voice background have a clearer picture of how information is moving around out there."

Stephen J.L. Page, president of Page-Wheatcroft & Co. Ltd., an executive search firm in Dallas, said technicians from both sides will lose out if they do not concentrate on the job's management aspects.

Seth Lewis, project manager for voice communications at Home Insurance Co. of New York, concurred. "Neither has the advantage. If someone has totally stuck to the voice side or the data side, they run the danger of being too limited. The edge goes to the person who has some knowledge of the other side as well. If you had to choose between just those two, then it would be a toss-up on their management skills," Lewis said.

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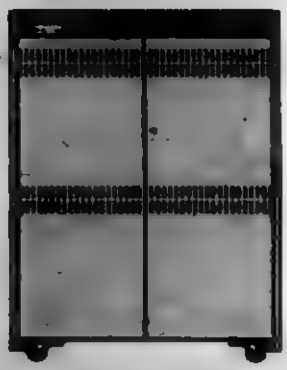
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Price war looms on telecommunications horizon

No major technical breakthroughs are likely in communications during 1985, but watch for a long-distance price war.

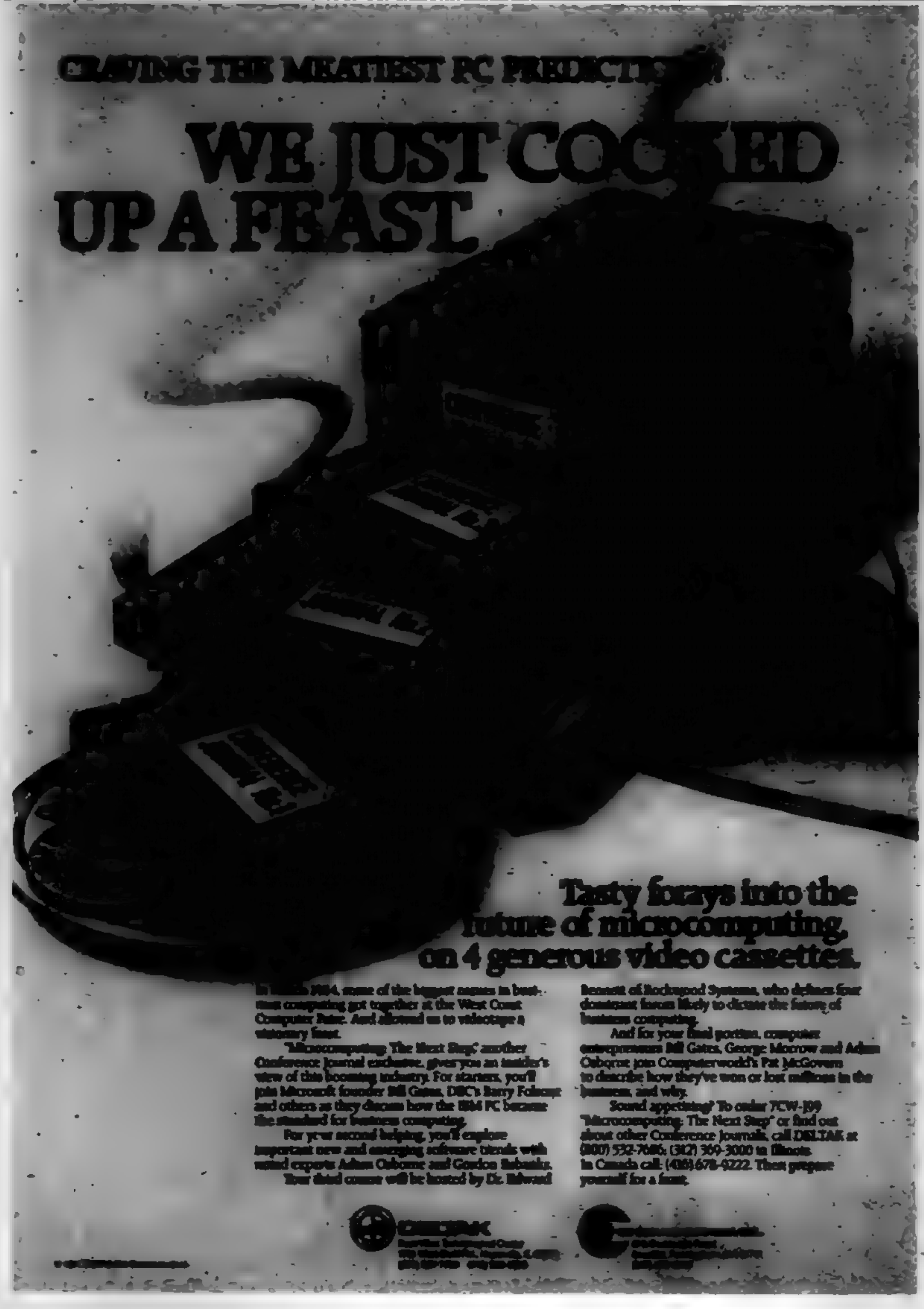
That warning came from one of several telecommunications managers and consultants asked for their thoughts on what will happen and what they would like to see happen in the coming year. "In 1985, we will see a long-distance price war really get rolling. AT&T will use predatory pricing as much as it can get away with. I suggest that telecommunications managers keep their powder dry, keep their commitments short-term and exploit the price wars," said one observer, who asked to remain anonymous.

Frank Haddon, senior engineer for Southern California Rapid Transit in Los Angeles, noted, "A magic lantern would help. I don't know of a single thing that would make life that much easier. Protocol conversion is a headache at this time, but I know that five years from now we will have black boxes that will take care of it for us."

Gary King, manager of telecommunications for the Gillette Co. in Boston added, "I want true compatibility among workstations, networks, nodes and all devices. They just aren't as compatible as the vendors promise. I think that would be the single most important thing in helping me to do my job. I also believe that that is unattainable. The major vendors will avoid it. It's just not in their best interest."

King predicted that in 1985 more vendors will keep some of the promises that they have made in recent years about their products' capabilities and said that he hopes the Federal Communications Commission will establish a policy on local bypass. Chuck Hlavac, telecommunications manager for Crowley Maritime Corp. of San Francisco, said he hopes more companies confide in their telecommunications managers when making major corporate decisions.

He noted that a company planning an expansion or relocation should remember that a private branch exchange installation or other major project takes many months of planning and site work and that the telecommunications manager not only needs warning of a move but can help to make the corporate decision.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Continued from page 86

peer status with the traditional data processing executive, and it won't be unusual to see them reporting to the senior vice-president for operations, two steps below the president," said telecommunications consultant Dixon Doll, president of the DMW Group, Inc. in Ann Arbor, Mich.

Doll said the rewards for making communications an asset could include a promotion to officer of the company and a salary in the $125,000 to $150,000 range.

Telecommunications manager profile

Stephen J.L. Page, president of the Dallas executive search firm Page-Wheatcroft & Co., specializes in finding telecommunications personnel. "Corporate America and the Fortune 1,000 companies are going to be demanding more and more sophistication from their telecommunications managers," he said. "We are seeing a greater trend toward lumping all of the functions relating to office automation into telephone and data communications and integrating them under one corporate manager. These are real [profit-and-loss] managers, and they are going to have to be business people first," Page said.

Page painted the profile of a telecommunications manager as a person in his late 30s or early 40s with a knack for managing a business unit and the ability to develop a peripheral technical knowledge during about 15 years of pragmatic experience. The person may be a "techie" but must show other business management skills.

"There will be a shortfall of talent for years to come because the technology is changing so rapidly. [Telecommunications managers] have a rosy, dynamic future. The operational savings they can identify by having a well-run communications department can make them very valuable," Page said.

Page said the telecommunications manager can rise to executive vice-president on the strength of an overall knowledge of how the company operates.

Doll, however, warned that telecommunications managers are in danger of being barred from the president's office because they do their jobs too well. He said that once they establish themselves in communications, they may be too hard to replace and too valuable to move laterally into the financial or administrative positions where they need to acquire experience in order to qualify for the top corporate job.

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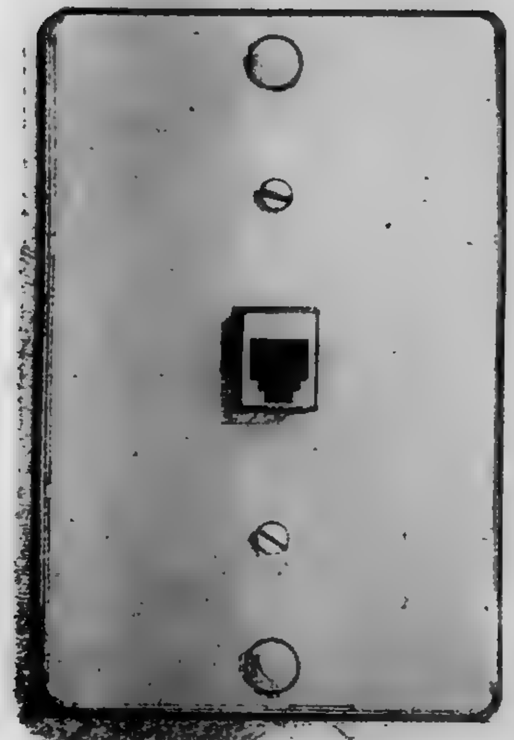

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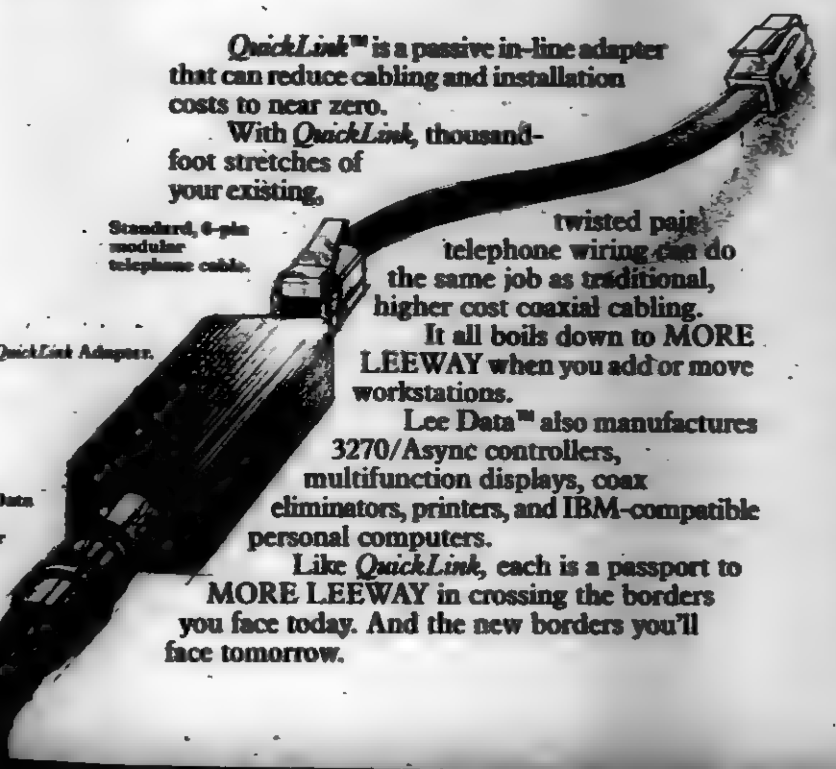

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WHAT'S HOT

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WHAT'S NOT

By Charles Babcock

In an age when breakthroughs in microcircuitry technology are taken for granted, MIS managers are spending little time worrying about hardware and instead want to know where to find good people or how to set up their own communications systems.

They know processing power will be there when they need it, and chances are, the cost per millions of instructions per second will be less than it was the last time around. So they are talking instead about how to treat their users' "on-line fever" with better micro-to-mainframe connections.

Fourth-generation languages are hot as a watercooler discussion topic, but when it comes to embracing one — a move that threatens upheaval of one kind or another — the conversation cools.

AT&T's Unix operating system doesn't particularly interest MIS managers. Sooner or later, it will probably appear somewhere in their operations, "but we'll wait and see what happens to Unix in the marketplace," said one

New York investment house MIS director.

Even if Unix is hot in some quarters, relational data base management systems, despite their great flexibility, are not. MIS departments have a heavy investment in their existing data base management systems (DBMS); the relational models are too time-consuming for shops that are involved in daily data collection and information flow.

But without a doubt, the single most important topic to MIS departments is the growing role of microcomputers and the resulting demands on the departments.

"Our hot button right now is promoting end-user computing," said Michael Luciuk, manager of systems and service for Exxon Corp. headquarters in New York.

Micros 'proliferating like rabbits'

"Microcomputers are proliferating like rabbits," said a vice-president for MIS at a New York securities firm.

"We're training over 100 people a month. It's just booming," said a project manager at a Princeton, N.J., firm's information center.

Microcomputers are tied to another pressing topic at many firms — strategic planning. By examining changes in their customer base, analyzing sales data and simulating potential products, banks, brokerage firms and other information-rich businesses can gain a competitive edge.

Another hot topic is the pursuit of people proficient at short-distance data communications or long-distance telecommunications.

With all the demands from microcomputer users for data, MIS managers are having to make the mainframe-to-micro connection and do it in a way that doesn't allow a breach of security. The people in short supply include experts in communications protocols and telephone systems, said John J. Davis, president of Worldwide Computer Services, Inc. in Wayne, N.J., a firm that places temporary engineers and programmers at AT&T and other companies.

Economic recovery drains labor pool

The economic recovery has soaked up the available supply just as many new communications jobs have been created by AT&T's breakup. Exxon's headquarters are in Manhattan, N.Y., but its information systems center is in Florham Park, N.J. It is setting up its own microwave telecommunications link, a task that in the past would have been handled by AT&T.

"You can take on as much of this responsibility as you want today," Exxon's Luciuk said.

Another shortage of people exists at the systems programmer level.

"There are few good people out there with experience, and you have to pay top dollar to get them. They can practically name their own salary," said Frederick W. Kern, vice-president of information processing at the insurance brokerage firm of Marsh & McLennan, Inc. in New York.

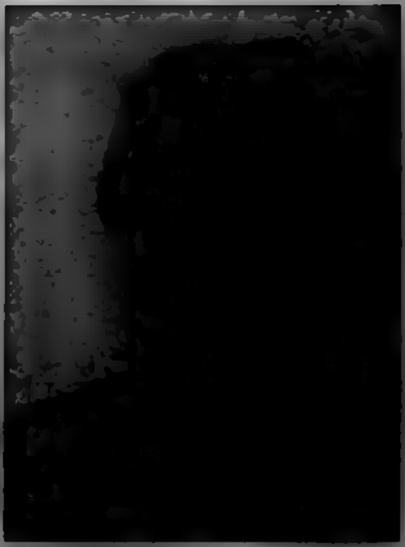
"The demand is greater than the supply and it appears to be growing," Davis said. Even doubling Worldwide's finder's fee to $2,000 hasn't helped, he said.

Fourth-generation languages are being embraced eagerly at a few MIS

Continued on page 96

Richard Sherlund

John J. Davis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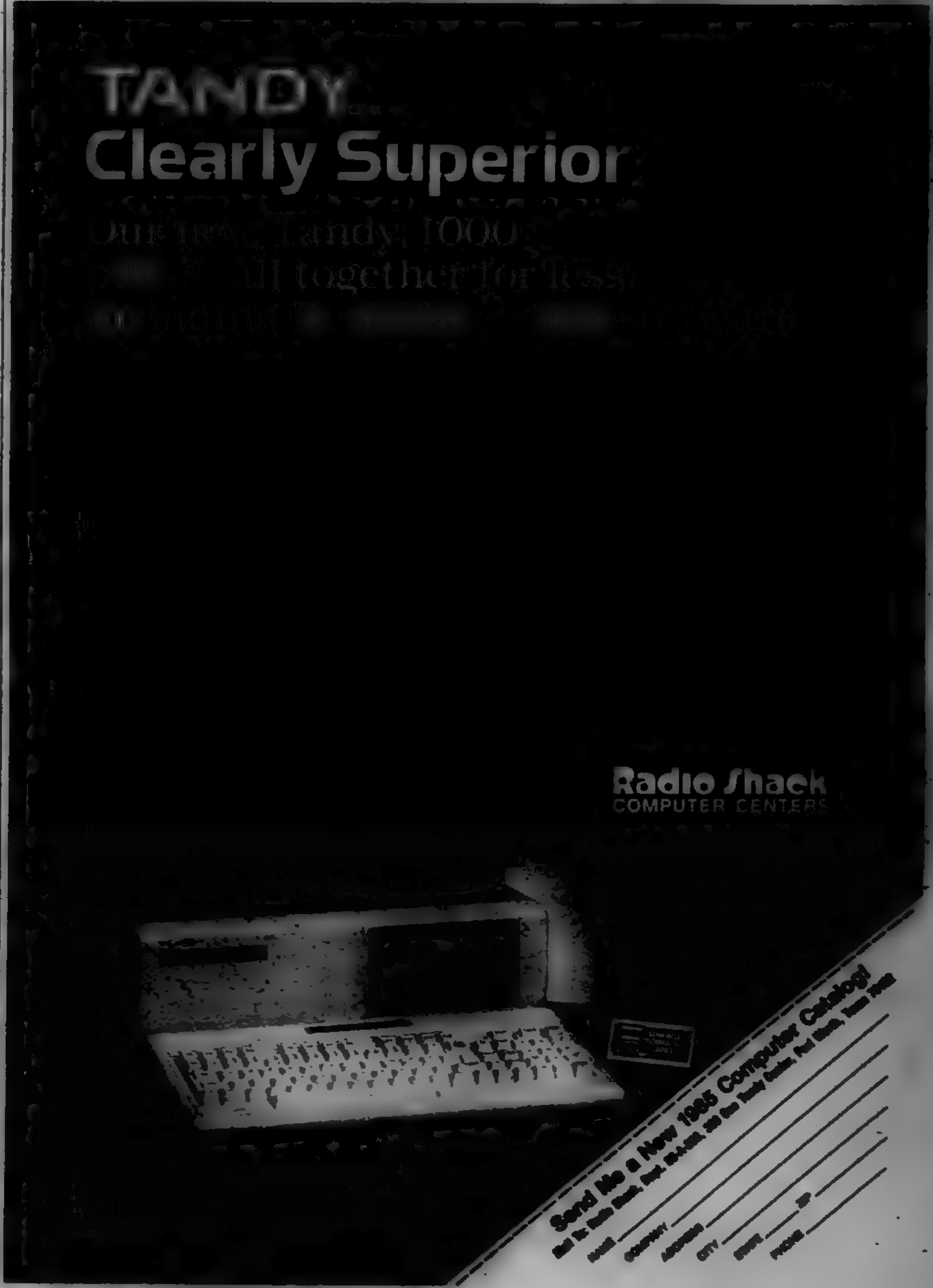
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Robert W. Woodrow

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shops, but for the most part, the harried MIS manager, with too many demands already on his agenda, wants nothing to do with them. The two phenomena are closely related, industry observers say.

To adopt a fourth-generation language, an MIS manager must find one that fits his needs, retrain programmers to use it and then begin to convert Cobol programs to it. Given a backlog of applications requests, he rarely feels he's got the time to make the switch.

But fourth-generation languages offer one of the few hopes of reducing the applications logjam, industry observers say.

"If people insist on using Cobol, we will continue to have a two-year applications backlog," said Richard K. Sherlund, software analyst at Goldman Sachs & Co. in New York.

A recent Sherlund research report included a James Martin chart showing people costs had outstripped hardware costs in the [illegible].

Adopting fourth-generation languages would permit "a new mind-set," noted David Dell, director of the Diebold Group Research Services. "We don't have to build software to last forever in order for it to have value. We might want to design software to make it easy to adapt and reuse," he said.

Nevertheless, most MIS directors remain unenthusiastic. They say fourth-generation languages are well-suited for end users, who will need less assistance from the MIS department if they have an easy-to-understand syntax.

"End-user computing is more into fourth-generation languages than we are," one MIS director said.

Among end users, the integrated software packages, such as Lotus Development Corp.'s Symphony and Ashton-Tate's Framework, which were hot topics a year ago, are barely warm now. They are "a bit like the Swiss Army knife," Goldman Sachs' Sherlund said. "They combine so many functions that they don't have the utility of a stand-alone."

Meanwhile, Lotus' 1-2-3 still warms the hearts of users; it is outselling Symphony three to one. They like its simplicity compared with the integrated packages, Sherlund said.

In the realm of prediction, several observers said they expect Cmos chip technology to play a more important role in 1985 and beyond. Complementary metal oxide silicon is slower switching than bipolar chips, but it uses less power and has a greater concentration of transistors.

"IBM will come out with Cmos technology in some product in 1985, probably somewhere in their 30 series lineup," predicted Frederic H. Cohen, an analyst with L. F. Rothchild, Unterberg, Towbin in New York.

Many MIS directors are intrigued by the prospect that an optical storage system will soon concentrate their tape libraries onto a few disks. In places like Manhattan, that could be a significant square-footage gain. The one manufacturer prepared to bring out a product, however, Storage Technology Corp., has filed for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act.

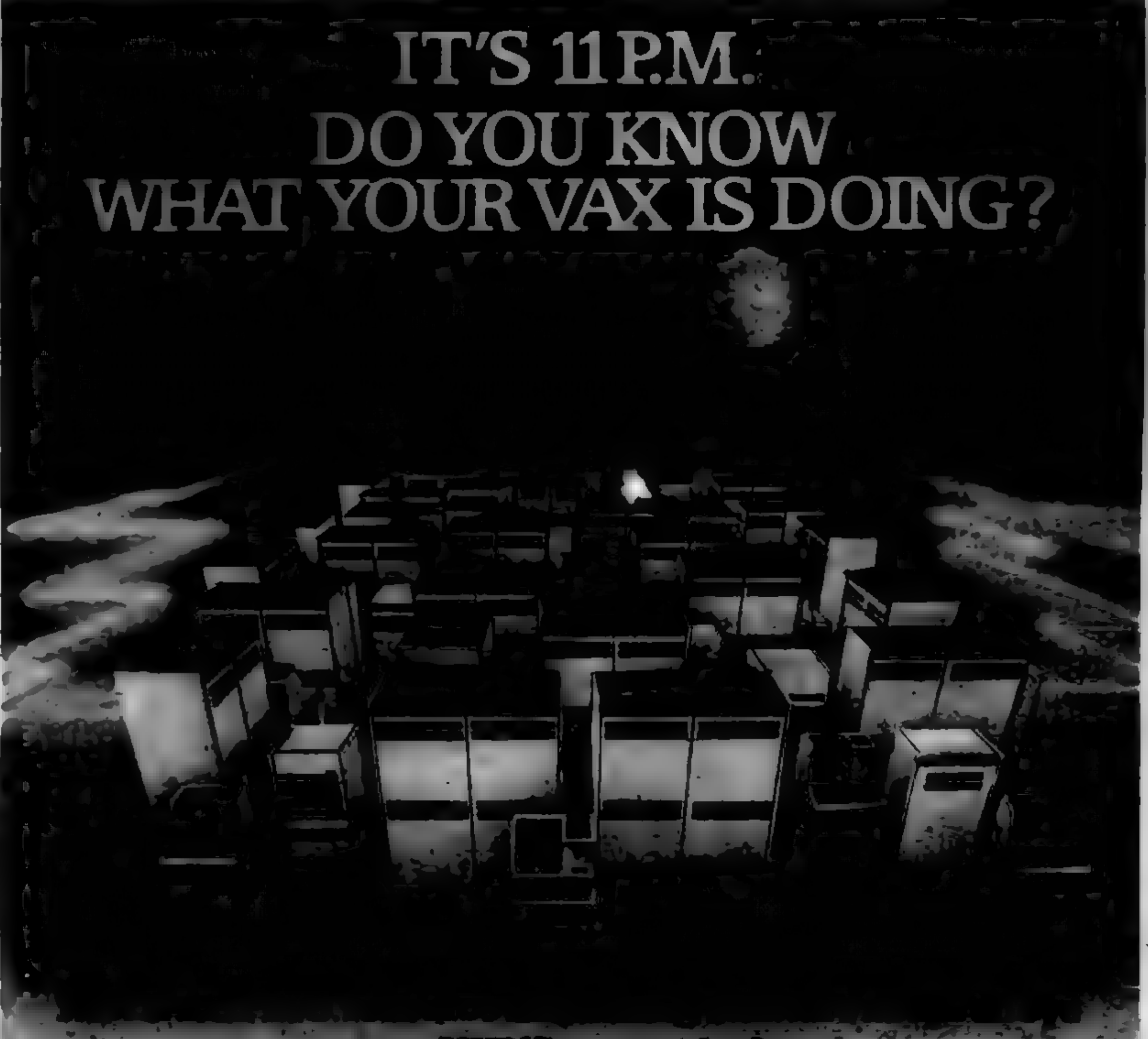
The Louisville, Colo., tape and disk drive manufacturer has designed a 4G-byte, 14-in., write-once videodisk with a 3380-style controller. "It was the only end-user system that we had any hope of [seeing] offered as a product," noted James N. Porter, president of Disk/Trend, a market research firm in Los Altos, Calif. (Japanese manufacturers are offering optical storage drives — both erasable and read- or write-only units — to OEMs.)

'Still too much paper'

A product that MIS managers would like to see brought to market in 1985 is a multifunctional workstation that combines computing with communications and allows a mainframe-to-desktop link. "I would like to see word processing, electronic mail, voice mail, spreadsheet, windowing and standard calculating capability in one unit," said Robert W. Woodrow, senior vice-president at Bank Leumi Trust Co. of New York.

The MIS managers in the securities industry wonder why no one has designed a software package that allows a stockbroker to perform all his functions on a desktop unit. Such a personal computer system would preferably be lightweight and portable, so brokers could demonstrate financial calculating at clients' offices, said Stephen S. Boguszewicz, systems vice-president, data, at the Pershing Division of Donaldson Lufkin & Jenrette, Inc. in New York.

Although few MIS managers contemplate buying one, they are keeping an eye on the race to build supercomputers. The Japanese are making great strides in this area, but Cray Research, Inc. of Minneapolis will maintain its lead, they say. Cray has said it will launch the Cray 2 early in 1985 and begin work on the Cray 3.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AROUND THE WORLD IN 16K

By Susan Blakeney

What has grown 20 times in size since 1980?

Q: What country is devouring low-end technology faster than any other?

Q: What were the names of four 1984 fiscal casualties of the roller-coaster microcomputer industry?

Q: What key issues will concern the corporate personal computer user in 1985?

A: The personal computer industry.

A: The Netherlands.

A: Franklin Computer Corp.; Victor Technologies, Inc.; Gavilan Computer Corp.; Otrona Corp.

A: Networking, communications capabilities, compatibility, security.

In light of its explosive growth and monstrous sales potential, vendors hardly consider the international personal computer marketplace a trivial pursuit.

At the same time, users around the world are often left guessing over a myriad of choices, compatibility snafus and operating system decisions. The game is complicated further by the relatively recent entries of IBM, AT&T and ITT, which have made their presences felt like that of King Kong at a cricket match.

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Because most microprocessor-based technology is born in the U.S., international users have traditionally been shackled with more problems than their American counterparts. Obstacles include strict import restrictions, such as those in Mexico and Eastern Europe; heavy tariffs like those in India and the Middle East; home market reservation policies, such as in Brazil; high shipping costs; long-distance support; and language barriers. The personal computer has not invaded foreign offices as deftly as it took American offices, and the foreign marketplace is just lifting off now.

A recent survey *Computerworld* conducted, along with research compiled by International Data Corp. (IDC) of Framingham, Mass., and the Paris-based Intelligent Electronics research firm, all indicate that a voracious vendor community is spurring an eager market, which in turn, is displacing user resistance.

IDC predicted that "the personal computer has the capability to become as important to most individuals as the calculator. This implies that an individual may own more than one [personal computer], and in fact, is quite likely to." Judging from market forecasts, this appears to be a valid claim.

In the Netherlands, for example, the personal computer market is expected to grow by a staggering annual rate of more than 50% in the coming years, which will result in an installed user base of 250,000 micro units by 1989. In Spain, the market is anticipated to expand by 50% in 1985. In Australia, surveys indicate the market is projected to increase by 30% in 1985.

Not only is this exciting for vendors all over the world, but also great news for users, according to the collective research. More than ever before, users can look forward to high availability of systems in their respective countries. They can also expect prices to stabilise or fall as competition grows increasingly ferocious over their personal computer dollars. Likewise, they can count on vendors trying value-added services such as training, installation, special software and so on to sway their purchasing decisions.

Suppliers also appear to be paying more attention to foreign users' individual needs, and studies reveal this emerging trend will gain momentum during 1985 as vendors vie to stay in the microcomputer race. Vendors will distinguish themselves by offering their customers the networking and communications capabilities they've been begging for. In other words, personal computer users can look forward to more responsive vendors. But currently, micro users abroad bear a striking resemblance to users in this country a couple of years ago.

Most countries import almost all of the hardware and about 95% of the software. The most popular applications packages overseas include Lotus Development Corp.'s 1-2-3 and Symphony; Software Arts, Inc.'s Visicalc; Micropro International Corp.'s. Wordstar; Ashton Tate's Dbase II and Framework; and Microsoft Corp.'s Multiplan. The remaining 5% of the software is locally produced. This category includes special tax preparation packages to meet individual country requirements and other customized applications, according to the surveys.

At the same time, in Spain and in several other smaller countries, according to the *Computerworld* survey, "professional applications are often carried out with models sometimes considered to be toys in the U.S. . . . such as with the Commodore 64 and the [Apple Computer, Inc.] IIe. This is partly because microcomputers cost almost twice as much in Spain as in the U.S."

The IDC survey also revealed, "The sharing of corporate personal computers will increase, especially as multitasking operating systems continue to remain a fairly small percentage of the market. [Personal Computers] are used primarily for one or possibly two tasks, and the [Personal Computer] is generally used less than eight hours per week. [Therefore], a single system can satisfy the demand of multiple potential customers. This will be a short-term phenomenon."

As in the U.S., purchase decisions for microcomputers are being handled for the most part by data processing managers in large foreign corporations. This is especially true if the user wishes the personal computer to communicate with the corporate mainframe. In small- and medium-size companies, executives and managers often make up their own minds on what to buy and sometimes look to a local consultant or expert for advice.

Unlike in the U.S., the concept of the corporate information center has not caught on very well overseas. Everyone surveyed on this subject tentatively reported that in their country, there were only a few full-grown information centers. At the same time, the research from Europe indicated that "there is a lot of talk going on on this subject."

In several countries, time-sharing services were viewed as a more cost-effective processing solution. In general, though, the research concluded that more than 90% of all personal computers abroad are used in stand-alone environments.

Intelligent Electronics' research revealed, "In the UK, 30% of companies surveyed have connected at least one of their [personal computers] to a data base. A similar percentage is observed in West Germany, although a much larger proportion of these connections are to internal data bases rather than outside. France is very retarded in this field, with only 9% of the companies having data base connections."

Continued on page 99

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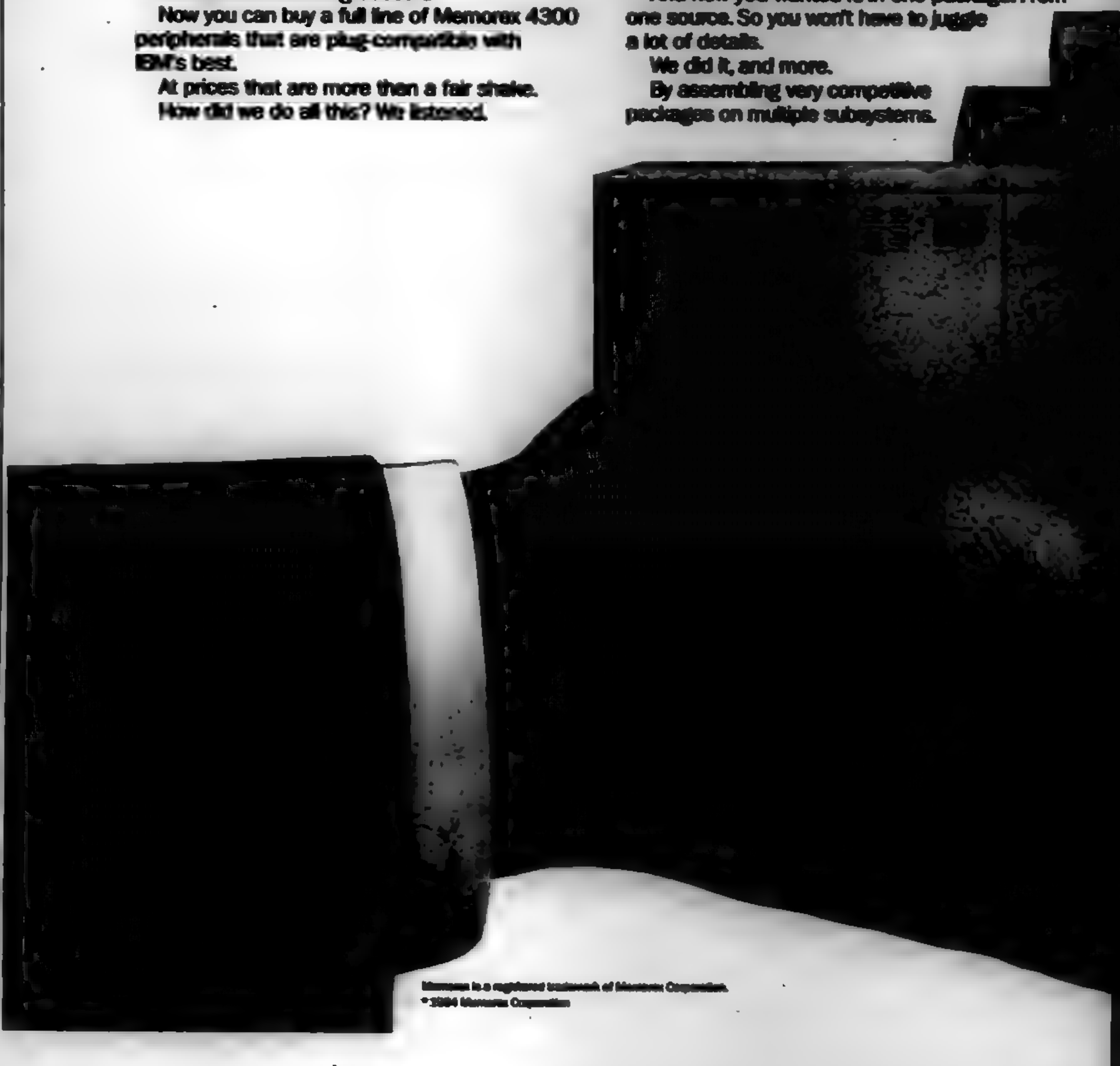

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European micro sales put Osborne back into the black

One of the most colorful stories in recent microcomputer history is the saga of Osborne Computer Corp., which sank to financial depths, filing under Chapter 11 of the Federal Bankruptcy Act in 1983, but, largely on the coattails of its international sales, rose from the near-dead this year.

Dave Miller, vice-president of sales and marketing, explained how Europe carried the American computer manufacturer out of the red and back into the black: "There were a lot of facets to the recovery, but the cornerstone to our revival was our ability to rely on the strength of our international distribution," Miller said. "In 1984, for example, 80% of our sales were international."

While things were going sour at home, Osborne's international customers remained buffered from the bad news, Miller claimed. "The international dealers remained loyal to Osborne and masked the company's financial problems. And there were financial problems — there was never anything wrong with the product.

"Anyway, dealers stayed with Osborne because they had faith in us. This is partially due to the fact that, unlike U.S. dealers, they can't change product lines quickly. They invest a lot of time and money and people to develop a product line and then stake their reputation behind it. Their reputations are extremely important to maintain."

INTERNATIONAL PERSONAL COMPUTER FORECAST

Year	Shipped	Installed base
1981	108,000	321,000
1982	282,000	603,000
1983	681,000	1,284,000
1984	960,000	2,244,000
1985	1,344,000	3,588,000
1986	1,882,000	5,470,000
1987	2,578,000	8,048,000
1988	3,378,000	11,426,000
1989	4,357,000	15,783,000

Figures courtesy of International Data Corp.'s "Personal Computer Market 1984."

CW Chart

"In Norway, for example, we are the No. 1 microcomputer vendor. This is because users can get an Osborne with a Norwegian keyboard, a Norwegian character set, Norwegian documentation and Norwegian software. Furthermore, there are not very many domestic personal computer makers in Norway — and certainly none in our price range," he noted.

Miller said the bulk of Osborne's customers overseas are small businessmen who use a single system or sometimes clusters of microcomputers to run their businesses. "The typical users will buy one system for the office, and everybody will share it."

But just what does the future hold for the personal computer user? According to Miller, good things.

"I think we may be entering a new era in which computer suppliers are going to attempt to get very close to users and their needs. The major vehicle is user group activity," Miller theorized.

Security a pressing issue

As for new products to expect, Miller said, "It's obvious that users will see a lot more communications-intensive products . . . and I think security — access availability and data integrity — is among the most pressing issues right now being addressed by communications people. Expect new and exciting breakthroughs in that area."

On the industry in general Miller said, "The world will not be dominated by — at least not the micro industry — a giant or two. New companies such as Osborne will work together to succeed.

"You do not have to become a giant to bring new and innovative products to the market. . . . That is what users can also be happy about. Traditionally it's been the small companies that have brought new things to the world, and I believe that trend will continue . . . more so in the microcomputer industry than anywhere else."

Continued from page 98

All parties surveyed unanimously agreed that IBM's market penetration with its personal computer product line has not met with the vendor's own great expectations. The IBM PCjr has not even made an appearance in most foreign companies surveyed and is not expected to in many countries.

IBM's share of the world micro market during 1983, in the business and professional sector, hovered slightly above 25%, trailed by Apple Computer, Inc., Tandy Corp. and Osborne Computer Corp. In the European countries, where IBM has yet to win a significant professional user base, many respondents ascribed to the belief that IBM will eventually dominate.

The main conclusion, in fact, of the Intelligent Electronics research was that IBM Personal Computer users all over the world enjoy "a high level of satisfaction" with IBM personal computers and a "high level of confidence" with IBM as a company. They believe that IBM can best serve their immediate needs "in terms of product quality and responsiveness" as well as their future needs "in terms of evolution of their companies and their subsequent computer requirements."

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DESTINATION UNKNOWN

By Bryan Wilkins

Like the U.N., the world of office automation and data processing users wants to believe that the vendors and companies supplying them are making efforts to make interconnection an easy thing. While most vendors claim to support the International Standards Organization's (ISO) seven-layered Open Systems Reference model for communication between dissimilar devices, the reality of the situation is far from peaceful.

At a Dallas conference earlier this year, a plea from a user, a DP supervisor at a petroleum company, affirmed the confusion users face when trying to link systems where there is no compatibility.

Addressing a panel of vendors at Intech '84, which includ-

Continued on page 102

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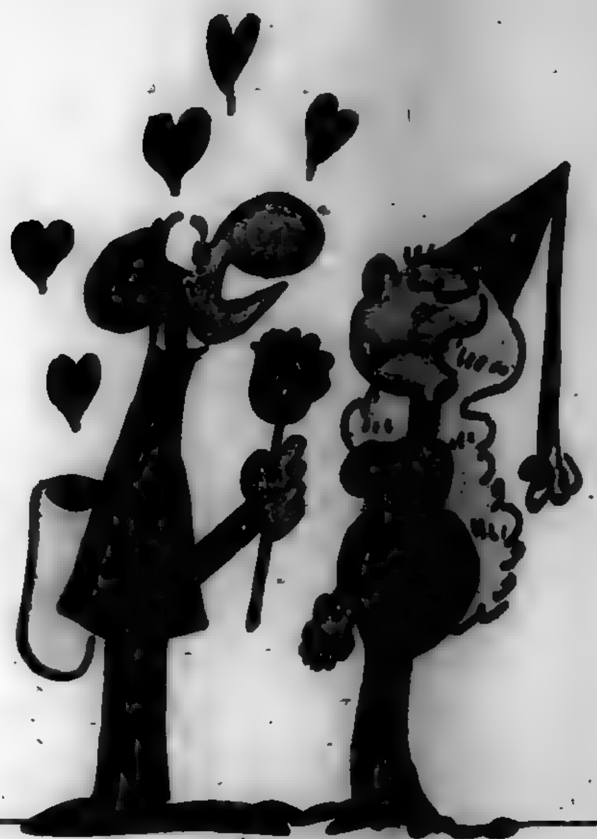

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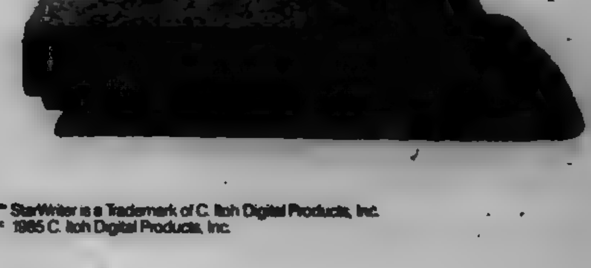

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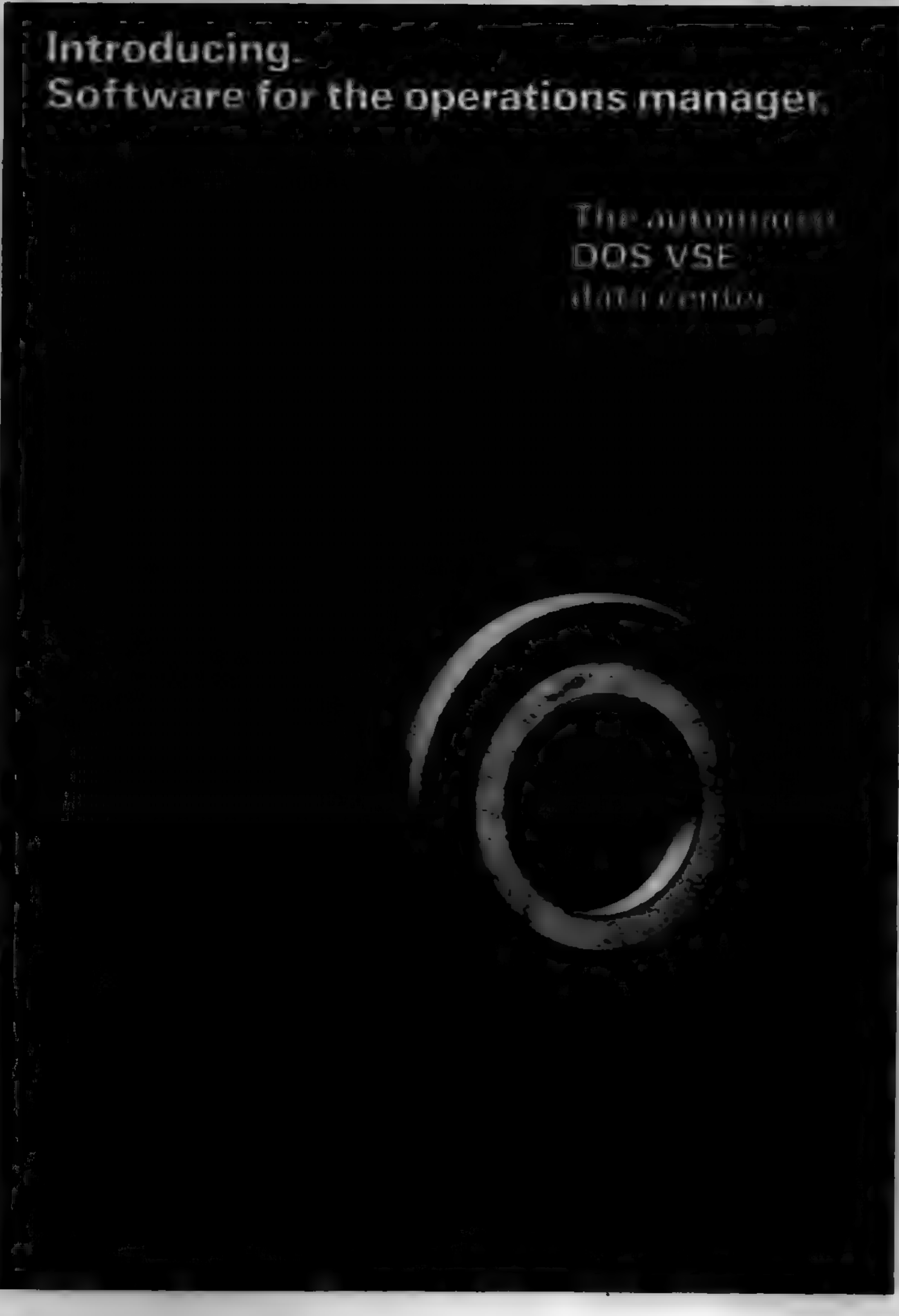
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Continued from page 100

ed Joseph Deblasio, IBM's director of standards, Romeo Matta, a Phillips Petroleum Corp. control supervisor said, "You are asking us to jump on a train you built, run to the front and guide it for you, and we don't even know where you are going."

Other vendor members of the panel tackled Deblasio when he voiced support for the seven-layer open systems integration (OSI) reference model for communications as adopted by the ISO.

"OSI will govern all future developments," Deblasio asserted."It is a very, very important part of [IBM's] product development efforts."

Al Malinger, director of product strategy for Datapoint Corp., challenged Deblasio's statement, citing IBM's release this year of a link product for the Personal Computer AT that does not follow the OSI model but rather is based on coaxial cable technology.

Standards help compatibility with IBM

Deblasio said that standards such as OSI are making it easier for users who do not have IBM equipment to connect into the Big Blue environment.

The dominance of IBM in the marketplace and the unavailability of usable communications links to the IBM environment have helped solidify customers' conviction that only chaos exists when it comes to standards.

However, standards as formulated in lengthy sessions of working groups under the auspices of the American National Standards Institute (Ansi) and the IEEE, Inc., which recently completed four years of work in its 802 committee on local-area network standards, are much different from the de facto standards that the dominant computer concern — IBM — creates by its ubiquity.

Instincts, not standards, followed

Due to the bloodletting competition in micro markets, the development of micro-mainframe links also is not following standard formats but rather follows the creative instincts of software engineers and increasingly, communications companies.

Progress was made in 1984 on standards for local-area networks. The IEEE 802 committee on local-area networks and its five subcommittees have completed their work, and the draft standards are currently undergoing publication.

The 802.3 committee has completed standards work on the carrier-sense multiple access-collision detection (CSMA-CD) architectures, which reportedly have already been adopted by the U.S. government as federal information processing standards.

The 802.4 committee has completed its work on the token-passing bus architectures for local-area network communications, and the 802.5 committee has completed work on the token-passing ring architecture that has been embraced by IBM as the standard of choice for its future universal communications systems.

In the estimation of Bert Stanley, the IEEE's deputy staff director in charge of standards, the significance to the user of the publication of local-area network standards for the various technologies is this: "After four years, there will be more uniformity in the way the materials [standards] are applied. In the past, people have taken versions of the standards and interpreted them their own way. There should be less of that. Otherwise, not much else will happen outside of the broad availability of the information."

Stanley raised the prospect that, because technology is changing so fast, parts of the work already done by the 802 committees will soon have to be revised to accommodate new applications.

"There will be substantial changes in the requirements as the state of the art matures," he said, adding, "It is rare that standards remain standard."

However, the IEEE 802 standards for CSMA-CD, token bus and token ring have all been submitted to the ISO in Geneva as draft international standards.

Another area of standards promulgation that will affect users in the future concerns the publication this month by the Ansi X12 committee of a draft Business Data Interchange (BDI) standard that will cover an interindustry standard for order placement and shipment and receiving information. The Transportation Data Coordinating Committee, based in Washington, D.C., is the administrative secretary for implementation of the BDI standard.

> *'There will be substantial changes in the requirements as the state of the art matures. It is rare that standards remain standard.'*
>
> Bert Stanley, IEEE

A relatively recent addition to the standards arena is the formation, under the auspices of Ansi, of the T1 committee. This committee has as its charter the formal connectivity and interoperability of the public communications network that was necessitated by the divestiture of AT&T a year ago.

Under the chairmanship of Ian Lifchus of Bell Communications Research Corp. in Parsippany, N.J., T1 has "already exceeded by 2½ times the size of Ansi's X3 committee on information processing," according to Lifchus. The committee is working toward universal connectivity to the network.

Under T1, 25 working groups have been formed, dealing with the esoterics of protocols, maintenance issues, ordering standards and building systems.

Equal access standard a main objective

Producing an equal access standard is also a major objective of the committee, as local telephone company exchanges across the country struggle to meet a 1986 legal deadline of treating all long-distance carriers equally in their interconnections.

This work, and the growing emphasis by users on digital-based transmission systems, is accelerating consideration of so-called integrated services digital network (ISDN) standards, where voice, data, facsimile and video are all carried over the same network.

T1 is the U.S. forum for developing a position for submission to world standards bodies such as the ISO and the Consultative Committee for International Telephone and Telegraph, which sets international telecommunications standards.

In Lifchus' estimation, ISDN services, which many believe will not be ready until the 1990s, will be undergoing selected beta testing in the U.S. during 1985 and 1986.

Other concerns of the T1 committee so far have centered on low bitrate voice coding, where the traditional 64K-byte standard now used to transmit voice is being halved to 32K bytes with the power of silicon technology, so that twice the volume of voice-grade communications can be carried on existing telephone line bandwidths.

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THE MICRO SHAKEOUT

FLASH IN THE PAN

By
Kathleen Sullivan

Being in the microcomputer business is like going 55 miles an hour three feet from a cliff. If you make the wrong turn, you're bankrupt so fast you don't know what hit you. But if you make the right turn, you're on a rocket with people throwing money at you.

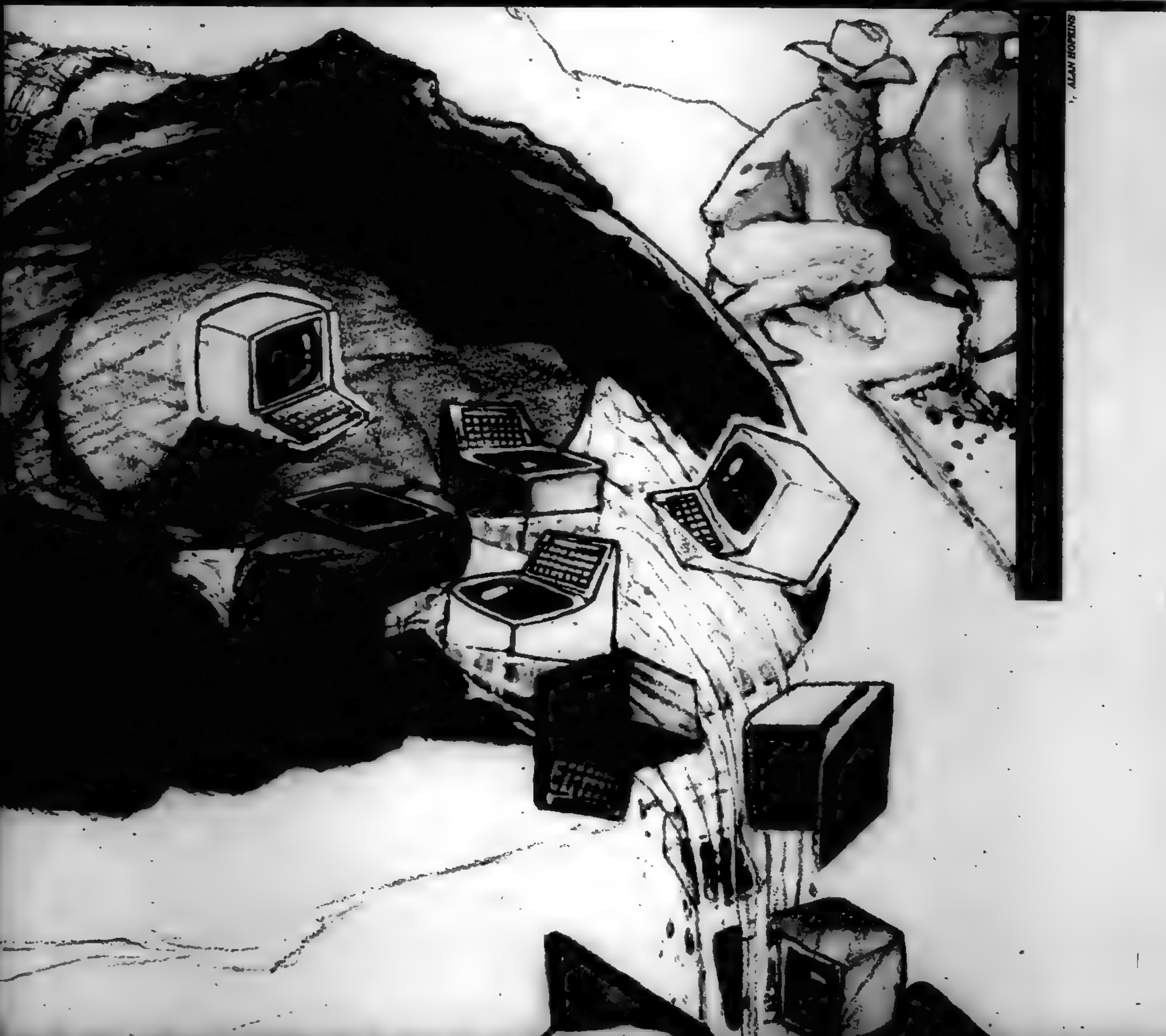
— George Morrow, chairman and founder of Morrow Design, Inc., from *Quotations From Chairman Morrow.*

By anyone's account, 1985 promises to be the most difficult year yet for personal computer companies. Analysts predict that the year will be dominated by the news of more and more microcomputer firms falling by the wayside, unable to compete in the hotly contested marketplace.

At present, 350 companies around the world produce microcomputers. When the dust clears by the end of 1986, only 75 will remain in the field, predicted Kenneth Lim, an analyst with Dataquest, Inc., a San Jose, Calif.-based market research firm. More than half that number — between 40 and 45 firms — will reside in the U.S.

When asked to explain why the bloom will fade for so many companies, analysts responded with a simple explanation: The market is too crowded. Enraptured by high rates of growth over the past two years — with gains in microcomputer sales revenues of 130% in 1983 over 1982 and 85% in 1984 compared with 1983 — start-up companies

Continued on page 106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THE MICRO SHAKEOUT

Continued from page 104

flooded the market.

But the growth rates will not be as impressive in 1985, Lim warned. He estimated that the industry's expansion rate would only be 35% over 1984's levels.

"Most companies don't have a chance," he said. "They don't have the resources to match up with the major players in the industry. They don't have the money for advertising, marketing, distributing, establishing dealer networks or penetrating niche markets."

Chris Christiansen, an analyst with the Yankee Group, a Boston-based market research company, agreed. "The real question is: Will there be a 1985 for microcomputer companies?" he said. "It's beginning to look all blue to me . . . now that IBM has decided to enter new markets and play the technology game like everybody else, instead of hanging back and waiting for others to make the market."

IBM will become even more firmly entrenched in the personal computer industry in 1985, according to most analysts. They cited the company's recent price reductions and the introduction of the Personal Computer AT, the Topview operating environment and the business software offeries as evidence of IBM's strength in the industry.

In 1985, MS-DOS compatibility will be the 'kiss of death' for personal computer firms.

Some analysts believe that IBM will change its course of action over the next several years as the market reaches a plateau. According to Christiansen, IBM will be moving away from MS-DOS and Xenix and heading toward the adoption of a proprietary operating system for its personal computers.

Instead of standardizing on operating systems, he indicated, the industry will move toward language standards, which will make it easier to move software from one system to another.

For the IBM-compatible firms, which make up about half of the companies now in business, that spells trouble. Christiansen said that in 1985, MS-DOS compatibility will be the "kiss of death" for personal computer firms.

'Hitting the moving target'

Why? In 1985, IBM-compatible firms will have a harder time trying to "hit the moving target of IBM-compatibility" because the target is moving in several directions at once: upward toward the Personal Computer AT, downward toward the PCjr and expanding in terms of the soon-to-be-announced Personal Computer II, Christiansen said.

"If you're going to be IBM-compatible, it probably means you're going to be compatible with the older [Personal Computer] architecture, which is out of date and lacks the performance of newer computers," he noted, adding "It's difficult to make the jump in compatibility from the [Personal Computer] to the AT."

According to Andy Seybold, contributing editor of the "Seybold Report on Professional Computing," Topview will be the "tip" of IBM's new operating system by the end of 1985, with MS-DOS and Xenix running under it.

Seybold predicted that IBM will copyright Topview by the end of the year, making it part of a read-only-memory-based system. The IBM-compatible firms will have to scramble once again, because they will be unable to offer Topview on their systems.

'Year of the integrator'

It will be important for these firms to be able to offer an alternative to Topview, because 1985 will be the "year of the integrator," Seybold said. Unlike last year, when integrated software was the watchword of the industry, 1985's customers will expect total business solutions when they purchase a system.

When they walk into a computer store, he explained, customers will sit down with the sales staff, describe their computing requirements and design a system by mixing and matching various software packages, which will be integrated under an operating environment such as Topview.

The IBM-compatible firms will have to be able to offer an alternative, choosing among the competing environments — such as Microsoft Corp.'s Windows, Digital Research, Inc.'s Gem or Quarterdeck Software's Desq — so they can offer a similar solution to their customers, Seybold said.

The analysts agreed that Apple Computer, Inc., which has eschewed IBM-compatibility, has the best

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chance of surviving the IBM onslaught in 1985. Apple will flourish, they said, because it provides an alternative.

"You can divide the world into two parts: the people who will buy IBM and the people who won't," said Dataquest's Lim. "Whoever is a leader in [the microcomputer] market will survive."

While some observers expect AT&T to offer another alternative to IBM, most analysts questioned AT&T's present course of action. AT&T cannot strike out on its own, as Apple has, because it is already "too locked into PC-DOS," said Aaron Goldberg, an analyst with the Framingham, Mass.-based market research firm International Data Corp. (IDC).

The firm will not find success by pushing Unix as an operating system for single-user systems. "In 1985, Unix will be recognized for the disaster it really is," he noted.

The VAR market

Are there any viable strategies for surviving the shakeout in 1985? While many analysts suggested that the value-added reseller (VAR) market represents a protective niche for personal computer companies in 1985, IDC's Goldberg questioned the wisdom of that strategy.

"The VAR market is not the salvation of troubled microcomputer companies," Goldberg said. "Most VARs are very discriminating buyers. What would make them think that a company that failed when it went up against IBM in the retail market would be appealing in the VAR market?" he asked.

According to Goldberg, selling to the VAR market is a "harder sell than retail." The companies that will be successful in the VAR market will be those with 20 years' experience and a broad product line, not a troubled firm that sells micros, he explained.

Guidelines for surviving the shakeout

While there are no hard and fast rules on how to survive the shakeout in 1985, the analysts offered a variety of guidelines for companies that will try to make it through the year:

- Try to jump ahead in terms of the technology.
- Seek shelter in market niches. Find contentment with .01% market share.
- Grow big enough to maintain independence. Plan on spending at least $10 million to $20 million on advertising and a similar amount on R&D. Develop a strong dealer base by offering dealers proposals they cannot refuse.
- Keep a watchful eye on the corporate financial health. Preserve the financial base. Maintain a good cash position. Spend carefully so that the firm has the money to weather the inevitable dry spells.
- Get production costs down by designing low-cost, efficient manufacturing plants. Consider moving offshore.
- Advertise. It does not matter if you have got a great product if no one has heard about it.
- End eternal product development cycles. Customers have lost their patience with companies that promise products they cannot deliver.
- Sell aggressively. Get down to the nuts-and-bolts work of getting contracts signed.
- Establish a corporate framework that allows the company to bring in a good, solid management team as the firm grows.

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]

THE MICRO SHAKEOUT

Firms reentering micro fray said to face long odds

Osborne Computer Corp. and Victor Technologies, Inc. — in many ways these companies have come to symbolize the reckless and ruthless nature of the personal computer industry, to which each has fallen victim.

Within the past two years, these two companies filed for protection under Chapter 11 of the Federal Bankruptcy Act, winning at least a temporary reprieve from their troubles: time to devise a plan to pay off creditors and reorganize.

Like the mythological phoenix that consumed itself in fire and then rose again to begin another life, these firms intend to emerge once again and regain market footholds.

Victor Technologies expects to receive the final seal of approval on its reorganization plan in late 1984, said Roy Wright, president of the Scotts Valley, Calif.-based firm. By the end of January the company will finalize the sale of Victor Technologies to Datatronic AB, a Swedish computer company.

Brown

Osborne plans to make a simultaneous announcement in January that will herald the company's exit from bankruptcy court and its inauguration as a publicly held company, said Ronald Brown, the firm's president (see story page 99). The Fremont, Calif.-based firm, which played a pioneering role in the portable computer industry by introducing a machine with bundled applications software, recently unveiled two new portable machines.

But what are their chances of survival in an industry that has become even more competitive in their absence? Some analysts expressed skepticism that the firms could recover a significant share of the market.

Robert T. Cornell, first vice-president of Paine Webber, Inc., a New York-based securities firm, said the companies will fail in their efforts to carve out a new place in the market because their computers are still priced too high. "People don't believe the portable computer market will go anywhere until the systems cost less than $1,000," he said.

Andy Seybold, contributing editor of the "Seybold Report on Professional Computing," said the companies that struggled to survive in 1984 will find 1985 an even more difficult year. "The competition is going to get keener in 1985," he said. When asked to describe the companies' chances of success in the 1985 marketplace, his answer was succinct. "Not good," he said.

But Bob Katzive, vice-president of Gnostic Concepts, Inc., a San Jose, Calif.-based market research firm, took a more philosophical point of view.

Wright

"Osborne is a different company now," he said. It has scaled back, narrowing its focus to niche markets, he explained. Katzive said Victor Technologies' odds on survival were an even call at present, but, like Osborne, it retained some strength as a result of its European distribution network.

Not surprisingly, the current presidents of Osborne and Victor Technologies are bullish on their companies' future.

Osborne's Brown said three factors allowed the company to forge a viable reorganization plan: Osborne's brand-name recognition; its worldwide customer base; and its international distribution network. The company plans to pay off its remaining $5 million in debts out of the firm's assets, he said, adding that Osborne will use the proceeds from its $3 million stock offering to fund product development.

Ironically, the company has emerged from bankruptcy proceedings with a financial advantage. According to Brown, Osborne will not have to pay taxes for the next 15 years, until its profits exceed $18 million, because it inherited a tax-loss carryforward from its troubled parent. "What was bad news for the old Osborne is good news for the new Osborne," he said.

Sights on the vertical mart

Like Osborne, Victor Technologies has set its sights on the vertical market and recently introduced 18 vertical-market software packages. The company will direct its efforts at selling to small business, said Victor Technologies' Wright. No longer will Victor Technologies make the mistake of "trying to be all things to all people," he said.

Victor Technologies plans to introduce enhancements to its computer line, which includes the Victor 9000 as well as the Vicki portable, during the first quarter of 1985, Wright said.

In addition, the firm will unveil its next generation of computers by the end of that year, he added.

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ED BRAVERMAN

ALL PUMPED UP

By Jeffry Beeler

For years, they remained cloistered in their own self-contained, little world far from the hubbub of mainstream information processing. Far and away the computing field's number-crunching speed champs, they quickly entrenched themselves in large research institutions, government agencies and a few giant oil companies. There, they soon made a name for themselves by solving esoteric, stupifyingly complex problems that no other processors could even dent.

But for the vast majority of the world's user organizations, supercomputers lay woefully beyond reach — their towering price tags and proprietary architectures forming seemingly insurmountable barriers to acquisition. Even now, high-speed vector processing remains largely the preserve of a few scientific or engineering heavyweights, the only operators technically adept enough to master its many intricacies.

In a sense, today's supercomputers bear a curious resemblance to the micros of yesteryear. During the mid-1970s,

Continued on page 112

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The IBM PC market is booming in Australia. By the end of 1984, almost 20,000 units will have been sold. **Australian PC World** — the only computer magazine for IBM PC users in Australia — premiered this March in response to the growing demand. Total distribution has already topped 16,000. And newsstand sales are vigorous from Sydney to Perth.

Forecasters predict that the Australian government and businesses will increase their usage of microcomputers by 170% over the next two years. **Australian Micro Computerworld** is the only monthly magazine covering this market. Written for both single-unit and networked users, most of our 12,000 readers are skilled professionals involved in the selection or design of systems and networks.

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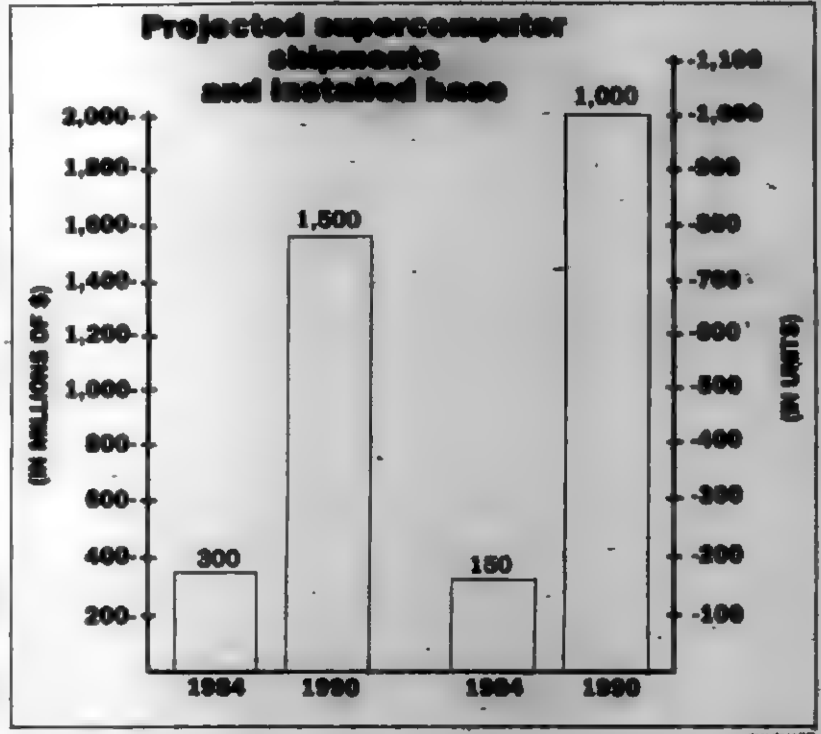


CW CHART

Continued from page 109

personal computers were little more than a gleam in the eye of a small band of high-tech visionaries, a glorified plaything apparently devoid of widespread commercial potential. Only a few years later, the newfangled technology suddenly came into its own, burst free of its cramped confines and took the business world by storm.

Today, industry history seems poised on the brink of repeating itself — only this time on the opposite end of the performance spectrum. Already, supercomputer use is steadily climbing, and during the coming year and beyond, installations are almost certain to increase, according to Kevin Moriarty, a seasoned vector processor user and computer science professor at Canada's Dalhousie University.

Much of the expanded activity, to be sure, will take place among the large defense- and research-oriented users that have formed supercomputing's traditional stronghold. But increasingly, number-crunching machines are expected to expand their limited sphere of influence and find their way into environments from which they have hitherto been largely excluded. One of those new-found user domains will be the world of big business, according to Carl Claunch, National Advanced Systems Corp.'s (NAS)marketing director for technology planning.

Moreover, the influx of vector processors into the commercial realm is expected to come from diverse sources. Part of the increased traffic will undoubtedly consist of high-end machines of the sort that have long been sold by the supercomputer field's two leaders, Cray Research, Inc. and Control Data Corp.

Also contributing to supercomputing's heightened commercial presence will be a flock of comparative newcomers to the number-crunching game. One such recent market entry is likely to be special-purpose vector processors that basically serve as scaled-down versions of full-fledged supercomputers. Priced at less than $1 million, near-supercomputers will specialize in the dedicated scientific and engineering applications where superminicomputers have traditionally been preeminent, according to Eugene Starr, vice-president of the Boston-based Moseley Hallgarten Estabrook & Weeden, Inc. brokerage firm.

Another supercomputer subspecies that seems destined to have a major corporate impact are the emerging IBM-compatible vector processors, which first appeared on the scene earlier this year with introductions from Amdahl Corp. and NAS.

For corporate information systems organizations, the implications of supercomputing's increased business profile are manifold and, in some cases, conflicting. On one hand, the recent advent of IBM compatibility promises to hasten a reconciliation between administrative DP and scientific processing by removing the architectural impediments that have historically kept the two apart. The coming union, in turn, will bring technical computing operations increasingly under MIS control, according to Wayne McIntyre, Amdahl's special-purpose systems director.

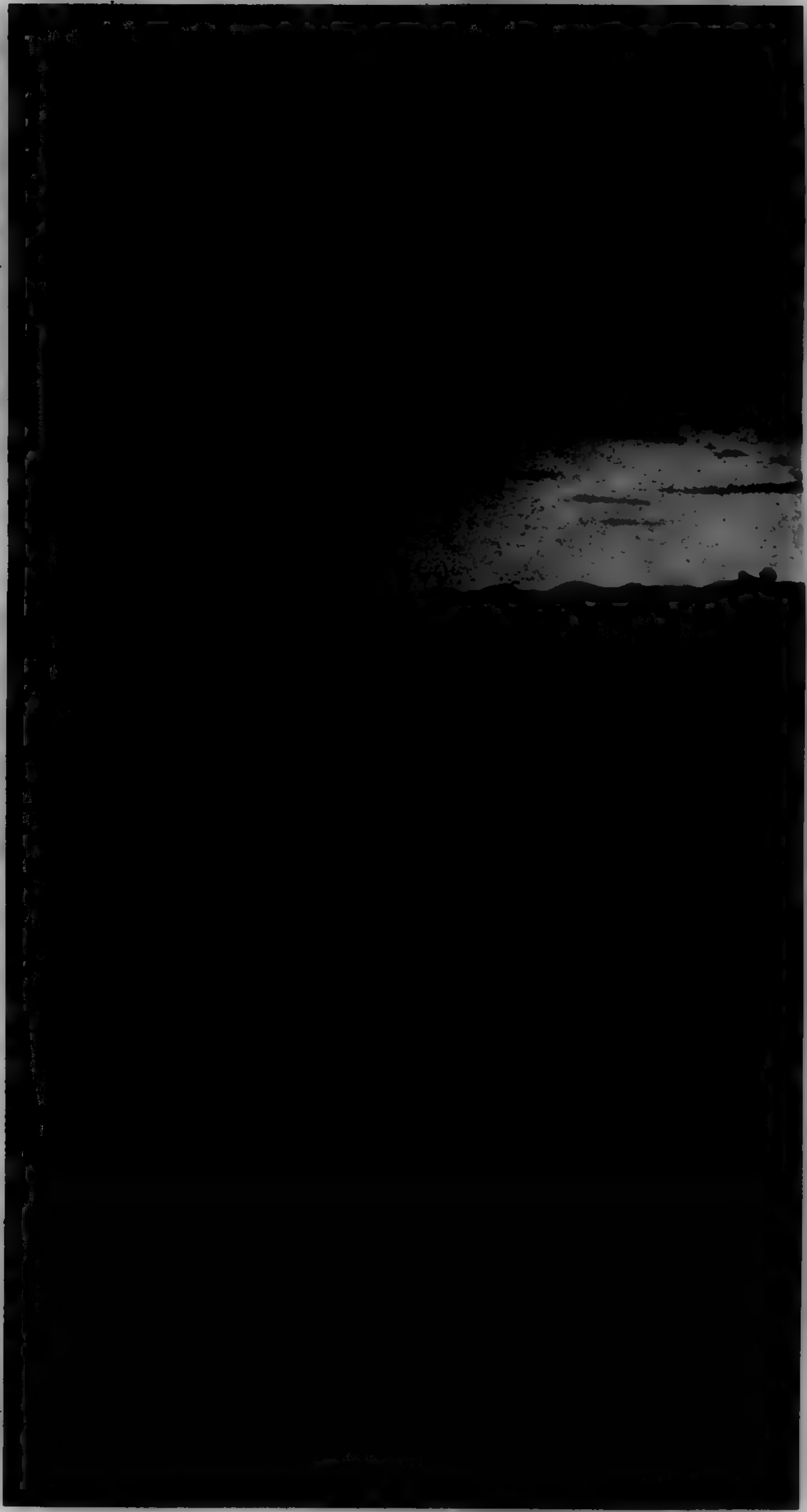
On the other hand, as the supercomputing performance range continues to extend downward, corporate users can expect their vector processing resources, which in the past have been highly centralized, to be gradually dispersed. Thus, the same distributed processing forces that have long been at work in MIS will soon overtake scientific computing as well, according to Bob Paluck, president of Richardson, Texas-based Convex Computer Corp., a near-supercomputer supplier.

Unlike general-purpose scalar mainframes, which are optimized for transaction processing, vector computers are geared for executing scientific programs, which typically require one instruction to operate simultaneously on long streams of elements.

At present, the worldwide base of installed supercomputers still totals only about 100 or so machines. But by the end of the decade, the population will swell to include some 2,000 units, Moriarty predicted.

During the same period, the total market for large-scale number crunchers will expand from $300 million to approximately $1.5 billion, according to Amdahl's official projections.

Continued on page 114



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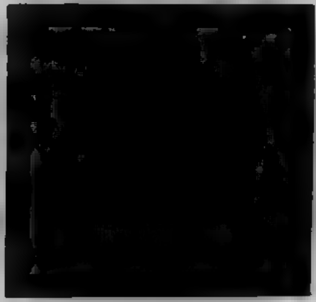

By Jeffry Beeler
CW West Coast Bureau

Virtually all industry pundits agree on at least one point: Sooner or later, IBM is almost certain to announce its long-awaited entry into the vector processing marketplace.

But when will the announcement take place, and what form will it ultimately assume? On these and similar speculative questions the experts quickly part company.

For years, IBM has largely refrained from entering into the insular world of high-speed vector processing. The reason for the company's apparent indifference is simple: For all its potential strategic value and long-term market promise, supercomputing remains comparatively small potatoes in the information processing scheme of things.

Although it already accounts for an estimated $300 million in sales, the number-crunching market is still far too small to draw much more than an occasional sidelong glance from Big Blue.

"For IBM to become seriously interested in a market, it has to exceed $1 billion," Eugene Starr, vice-president of Moseley Hallgarten, a New York-based brokerage firm, said.

Even so, a widespread wariness of IBM's long-term intentions persists — and with good reasons. Already, signs of the company's grow-

Continued from page 112

Although supercomputers will continue to be used heavily for specialized scientific and engineering tasks, they will increasingly find use in applications that have traditionally relied on scalar processing techniques.

An estimated 20% to 40% of all general-purpose MIS programs are written in Fortran and thus lend themselves readily to vectorization. Such applications include certain data base management jobs involving large volumes of information, the various elements of which can be processed independently of each other.

"If, for example, you're calculating the salaries for each of a company's employees, you can easily form the raw data into vectors and process it in a pipeline computer," Moriarty said.

An estimated 20% to 40% of all general-purpose MIS programs are written in Fortran and thus lend themselves readily to vectorization.

Other applications that are likely to migrate someday from scalar to vector processors include financial modeling, commodities forecasting and stock market analysis. In fact, "supercomputers would probably make sense in any commercial application where users have to recognize patterns in lots of data and react swiftly," David Hertz, director of the University of Miami's Intelligent Computer Systems Research Institute said.

In the long run, the way users think about supercomputer applications will fundamentally change. "People will stop asking what supercomputers can be used for," Ken Wilson, the James A. Weeks professor of physical sciences at Cornell University said. "Instead, they'll start thinking about supercomputers in the same way they talk about personal computers. No one asks what the applications for personal computers are anymore."

arena, allowing others to till soil of number crunching

ing interest in vector processing abound.

Not long ago, for example, the industry giant underwent an internal shakeup in which the commercial and scientific sides of its computer business were organizationally separated — a sure indication that a major market [illegible] lies ahead.

Perhaps even more revealing were recent remarks made by IBM chairman John Opel, who publicly acknowledged his firm's supercomputer development efforts before a gathering of Big Blue's stockholders in Los Angeles.

But what makes IBM's future debut as a number-cruncher an all-but-foregone conclusion is the vector processing field's steep projected growth. For the immediate future, though, the company will likely continue to stand casually on the sidelines of the supercomputer field and quietly bide its time. IBM is behaving in accordance with a tried-and-true formula, according to Wayne McIntyre, Amdahl Corp.'s director of special purpose systems. "IBM seldom innovates markets," he said. On the contrary, it allows its competitors to till the soil of new product opportunity and plant the technological seeds. Then, when the crops have ripened and are ready to be picked, it sends a convoy of blue combines out of Armonk and claims the harvest for itself, while the company's rivals sputter in rage.

To see the tactics in action, McIntyre said, one need look no further than Apple Computer, Inc., which pioneered the microcomputer business only later to lose its market leadership to IBM.

The methods that worked with such devastating success in the personal computer arena will likely prove equally effective in the supercomputer sector, where IBM's initial offering will probably be an attached vector processor for the Sierra series, McIntyre predicted.

But when IBM finally does leap into number crunching with both feet, the move will lend respectability to the entire field and greatly promote supercomputer use among otherwise reluctant buyers, according to Dalhousie University computing science professor Kevin Moriarty. Users who wish to influence the future course of IBM supercomputer development efforts should make their views known.

When IBM finally does leap into number crunching with both feet, the move will lend respectability to the entire field and greatly promote supercomputer use among otherwise reluctant buyers.

"What's important during the next year is the kind of information that users feed back to IBM for the evaluation of future products," Ken Wilson, the James A. Weeks professor of physical science at Cornell University said.

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Supercomputers to land corporate resource roles

For Fortune 1,000 companies, success in an increasingly competitive marketplace may soon depend on the ability to use supercomputers effectively.

As their presence in the big business world steadily expands, large-scale number crunchers are destined to be elevated to the level of strategic corporate resources, according to Carl Claunch, National Advanced Systems Corp.'s (NAS) marketing director for technology planning.

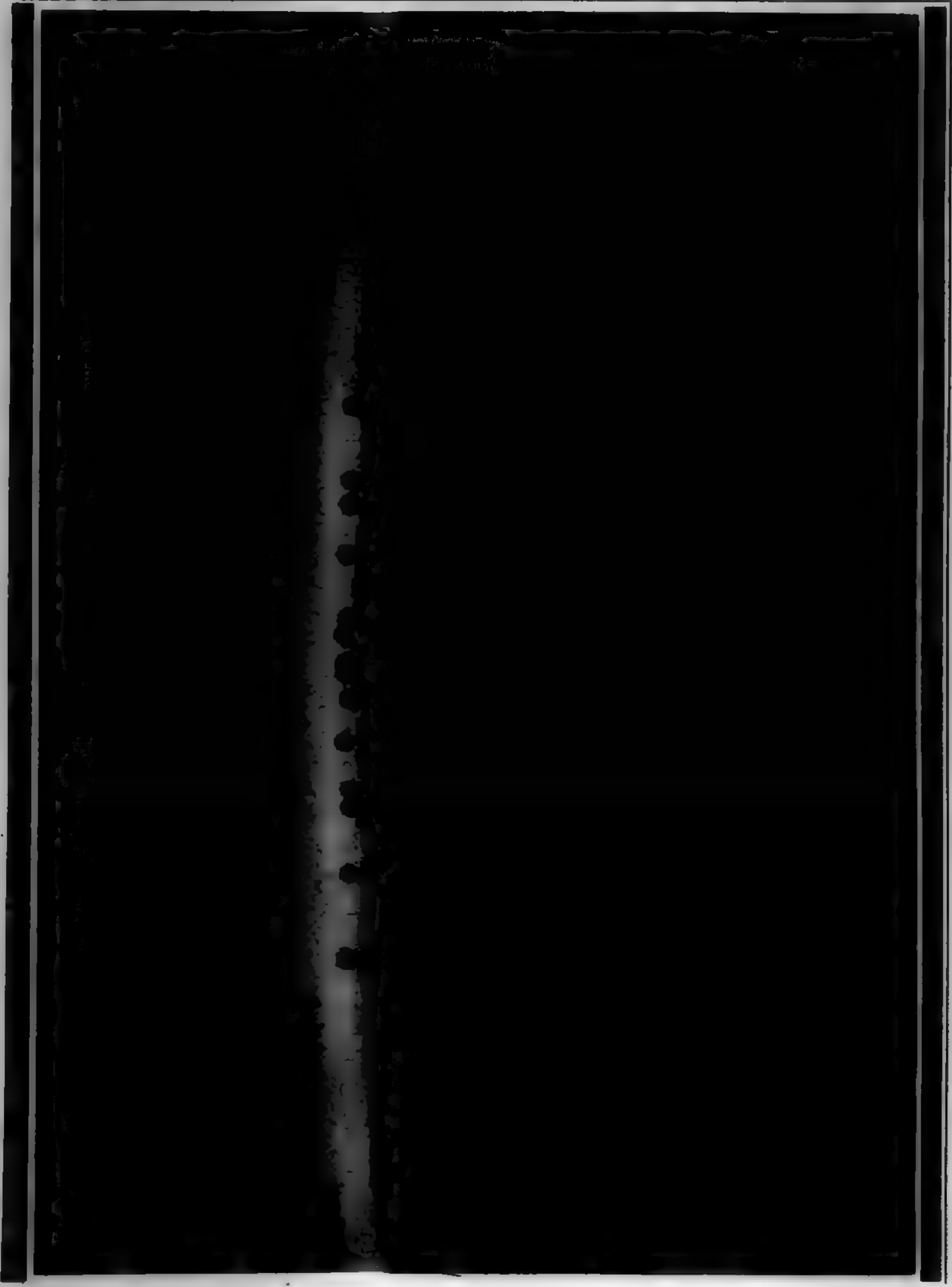
"In a lot of industries during the next 10 years, the competitive edge will belong to companies that can use their processing power to achieve the most accurate results," Claunch said. "An insurance company, for example, that can improve its forecasting abilities will be able to gain an advantage over its rivals by increasing the accuracy of its group policies and lowering its prices."

Stimulating growth

Another influence that will stimulate the growth of commercial supercomputing is decreased hardware prices. Elasticity of demand applies no less to the scientific side of the information processing field than to the mainstream MIS sector, Claunch said.

Probably nowhere is the phenomenon of declining vector processor prices more clearly illustrated than in the recent advent of so-called "near-supercomputers" — scaled-down number crunchers that typically cost a few hundred thousand dollars. Because of their comparatively low prices, near-supercomputers will greatly widen the potential universe of number-cruncher users, according to Bob Paluck, president of Richardson, Texas-based Convex Computer Corp.

Even today, only a handful of the very largest corporations can afford the luxury of installing their own in-house supercomputers, which can easily cost $10 million. "Getting the go-ahead to buy such an expensive piece of equipment is a major event," Paluck said. "It usually requires the approval of the board of directors."



So to satisfy their demand for engineering and scientific processing power, many companies have opted to use supercomputer time-sharing services for their most computing-intensive jobs and in-house superminicomputers for more modest applications. But now, with the appearance of near-supercomputers, those existing vector processing resources seem destined to be replaced or at the very least supplemented, Paluck said.

To illustrate Paluck's point, consider recent developments at United Technologies, Inc.'s Mostek Corp. subsidiary, which uses vector processors for a variety of engineering purposes.

To date, Mostek has used an outside Control Data Corp. Cyber 205 supercomputer to perform its largest and most complex engineering tasks like integrated circuit simulation. "But as the complexity of our VLSI-circuitry has increased, our simulation activities have required more and more [computing] horsepower," according to Kwok Wu, manager of the company's CAD development and operations.

To satisfy their processing demands, many companies have opted to use supercomputer time-sharing services for their most computing-intensive jobs and in-house superminicomputers for more modest applications.

Last September, growing demand for vector processing resources finally persuaded Mostek to acquire a Convex C-1 near-supercomputer, which reportedly provides a quarter of the performance of a Cray Research, Inc. machine for one-tenth the price. The in-house C-1 is currently undergoing beta tests.

Another user organization that expects its supercomputer use to grow in the near future is Lockheed-Georgia Co., which needs scientific processors to help it design aircraft parts. Like Mostek, Lockheed-Georgia relies heavily on an outside time-sharing system in the absence of its own in-house supercomputer.

But because of the growing complexity of its design tasks, the company has seen its demand for processing power escalate and its time-sharing costs do likewise. So much, in fact, have its time-sharing bills risen that Lockheed-Georgia plans to order its first in-house supercomputer sometime next year, according to Roy Harris, manager of the firm's scientific computing group.

Until the supercomputer is purchased however, Lockheed-Georgia will use an NAS 9070 with an integrated NAS vector processor to support many of the firm's CAD activities.

HEWLETT-PACKARD

TO MARKET, TO MARKET

By Kathleen Burton

In 1984, Hewlett-Packard Co. shed its technocrat image and pushed aggressively into the mainstream business computer market.

The $6 billion corporation launched its drive last July to join the mainstream computer market by radically restructuring management and introducing personal-computer and peripheral products that represented design and marketing breakthroughs for the previously engineering-oriented company.

HP's growth over the past 11 years would be considered more than respectable by most industry standards. Since 1973, company revenues increased at a 21.5% compound annual rate, reaching $6 billion for the year ending Oct. 31. But industry watchers said the mercurial personal computer, minicomputer and computer-aided engineering markets HP hopes to conquer in 1985 and beyond will require an all-out effort by the company to grow even faster and keep pace with industry leaders.

Before the reorganization, HP was a preeminent supplier of analytical and test instruments, minicomputers, medical equipment and scientific calculators.

"The idea behind the reorganization is to make HP as important to mainstream consumers as it's traditionally been to the scientific and engineering communities for the past 45 years," said John Young, HP chief executive officer.

Under the old organization, HP operated as a loose amalgamation of small, autonomous and often uncooperative fiefdoms, each focused tightly on its own product lines, a viable strategy only as long as HP pursued its traditional niche markets.

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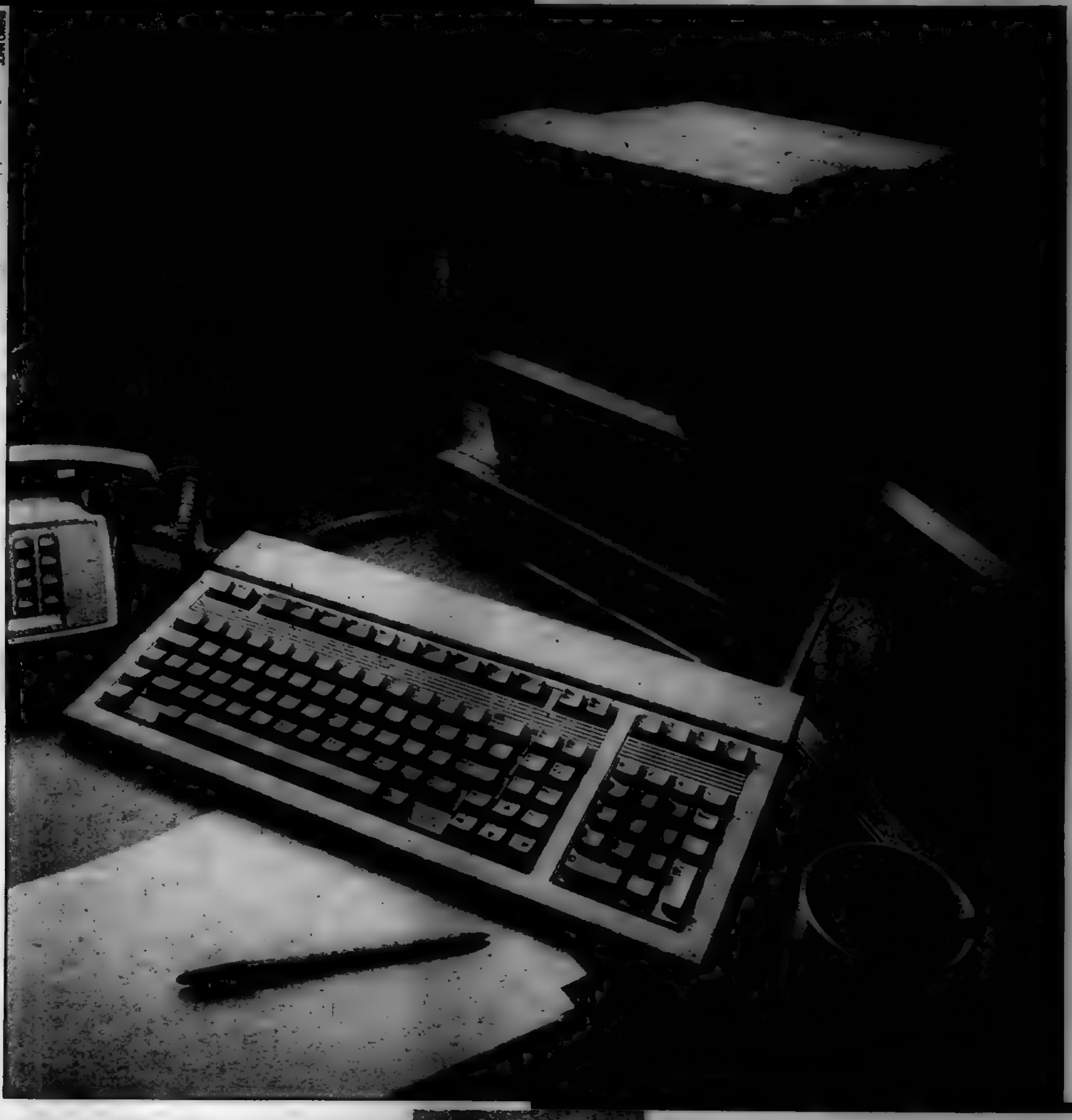

JOHN OWENS

HEWLETT-PACKARD

John A. Young

Continued from page 117

But by 1983, when customers began demanding integrated systems and as HP's instruments and computer markets began converging, HP's once-viable, separatist structure became a liability.

Now, HP is targeting three distinct markets — instruments, business computers and analytical components — each consolidated under three newly organized product divisions and sales teams, overseen by Dean Morton, newly appointed chief operating officer.

Ross Hunt, marketing manager of HP's Information Systems Group, and overseer of the HP 3000 series minicomputer, said, "The glass-enclosed walls of the computer room are breaking down, and 85% of HP's future business will be integrated products such as microprocessor-driven instruments and distributed data processing products networked to [personal computers]."

HP 3000 series enhancements

According to Hunt, with this in mind, HP plans several product enhancements to the HP 3000 series next year —memory upgrades, tighter integration between the HP 3000 and future personal computer products, more microcomputer-based applications and significantly larger data bases.

The year will also bring more competitive pricing for next-generation HP 3000 series products, Hunt said, and sales efforts that will increasingly focus on previously neglected value-added resellers, original equipment manufacturers and software suppliers.

"We've targeted [value-added resellers], OEMs and software developers next year to supply integrated solutions for largely untapped vertical markets that we never took the time to understand before," Hunt said. There will also be changes in field sales in '85, said Roy Verley, HP's director of corporate public relations.

HP's field sales groups will act as an early warning system for customer needs in '85, bringing complaints and problems back to corporate management, he said.

"Salespeople in the field are in a unique position to spot a customer's incipient toothache long before it becomes a full-blown problem, and we plan to use this resource," Verley said. HP will also adopt a long-time IBM sales strategy next year, Verley said, using floating, on-call technical product specialists to back up HP's traditional sales teams.

Increased support in 1985

Users will also benefit from increased support in 1985, Verley said. The company's recently created National Response Centers, located in three U.S. cities, will offer 24-hour remote diagnostics via satellite for international and domestic customers.

A dark cloud on HP's horizon, however, is last year's abortive attempt to gain a leading position in the lucrative computer-aided engineering (CAE) market, expected to grow to $275 million by the decade's end.

In 1984, the resignation of several key CAE division managers and engineers, the disappointing performance of HP's 9000 series workstation — intended to spearhead HP's entry into the burgeoning market — and a relocation to Colorado decimated the division, according to Rich Edwards, a former HP employee who tracks the company for Robertson Colman Stephens, a San Francisco investment banking firm. "HP's CAE group is now an empty shell, and new product introductions are at least six months away," he said. Even though the division is now back on course, consolidated under a new management team and scrambling to get new products out the door, Edwards said the delay in entering the exponentially growing market (which is expected to double in 1985) will cost HP irretrievable market share next year as competitors like Valid Logic, Inc. and Daisy Systems, Inc. rush new products into the market.

According to some analysts, a customer-driven new products strategy is critical in 1985 if HP intends to gain significant market share in the diverse product areas it has targeted.

Myron Kerstetter, program director for small computer systems at the Gartner Group, Inc. in Stamford, Conn., said, "1985 will have to be a product development phase for the company, as they are two years late in getting a high-end 32-bit HP 3000 product into the market."

Due to this, according to Kerstetter, the competition (led by Digital Equipment Corp. and Data General Corp.) is rapidly closing in, causing HP to drop prices throughout its minicomputer line and seriously impacting margins and profitability throughout the entire company.

Kerstetter said aggressive price discounting of the HP 150 personal

Continued on page 120

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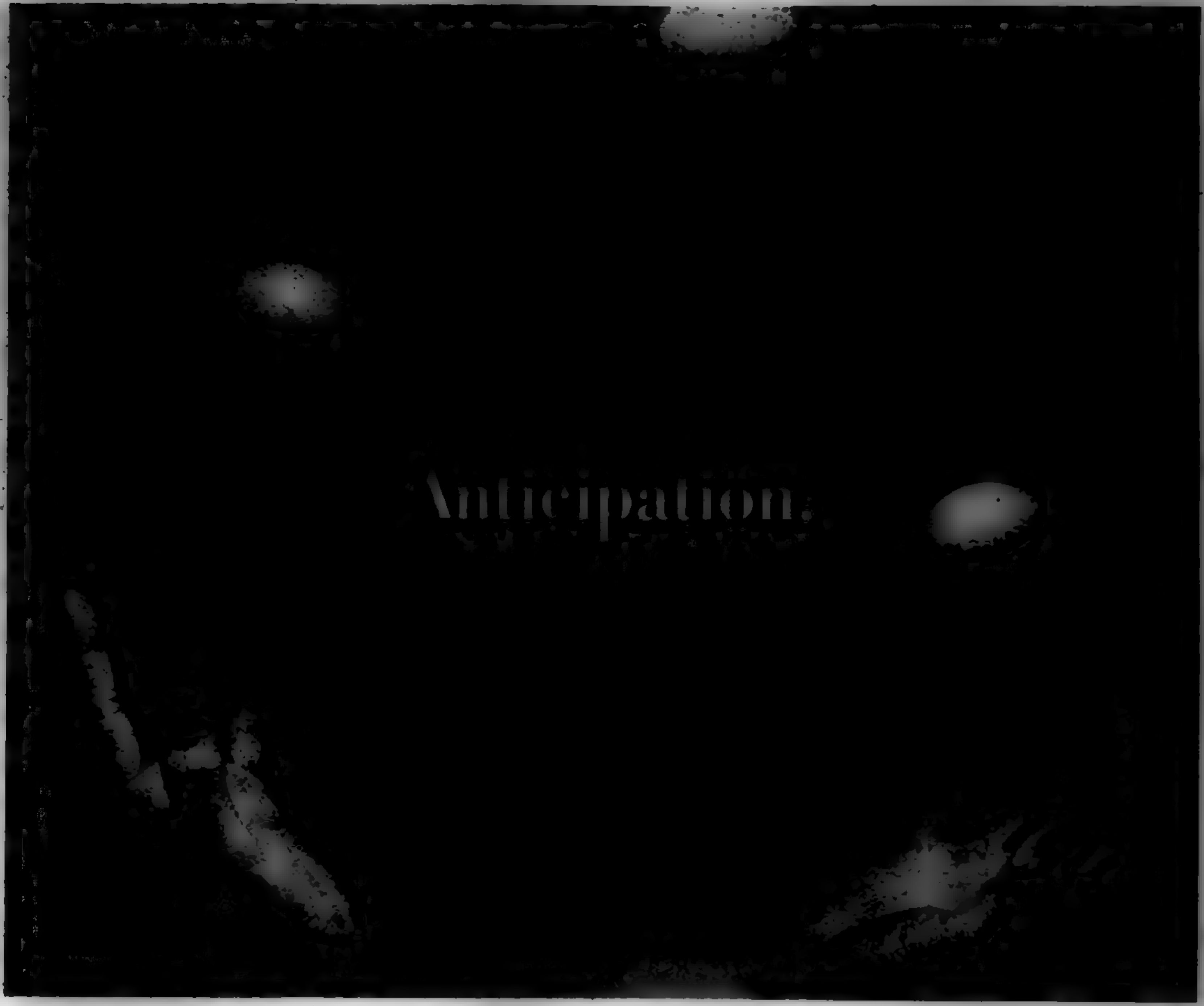

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1-7

Special group spearheads HP's marketing campaign

Hewlett-Packard Co.'s 18-month-old Personal Computer Group (PCG) has dramatically changed the way the rest of the company conceives, develops and sells its products, according to Cyril Yansouni, PCG vice-president.

Although the company did $500 million in personal computer business last year, before the group was formed HP had a disjointed personal computer strategy that targeted only its traditional scientific and engineering customers, Yansouni said.

"Personal computers are a must-win market for us now," Yansouni explained, "and creating the PCG was a good way for the company to learn marketing."

The blitzing of the personal computer market by IBM and Apple Computer, Inc. made it apparent that the burgeoning personal computer market, of which HP held only a 2% market share, was driven by average consumers. As a counteraction, HP planned to update its marketing strategy.

Murphy

Last year, HP began lowering prices aggressively on all its products, from the HP 150 personal computer to the Thinkjet and Laserjet printers, a trend expected to continue next year in its 3000 line.

According to Bill Murphy, marketing manager of the PCG, the division's plans for '85 include focusing on personal workstations in the $1,000 to $6,000 range, with four major computer product introductions scheduled for the year.

Other plans include extending the conceptual planning phase of product development and continuing to use the consumer marketing techniques that proved so successful in products released in 1984 — such as quantitative market research, focus groups, test marketing and closer attention to positioning.

Murphy said his division plans to trim costs and increase dealer productivity through the newly established Dealer Advisory Council, an aggregate of 12 dealers from across the nation who will meet four times with HP officials in '85 to hash out product, promotion and delivery strategies. "We still have a lot to learn with retail," Murphy admitted.

The net effect of PCG's 1984 efforts has been a rapid rise through the second tier personal computer companies, Murphy said. "Our challenge in '85 is to distance ourselves from the second tier companies and cut into the first tier — Apple and IBM," he said.

Yansouni

But according to some industry watchers, HP may still not be pragmatic enough to succeed against IBM in the personal computer business. E. David Crockett, a former HP executive and president of the market research firm Dataquest, Inc. in San Jose, Calif., said "HP's advertising budget is much too small when you consider Apple is spending $100 million on advertising next year," while HP plans to spend $30 million. "At that rate," he said, "they don't stand a chance against Apple or IBM."

Continued from page 118

computer and HP 3000 lowered product demand (due to the lack of new products) and last year's costly marketing efforts took financial tolls on the company in 1984.

HP's fiscal year figures bear him out, indicating that margins and profits have flattened out (in 1984, fourth-quarter profits were up 14%, compared to primary competitors DEC and DG, who both posted increases in the low 30s) and sales for the quarter showed only a 27% increase, trailing DEC (41%) and DG (53%).

Still reeling from the reorganization, Kerstetter predicted HP would release only minor enhancements to existing 3000 products next year, such as increased networking capability for low-end 3000 series products, several new micro products and networking support for the IBM Personal Computer.

In sum, in 1985, a feisty HP will enter the ring with gloves on, targeting the personal computer, CAE and minicomputer markets, armed with new products and new marketing strategies and ready to roll with the punches from the industry's big boys. "We plan to win big," was Young's optimistic prediction for next year.

But, to do so, HP must overcome several obstacles. Most importantly, the company must introduce new, competitively-priced personal computer and 3000 series products into the market before the year is up to head off a triumvirate of eastern contendors — IBM, DEC and DG.

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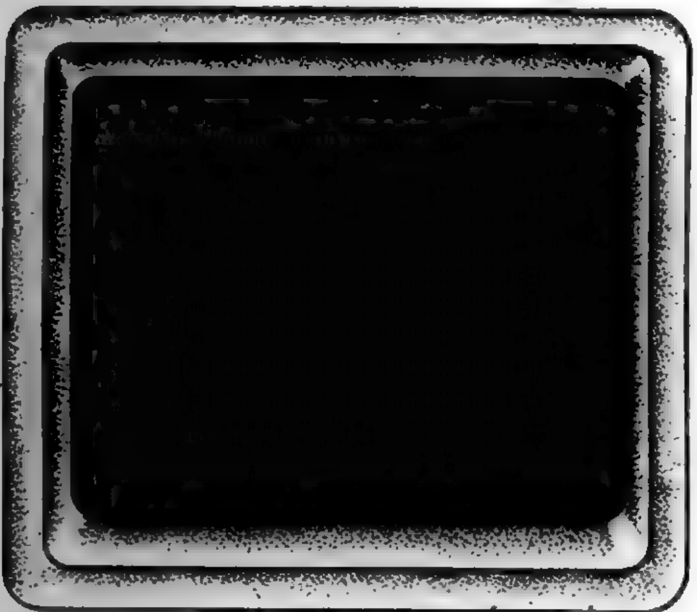

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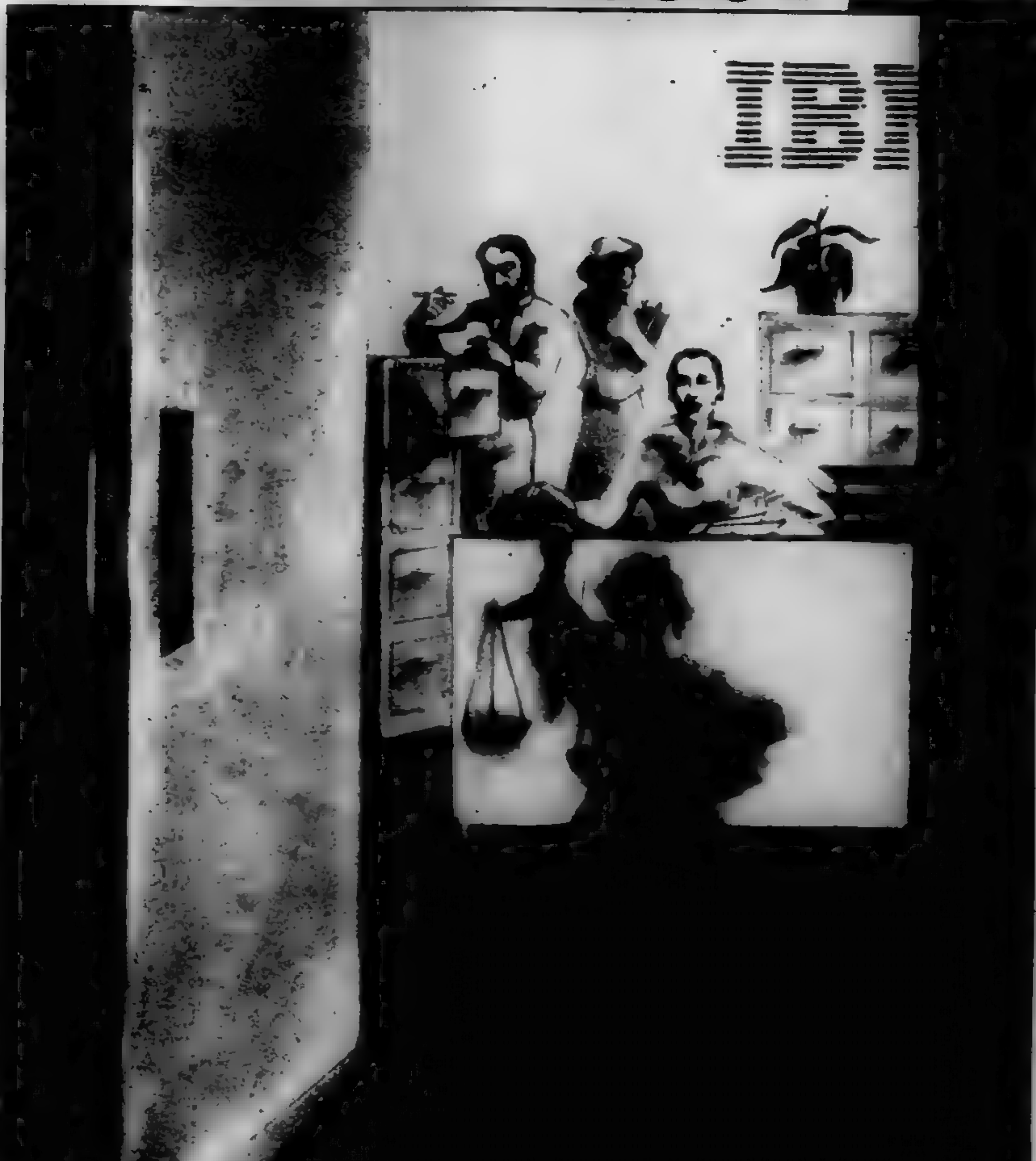
IBM

THE SPECTER OF ANTITRUST

By Edward Warner


KATHY CHOU

Two years ago this month, the U.S. Justice Department dropped its antitrust case against IBM. Some say the giant of Armonk, N.Y., whose 1983 revenues topped $40 billion, walked from the courtroom back into the competitive arena — and came out swinging.

In addition to having pressed the advantages of dominance in most market niches where it competes, the company has also made key minority and total acquisitions, including a 25% stake in Intel Corp. and the recent $1 billion-plus acquisition of Rolm Corp.

"Whether the strategies involve influencing lease vs. buy actions, outside leasing arrangements, volume-discount leveraging or drastic cuts in purchase prices, IBM is dramatically changing its traditional stance and using every means to meet its competition head on," said a 1984 report on IBM strategy produced by the International Data Corp. (IDC), a Framingham, Mass.-based computer industry market research firm.

IBM's competitive strategies all fall within the limits of the law, according to IBM spokesman Peter Kuhn. And, he argued, they are often based on competitive pricing or advances in technology.

Some IBM competitors are not convinced. At least one, BMC Software, Inc., filed suit late last year in the U.S. District Court for Northern California, claiming IBM had violated antitrust laws by bundling two data communications

Continued on page 122

Continued from page 121

products with the latest release of its IMS data base management system.

"They're saying we're bundling; we're saying we're not," Kuhn responded. A hearing in the case was held in December, but no trial date has been set.

The justice department, meanwhile, is also taking a critical look at IBM. The agency calls it part of a routine investigation of the settlement IBM reached with Hitachi Ltd. in a suit IBM had brought alleging copyright infringement. Parts of that settlement were not made public, and computer industry analyst Robert Djurdjevic, editor of the industry newsletter "Annex Computer Report," claims the settlement requires that IBM be permitted to inspect Hitachi computers prior to their introduction. Kuhn denied this and said that Hitachi would, at its option, be able to permit IBM inspections but only after the product had been unveiled.

'[There is] no rule against having a very large market share. The question is how you come by it and how you keep it.'

— William Baxter, former U.S. Assistant Attorney General

In a letter to Djurdjevic, though, Assistant U.S. Attorney General J. Paul McGrath, head of the agency's antitrust division, said that "The fact that IBM freely can use the courts to pursue its claims does not mean that it can unlawfully extract from its opponents settlement terms that have anticompetitive effects." A Justice Department spokesman said the investigation, begun in June of 1983, is continuing.

Although competitors may be eyeing the courts as an option to curb IBM, the track record of previous efforts has not favored those plaintiffs. During the 1970s, IBM faced at least nine lawsuits from competitors that claimed the firm had violated antitrust laws. Although IBM did make large out-of-court settlements in some of those suits, such as its 1973 settlement with Control Data Corp., IDC data indicates that IBM won all of those cases that went to trial.

Since the settlement of the Justice Department's case, IBM has sued 10 firms for either dealing in its trade secrets or infringing on its copyrights. Some of those suits, such as the ones against Hitachi, National Semiconductor Corp. and its subsidiary National Advanced Systems, lasted months. Others, such as the one against the Gartner Group, Inc., a Stamford, Conn., consulting firm, were settled within days.

The most recent celebrated attempt to prove IBM guilty of antitrust law violations, U.S. v. IBM, was eventually abandoned on Jan. 8, 1982 for what the Justice Department described as a lack of evidence. On the international level, IBM has also prevailed, settling in 1984, on what are said to be favorable terms, an antitrust investigation by the European Economic Community.

Former U.S. Assistant Attorney General William Baxter, the man who announced the government's decision to cease prosecution of IBM, said he believed that IBM is "too well represented by too smart counsel" to fall into antitrust culpability. He added, though, that such charges might well be brought against the company by a future administration. "I would hope that they would have better evidence" next time, said Baxter, who is now a professor of law at Stanford University in California.

Such evidence must do more than point to IBM's

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dominance in some computer industry fields, Baxter said. There is, he noted, "no rule against having a very large market share. The question is how you come by it and how you keep it."

In the view of Ray Carlson, a former chief prosecutor in the U.S. v. IBM case, a successful prosecution of [redacted] that the firm acted with another organization to fix prices or had priced its products below cost, a practice known as "predatory pricing." But, he added, "It is impossible in my view to prove predatory pricing, [because] it's not a competitive market with a monopolist in it."

Carlson said he is sure [redacted] danger of Justice Department antitrust action because "There is just no more Section Two enforcement [of the Sherman Antitrust Act] in the U.S. government. Sec- [redacted] Act, the nation's prime antimonopoly law, forbids independent monopolistic prac- [redacted]

"Not only isn't it being enforced," he added, but "under current views of the law, it probably couldn't be en- [redacted] the Sherman Act, which bans anticompetitive agreements such as price fixing between two or more firms, is receiving enforcement, he claimed.

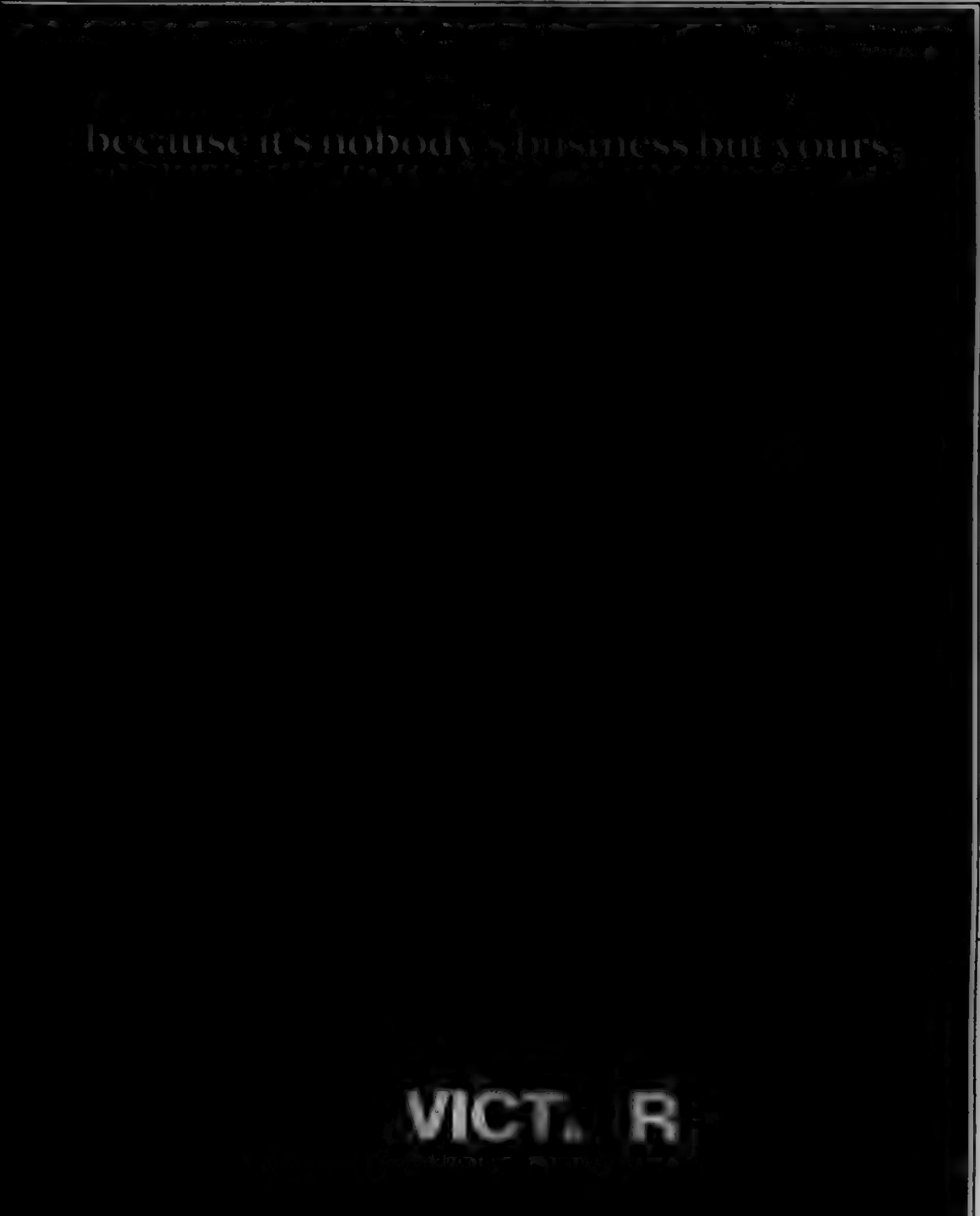
[redacted] George Priest, an expert in antitrust law, disagreed. The "Reagan administration has [redacted] fenses," he said, because the [redacted] fenses."

While claiming that "IBM is the darling of the Reagan administration," industry observer Frederick Withington, vice-president for information systems with Arthur D. Little, Inc., said the true [redacted] because its "frog-to-puddle ratio is declining." By that, [redacted] especially in relation to foreign [redacted] tachi, Ltd., Philips Informa- [redacted] Matsushita Electric Industrial Co. "If they can prove that," he added, "then there is less chance of being attacked by the regulators."

Withington admitted, though, that there are some parts of the computer industry where IBM casts a long [redacted] mainframe and personal computers. There, he said, [redacted] on the government's behalf," especially if the U.S. is to protect its computer industry from falling to Japanese competition. He added, however, that he "wouldn't go as far as saying that everybody wants to cuddle up to [Big Blue] and take them to bed."

[redacted] ney General Baxter said he [redacted] point of the national economy, [IBM's size] is just splendid," as does analyst Gideon Gartner — at least at present. While Gartner, president of the Gartner Group, [redacted] good today because it is keeping prices down, he speculated that "in 10 years, if IBM sees it has a position of dominance, and if IBM realizes it has won the war, and the pace of innovation slows down . . . then it could be adverse for users."

A spokesman for another IBM competitor, though, said he believes enough indepen- [redacted] ways exist to keep Big Blue's major competitors in the game. According to Memorex Corp. spokesman Bob Fermoyle, competing with IBM "isn't a survival question" for Memorex, even though CDC has exited the storage system market, and STC is now in Chapter 11. "A certain percentage of [data processing] shops will be two-vendor shops forever," he observed. "They want and need that competitor."



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1983 IBM Market Share

Market	Rank	Share	1983 Worldwide Shipments All U.S. Manufacturers
Mainframes	1	72%	$22 billion
Small Business/Minicomputers	2	17%	$ 9 billion
Personal Computers	1	26%	$12 billion
Terminals	1	40%	$ 6 billion
Mass Storage	1	70%	$ 8 billion
Word Processors	1	25%	$ 5 billion
Software	1	30%	$ 8 billion
Personal Computer Software	1	10%	$ 1 billion
Private Branch Exchanges (Rolm Corp.)	1	21%	$ 3 billion
Semiconductors (Intel Corp.)	3	18%	$ 6 billion

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Case settlement raises questions

Did the U.S. government drop its antitrust case against IBM because it believed the judge in the case, David Edelstein, was about to decide the case in the government's favor?

That claim, made by one of the former chief prosecutors of the government's case, Raymond Carlson, is only one of the issues surrounding the unsettled case, which lasted 13 years before the government gave up trying to prove that IBM violated antitrust laws.

In an interview last month, Carlson said "The reason [the case] was dismissed was that the Reagan administration had concluded that the judge was going to find that monopolization had occurred."

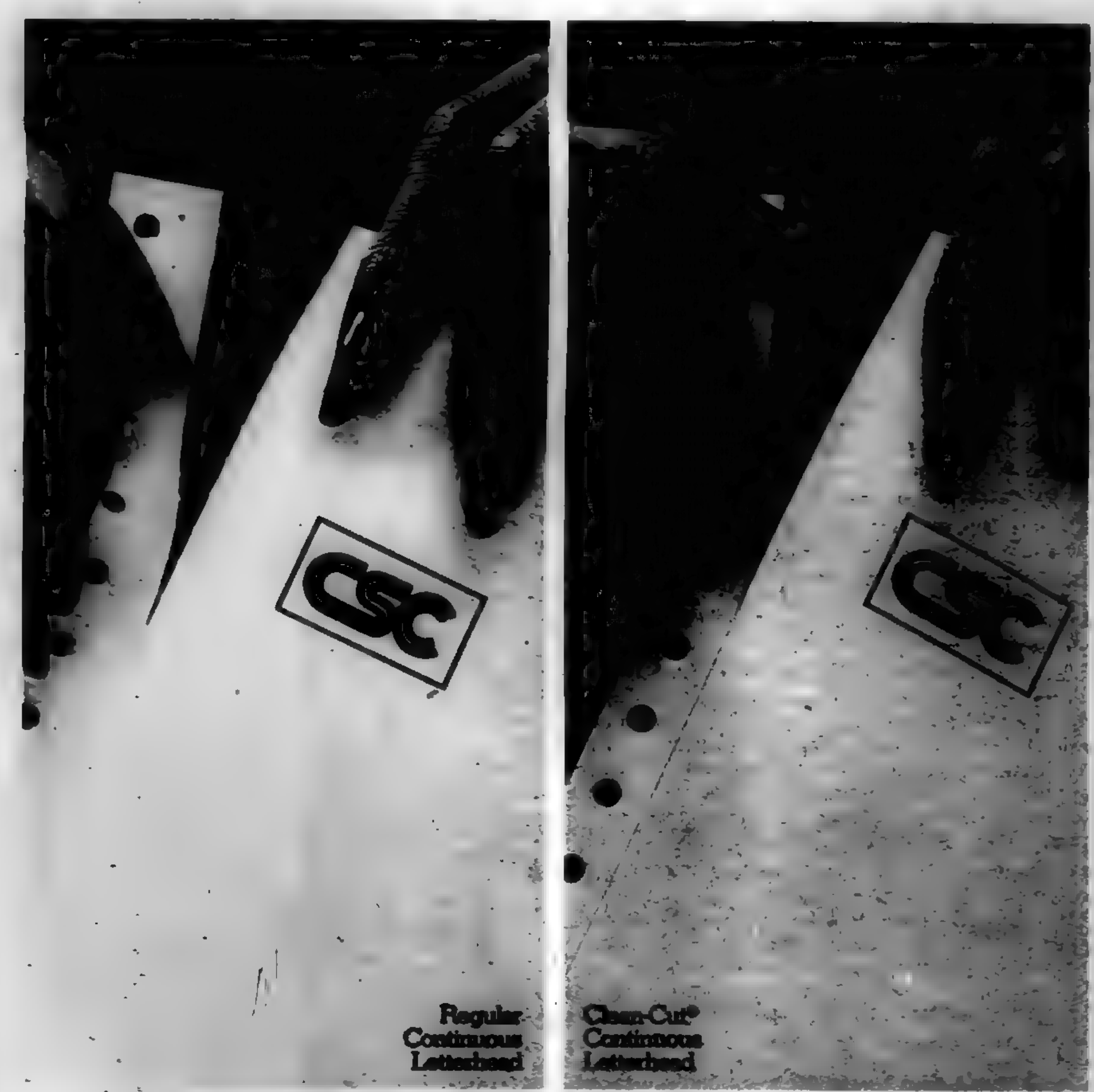
Former Assistant Attorney General William Baxter, however, insisted that the government abandoned the case because of a lack of evidence.

Had Edelstein ruled in the government's favor, the likely penalty is uncertain. Would the firm have been fined or would it have been broken up, as was the case in the suit brought by the government against AT&T, and settled on the day that the IBM prosecution ceased?

One economist who testified on the government's behalf, Lee Preston of the University of Maryland, said he "was sorry that IBM Domestic and IBM World Trade were not separated."

One or both of the two divisions, competing as separate firms, he said, might eventually have become as eager and innovative as Northern Electric after it was separated from Bell Canada to become Northern Telecom, Inc.

Preston said he did not view the U.S. Justice Department's conditional approval of IBM's acquisition of Rolm Corp. as creating the potential for an IBM monopoly in private branch exchange communications. "Rolm is not a terribly large company," he said.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EDITORIAL

New Year's revelations

You hold in your hands *Computerworld*'s fifth annual Forecast issue: the culmination of months of effort by the editorial staff of this newspaper.

As in previous years, our objective has been to suggest the forces and trends data processing management will have to reckon with in 1985. We paint in broad strokes in this issue, leaving the fine detail to professional forecasters and the events themselves to the future. Some key areas to watch are:

- **DP budgets will be more conservative in 1985.** Yes, corporate DP budgets are growing, but at a slower rate than in any of the past three years. Managers surveyed by *Computerworld* in late November reported an overall budget increase of 9.9% in 1985 vs. 12.4% in 1984, which means there were fewer new hires, deferred software purchases, tighter cost control and a continued applications backlog.
- **Microcomputer costs will drop, but the user's cost may climb.** Micro users are getting more bang for the buck from their hardware, but the typical configuration cost is rising, not falling. This is because full systems service and support does not come cheap. By one estimate, each fully supported desktop machine in a Fortune 1,000 company costs $8,000.
- **Capacity planners face increased demand for more horsepower.** The growing number of micro and intelligent terminal users who want access to the mainframe will further strain system resources. Accommodating them will require new and unexplored approaches to a problem that will not go away.
- **More users will embrace bypass.** A number of Fortune 1,000 companies are not waiting for dust from the AT&T divestiture to settle. They have begun to take control of line rates by practicing some type of local or long-distance bypass. Technologies such as CATV networks and low-cost, two-way satellite systems are expected to mature in 1985, heightening user interest in bypass alternatives.
- **IBM software prices will rise.** One of the fastest growing segments of the company, software is an increasingly important component of IBM's revenue growth. Software products could account for 8% of total revenues in 1985, up from 6.5% in 1982. Users should probably brace themselves for higher price tags — dramatically so, in some cases.
- **The Japanese still face major hurdles in the U.S. computer market.** Japanese companies have not yet cracked the micro and large-systems markets in the U.S. — nor will they in 1985. This owes to weaknesses in Japanese software, lack of American distribution channels, unfavorable market-entry conditions and cultural differences.
- **The threat of the "intelligent terrorist" will require DP vigilance.** The intelligent terrorist that recognizes the value of computer centers to the fabric of society fortunately has not yet arrived. But terrorists have launched isolated attacks on data centers, and authorities warn of the threat to fragile computer-based networks.
- **Supercomputers will find a new market in commercial DP.** High-speed vector processing remains largely the preserve of scientific or engineering heavyweights. But number-crunching machines are moving into corporate environments.

You'll find these and other revelations in the pages of this issue. We'll be watching them as closely as you throughout the new year.

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HAPPY HOLIDAYS!

LETTER

Basic DP concepts need rethinking

Hurray for David Hayes in "Integration halves fireplace maker's DP costs" [CW, Dec. 3]. The decisions that he successfully implemented are not easily swallowed, but the underlying problem that he managed to turn around has roots that go very deep.

More and more followers and leaders of DP are being asked to use a product or methodology that never or only partially performs its intended function. Many times the product may even be outdated by the time it is implemented. All of this is forcing a rethinking of the basic DP concepts.

One wonders if corporate expenditure decisions for DP support are being left in the hands of those who have mastered the ability to double-talk. They were probably very good at the hula hoop, wear Calvin Klein jeans at home and rallied to Mel Brooks' cry, "Gentlemen, we've got to protect our phony-baloney jobs." These people love water-cooled, bubble-memoried, cattle-prod-prompted behemoths and closets full of razzmatazz. But then, they don't have to use it.

People who make the decisions must be those who are actively involved with the problems at hand and have to solve the problems using the tools they acquire. It is not enough to allow expenditure decisions to be made based on hyped-up brochures and media blitzes surrounding a product that has been packaged to appeal to the market's sublime pleasure centers.

Hayes seems to have been very fortunate in that he levelheadedly approached the inadequacies of his shop's position, got back to the problem at

See LETTER page 128

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VIEWPOINT

'Know-how' machines on the horizon

LECHT ON SCIENCE
Charles P. Lecht

Part 1 of series

Recent happenings in our industry suggest that 1985 will be the year when practical artificial intelligence applications will leave research laboratories to make their way into our workaday world. The increasing availability of macro systems capable of processing massive information bases is making it possible to create such systems.

The emergence of advanced, integrated service, digital networks and powerful terminals is paving the way for AI systems. Emerging federations of high-technology companies and traditional business institutions — finance, insurance, energy, education and so on — will create the source of their intelligence.

The formation of these federations is an event of staggering beauty. Born in the late 1940s, our computer industry has evolved from a few, small laboratories producing experimental calculating instruments to a massive enterprise spawning an ever-increasing sea of data and information processing devices — some of which seem to possess an intelligence that confounds us. To many, this intelligence appears indistinguishable from that which we thought was found only in human beings.

Evolving partnership

During this evolution, the model of our American computer industry, as it related to other industries, was cloned both inwardly and outwardly. It spread from our largest industrial corporations to our smallest and spilled over into foreign lands. Now, this model, which heretofore presumed the employment of computer technology to be mostly an adjunct to other industries, is changing to become one of partnership. This is likely to create new product development environments that are catalysts for computer system technologies of improved utility.

I believe the appearance of these "know-how" machines confirms that our hopes and aspirations for the creation of computer systems are being realized — more productivity with [illegible] toil.

There follows, now, a scenario for how this happens. As if obeying some mysterious and immutable law instituted in its collective consciousness by an otherworldly force, the banking industry's largest members have metamorphosed into massive computer systems/banks. Similarly, our largest computer companies are undergoing a metamorphosis to massive information processing systems that do more than merely provide hardware, software and services; Control Data Corp., IBM, General Electric Co. and many others now offer financial services.

Joint ventures and acquisitions

At the same time, both banks and computer companies are creating federations with the largest corporations in other fields: Communications, automotive, publishing, brokerage, insurance, manufacturing and aerospace companies head the list. These usually start as joint ventures, such as the recent IBM and Merrill Lynch Pierce Fenner and Smith, Inc. venture to market financial data systems and services [CW, March 26]. They can also emerge through acquisitions, such as General Motors Corp.'s takeover of Electronic Data Systems Corp. (EDS) [CW, Oct.1, Oct.22].

However they happen, these new business entities prefigure the form all industries will adopt as computer technology joins with other industries to transform the way we do business.

The products resulting from such federations will provide us with the means to address problems of increasing consequence to us. They will, quite naturally, see first application to problems with the biggest payoff potential. Later, they will be used to spawn systems whose costs will put them within reach of ever-smaller enterprises, providing one of mankind's most precious gifts — automated know-how. The kind of capability, for example, created when IBM and Merrill Lynch work together to address personal financial problems, or when GM and EDS collaborate to address mobility prob[illegible]

Replication of all intelligence levels

I call these systems "know-how machines" rather than, say, "expert systems" on purpose. The former may appear to be nothing more than a euphemism for the latter — an AI entity possessed of expertise. I intend for know-how machine to have a broader meaning than that implied by the word "expert." I envision AI embracing the replication, in machine format, of all forms and levels of intelligence that we encounter in the world of human intelligence — and hopefully more.

I cannot conceive of a world devoid of dumb, sometimes fumbling robots, in addition to others that may eventually exceed us. Like old Chevrolets, primitive forms of artificial intelligence will always find a place. I say this because I want to reserve the title of expert system for a special class of know-how machine — those possessing expertise as we have come to accept its meaning. Many know-how machines, in fact most, will possess no more expertise than the mundane skills expected of people in the nonexpert category.

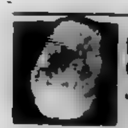
Large or small, possessing expertise or something less, know-how machines will be composed of hardware, software and data and will be packaged in a manner to facilitate their swiftest application. They will be purchased and installed by businesses and individuals alike. Their availability will enable a quantum leap in our industrial efficiency, and the basis of our economic system — competition — will benefit from their appearance. Success will be based less upon what the competition cannot do because it lacks know-how and more on what it can because it has know-how.

You may consider this forecast the

See KNOW-HOW page [illegible]

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Hacking incidents mandate stricter security



HUMAN CONNECTION
Jack Stone

This industry has seen its share of bizarre antics over the years, but I don't recall any as weird — perhaps distressing is a better word — as that concerning Richard Sandza, a reporter for *Newsweek* magazine. The story was splashed all over the news recently, but if you missed it, let me give you a quick summary.

Sandza, in an article he wrote for the magazine Nov. 12, let the public in on a secret that was surely no surprise to DP workers. A ring of hackers, operating an elaborate underground network using personal-computer-based electronic bulletin boards, had been passing around illegally obtained computer access codes, credit card numbers and telephone numbers.

As a consequence of his article, the hackers stuffed Sandza's phone line using autodialing systems; threatened to shut off his home electricity by remote control of the power company computer; and conducted a modern-day version of a medieval inquisition — a "teletrial" — in which they debated his fate — anonymously, of course — over a central bulletin board.

But this was just fun and games for these hackers — a warm-up for the big league. With a little ingenuity, they cracked the TRW, Inc. Information Services Division's credit files, pulled Sandza's credit card codes and passed them around.

> *It is completely mystifying why organizations that provide telephone access to their data bases continue to equate security with little more than password protection and user identification.*

The issue here is not how far out of touch with this society these people are, nor how much sympathy they deserve because their parents didn't give them nickels for Tootsie Rolls when they were kids, causing them to feel unloved ever since. The truth is that they violated the law in numerous ways — wire fraud, conspiracy and threats of bodily harm — and should be sent to prison until they learn their actions will not be tolerated.

Let me turn now to the issue of the security controls on the TRW credit system — or better stated, the lack of controls. This system should be familiar to you as the result of a highly publicized incident earlier this year when hackers reportedly penetrated the TRW division's files [CW, July 2] — an action that be can performed by any high school dropout who can steal a subscriber's telephone number and password and has a thousand dollars or so to invest in a low-grade, modem-based micro.

Delia Fernandez, TRW Information Services' public affairs director, said in the Dec. 6 *Washington Post*, "You can put all the sophisticated bells and whistles on a computer that you can think of to keep it secure. But if someone who has the legitimate right to get into the system . . . releases the password . . . you have lost that security."

This statement provides a shocking example of the naivete associated with system security that penetrates this industry. After years of warnings, it is completely mystifying why organizations that provide telephone access to their data bases continue to equate security with little more than password protection and user identification.

I realize that there would be added costs and inconveniences involved in implementing additional security safeguards. But consider the legal problems presented by the illegal penetration and distribution of data.

Can it happen to your data center? That's for you to judge. ‡

Stone is an independent management consultant, educator and writer, specialising in DP human communications and personnel development, based in Washington, D.C.

LETTERS

AI programs not true to life

As I was reading "Experiments in Artificial Intelligence" [CW, Nov. 12], I found myself disturbed, not so much by the content of the text, but by the content of the examples. I became irritated while reading the divorce scenario, which was analyzed by the Boris AI program. I found the cliche about women being selfish, dishonest and promiscuous irritating. Of course, the man was hardworking, but poor, and had to defend himself from the selfish wife.

As I glanced back over the examples, it became apparent that many others were equally poor. For instance, the example used by the Margie program showed that women could only receive action. At no point did women initiate an action. Women were told, advised, reminded, sold to, and assaulted. Men, on the other hand, were able to do things, not just have things done to them. Men told people what to do, hurt other people, gave people things, went places and prevented things from happening.

The Sam, Pam, Frump and IPP programs were not given any better reading material. Women were not worth discussing, apparently.

In the conclusion, the authors pointed out some of the fallacies that the IPP program made as a result of reading these examples. One is forced to wonder what conclusions the program would have made about women and men.

It is not clear whether the fault owes to the selection of examples for the article or whether the examples given to the programs were full of absurd and offensive cliches about women and men. If the former case is true, perhaps the authors should have given as much thought to how the readers would interpret the article as they gave to how computers understand language. If the latter is true, the individuals who wrote the examples should examine their own thinking. Either way, the articles should have been well-balanced and well-written. The articles in *Computerworld* should spark intelligent and creative thought about issues in the computer business, not reinforce outdated social ideas.

Beth Shelly
Cary, N.C.

KNOW-HOW

from page 127

product of unbridled optimism. There were those who only a few, short years ago pooh-poohed the possibility that tens of millions of computers — more powerful than they had ever seen — would make their ways into our offices and homes. Some doubted that orbital flights would be routine and available for commercial applications and education. Automated bank tellers were inconceivable not too many years ago, yet they are commonplace today.

Now, I don't expect know-how machines to appear everywhere overnight. But in 1985 they will start to appear, and when they do, the rush to acquire them should provide endless opportunity to our computer industry.

Systems that can do the work of bank tellers, typesetters, environmental controllers, mail deliverers, draftsmen, guards and telephone operators all display some measure of intelligence as we define it. The fact that a bank teller had to use his brain to perform transactions and that machines now perform the same duties must lead us to the conclusion that machines have been imbued with some measure of intelligence. To argue that the job of bank teller does not require intelligence is unwarranted and an insult to the people who made — and still make — this a career.

LETTER

from page 126

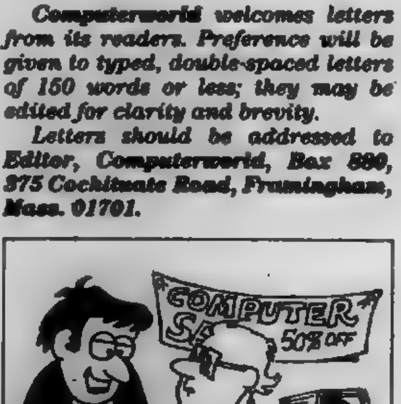
hand, identified the solution and then was able to sell it to the right people, rather than attempt to prop up bad money with good money.

When we make the decision to spend the money, let's get back to the basics. Is it cost-effective for now and the future? Is the mission accomplished efficiently and correctly? Is the finished product what the user wanted? Designer jeans are too expensive for the use you get out of them. Let's leave fads and cosmetics to the young and let's be realistic and mature in our decisions. I'll take my faded blue jeans, thank-you.

Mike Stonecipher
St. Louis

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for clarity and brevity.

Letters should be addressed to ***Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.***



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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Writer

Unix may enter 1985 as hot topic

It is customary at this time of the newborn year to reflect on the previous year in terms of important events and major trends. Any number of pundits and observers will begin to speak of 1984 as the year of *this* or the year of *that*.

Undoubtedly, some analysts will say that 1984 was the year of Unix — at least, they will claim, it was the year Unix became a hot issue in the computer industry. They will point to unbridled AT&T's major Unix forays and IBM's introduction of its Personal Computer — PC/IX — version of that operating system and the availability of Microsoft Corp.'s Xenix for the Personal Computer AT. They will also make glowing reference to the increasing stock of software packages introduced for Unix and the growing number of small systems with Unix support announced last year.

But if 1984 was a year in which public attention was turned to Unix, it was also a year in which its detractors became more vocal about that operating system's limitations. Nay-sayers spoke of the basic incompatibilities between the different versions of Unix, the system's lack of security mechanisms and so-called user-friendliness and the absence of advanced features such as windowing.

Unix proponents, however, say those are limitations that can be overcome, and they claim that the system's strengths — its mulituser, multitasking capabilities — outweigh its weaknesses. Much of the leviathan AT&T's new competitive strategy rests on the success of Unix — System V, at least. While AT&T may be new to the open market, it certainly has the resources required to make its presence felt in a big way. Thus, Unix backers say, if 1984 was not the year that Unix won over the majority, 1985 or some subsequent year will be.

Though Unix is AT&T's leading weapon, a key factor in the success of that system is clearly IBM. Considering IBM's dominance in the high- and low-end computer markets, what the blue force does

See UNIX page 136

Policy options aiding software industry released recently

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — A U.S. government agency has urged consideration of several policy options designed to aid the U.S. software industry in maintaining its expected short-term leadership of the world software market over the longer term.

In a comprehensive review of the industry released recently, the agency reviewed the past, present and future of the U.S. software industry in light of technological changes and foreign competition.

"A Competitive Assessment of the United States Software Industry," drafted by a branch of the U.S. Department of Commerce's International Trade Association (ITA), concluded that the worldwide market share of U.S. software vendors should grow from its current 70% to 75% in 1987. Over the longer term, however, the U.S. software industry could be at a disadvantage relative to foreign competition due to U.S. government policies discouraging market growth and policies of foreign governments favoring their own domestic companies.

The ITA's Office of Computers and Business Equipment prepared the report over an eight-month period as part of Commerce Secretary Malcolm Baldridge's plan to draw up competitive assessments analyzing U.S. industries. The study offered the following options for consideration by the U.S. government that could aid the U.S. software industry in maintaining its current leadership.

- A coordinated program to promote the U.S. position that copyright law is the best overall form of software protection;
- Bilateral discussions to ensure that signatory nations adhere to international conventions on copyright protection of software;
- Through diplomatic channels, to strongly protest proposals by nations that seek to establish special legal systems outside of copyright law;

See STUDY page 134

INSIDE

Systems Software/130

AI field faces crucial barriers to acceptance

By David Gimes
CW Staff

PALM SPRINGS, Calif. — Artificial intelligence promises to have a "profound impact" on the computer industry in creating new products, but a number of barriers will have to be overcome before commericialization blossoms, according to an executive with a leading AI company.

Lee M. Hecht, chairman and chief executive officer of Teknowledge, Inc., a Palo Alto, Calif.-based, artificial intelligence firm, said the next several years will be crucial in determining the commercial development of AI. Hecht's remarks came at the annual Strategic Issues Conference here, sponsored by Infocorp, a Cupertino, Calif.-based market research firm.

One of the principal problems facing the field , Hecht said, is that for many people artificial intelligence means that computers will think like human beings. "There is this unfortunate distraction that has oc-

See AI page 134

Alsys compiler gets validation

Ada implementation runs on DEC VAX line

WALTHAM, Mass.— Alsys, Inc. has announced validation of its first Ada language compiler. The compiler was validated under the Department of Defense's revised Ada Compiler Validation Capability test suite Version 1.5, which became mandatory in December 1984.

Reportedly, the Alsys Ada compiler allows users of Digital Equipment Corp.'s VAX family of computer systems to develop and compile Ada programs and applications on the VAX. The compiler is targeted to systems using the Motorola, Inc. 68000 microprocessor and the AT&T Unix operating system.

A spokesman said Alsys' root compiler technology is 80% transportable to any other system. which means that only 20% of Ada compiler code needs to be custom-written for another host computer. The price of the Alsys Ada compiler is $35,000.

Alsys is located at 400 #1 Totten Pond Road, Waltham, Mass. 02154.

BIM [illegible]ght

Wouldn't it be nice to have a couple more terminals on your desk?

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BIMWNDOW permits multiple terminal sessions to be active concurrently at the same physical 3270 CRT, under DOS or OS VTAM. The user may switch back and forth instantly between the terminal sessions by hitting a PA or PF key. The terminal sessions may be in the same or in different VTAM-connected partitions/regions. For example, one session might be logged on to a CICS partition or to TSO to do program editing, and another session connected to a test CICS to test the application program being developed.

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Price: OS — $3600 or $180/mo., DOS — $2400 or $120/mo.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

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Direct marketing expert system serves IBM shops

WOBURN, Mass.— Persoft, Inc. has introduced an expert system designed for direct marketing organizations. The system reportedly allows users to determine which names on a mailing list should be mailed to and which names should be excluded from promotions because the recipient will probably not respond. The package is written in Cobol and runs on IBM processors under IBM's OS, MVS and DOS operating systems.

According to a spokesman, the Mail Order Response Enhancer (More) analyzes historical response data or the results of a test mailing and [redacted] of a likely respondent. The package assigns to each name on a list a statistical response value then issues a ranking of a list from most likely to respond to least likely to respond.

The system saves data on when mailings took place to individual names and what was mailed and incorporates the data into its forecasting equation. Individual companies using the system determine other characteristics to be figured into the equation, which may include demographics, psychographics, geographics and others, the spokesman said.

Once raw data is input, the matching of test results against the entire file and the ranking of files occurs automatically. The system reportedly "learns" from one mailing to the next, continually refining its profile of a likely respondent. The More system — using the client's mailing lists — can also target entire groups of people who would be likely to respond to new [redacted]

More is priced at $375,000. Persoft is located at 600 W. Cummings Park, Woburn, Mass. 01801.

SYSTEMS SOFTWARE

UNIPRESS SOFTWARE, INC.

Amsterdam Compiler Kit

Unipress Software, Inc. has introduced the Amsterdam Compiler Kit for AT&T's Unix operating system. The kit is a package of C and Pascal compilers and assemblers for C and Pascal programs on Digital Equipment Corp.'s VAX-11 and PDP-11 computers, and on Motorola, Inc. 68000 and Intel Corp. 8086-based processors under the Unix operating system.

The kit is a collection of programs developed at the Vrije University of Amsterdam to simplify the task of producing portable compilers and interpreters needed for micros and minicomputers.

It contains the complete sources of all programs — Source C compiler or Unix license required from AT&T — plus internal documentation describing how to make the modifications needed to add a new program language or a new target machine. Cross interpreters, used for testing, are also included.

Eight components are included: preprocessor, front end, "peephole" optimizer, global optimizer, back end, target machine optimizer, universal assembler and utility package. The full system in source is priced at $9,950 [redacted] tions), and selected binaries are priced at $4,500.

Unipress Software, Suite 312, 2025 Lincoln Highway, [redacted]

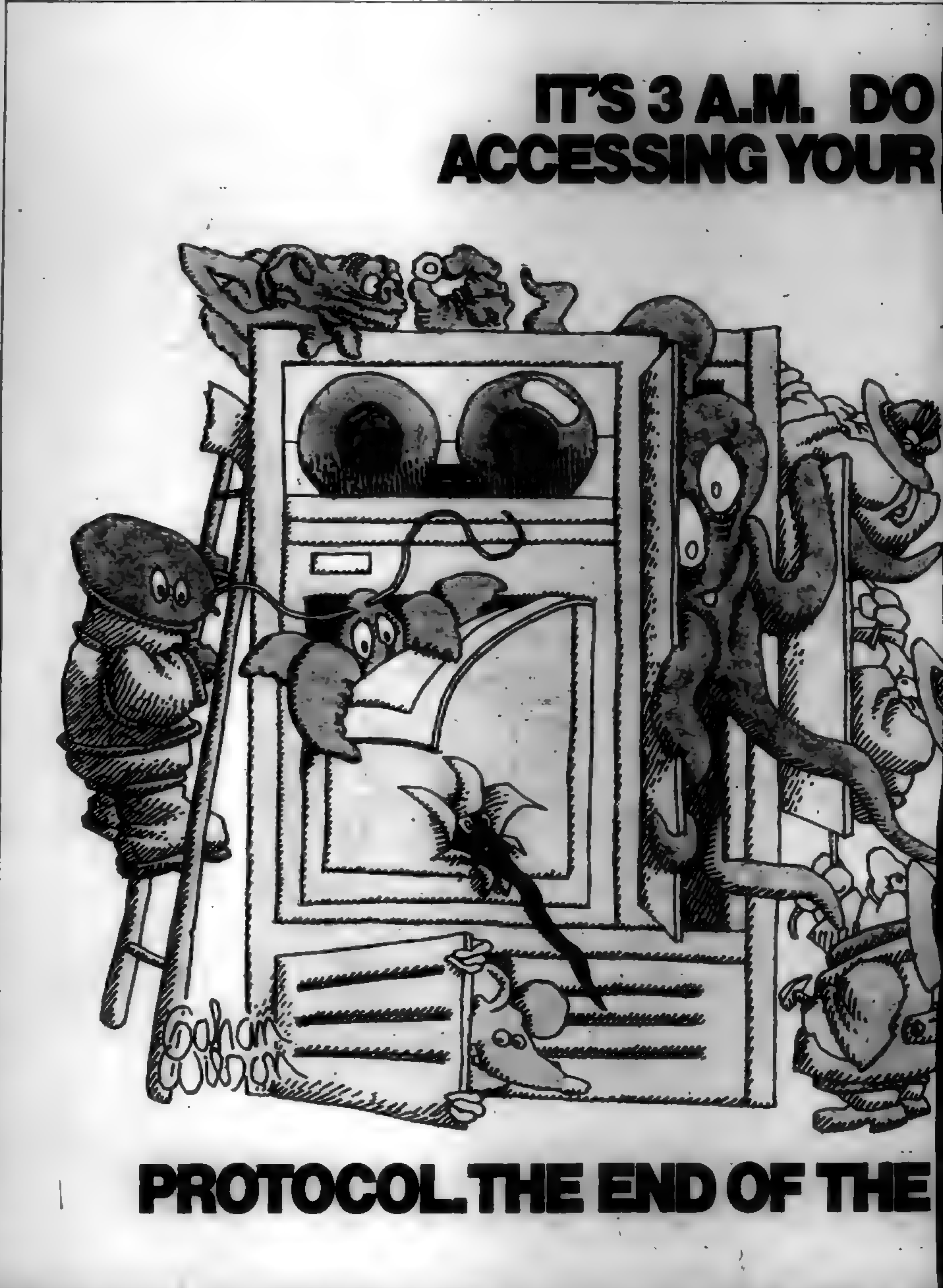
MCTEL, INC.

P/C Privacy: Personal/ Confidential

Mctel, Inc. has announced that its P/C Privacy: Personal/Confidential antipiracy package, formerly available only for microcomputers, is now also available for IBM 4300 and 3080 series and 370 mainframes under IBM's VM/CMS or OS/TSO operating systems and Digital Equipment Corp.'s VAX-11 computers running under DEC's VMS operating system.

According to a company spokesman, the package en-

Continued on page 131



SOFTWARE & SERVICES

Continued from page 130

crypts any file to provide privacy on the user's disks or over electronic mail. The user controls the encryption process with a key word that can exceed 100 characters and can be changed at any time. Encrypted files can be transmitted between terminals and other computers.

The price of the package ranges between $3,900 and $4,500, depending upon host configuration.

Mctel, Suite 506, Three Bala Plaza E., Bala Cynwyd, Pa. 19004.

COMPUTER ASSOCIATES INTERNATIONAL, INC.

Version 3.0 of CA-Raps

Computer Associates International, Inc. (CAI) has announced Release 3.0 of its CA-Remote Access Power Support (Raps) system for users of IBM's VM/CMS operating system.

According to a spokesman, enhancements to the product allow the user to select, display and manipulate entries in VM/SP spool queues and Power/VSE spool queue entries in IBM's DOS/VSE operating system.

CA-Raps is said to allow Power/VSE or VM/SP spool files to be printed at remote IBM CICS/VS or Remote Spooling Communications Subsystem-controlled printers. The user can initiate the print required independent of the batch system, the vendor said.

A three-year license for CA-Raps on the DOS/VSE operating system is $4,500.

Computer Associates International, 125 Jericho Tnpk., Jericho, N.Y. 11753.

VM SYSTEMS GROUP, INC.

Release 2.0, V/Spell

VM Systems Group, Inc. has announced an enhanced version of V/Spell, its interactive spelling checker for IBM Information Centers and other IBM VM/SP installations. V/Spell adds a Spell subcommand to IBM's Xedit, the primary editor for the IBM CMS component of VM.

According to a spokesman, Release 2.0 of V/Spell increases to eight the number of supplemental dictionaries that can be used at one time, and it can handle words up to 32 characters long. Installations can provide a local dictionary containing words unique to the site. The Spell subcommand allows users to check each word in the file being edited against a series of dictionaries.

Release 2.0 of V/Spell is priced at $2,360.

VM Systems Group, Suite 515, 2300 S. 9th Road, Arlington, Va. 22204.

EMPACT SOFTWARE, INC.

Stop-X37 enhancement

Empact Software, Inc. has enhanced its Stop-X37 package, which was designed to stop abnormal terminations in an IBM MVS or MVS/XA operating system environment.

According to the company, an option has been added that eliminates the condition that occurs when MVS cannot find the primary allocation for a new data set. The product reportedly will intercept the job at the time of abend, find available disk space, allocate the space to the job and continue the job without abending, the company said.

A permanent license for Stop-X37 costs between $7,000 and $15,000, depending on the CPU, the vendor said.

Empact Software, P.O. Box 1297, Stone Mountain, Ga. [illegible]

OXFORD SOFTWARE CORP.

Pcmainframe Release 1.2.1

Additional emulator board support has been added to the latest release of Oxford Software Corp.'s micro-to-mainframe link software. The package also supports IBM's PC-DOS Release 3.0 operating system, the company said.

Release 1.2.1 of Pcmainframe is an intelligent data transfer system that is said to allow personal computer users to upload and download generalized files to and from an IBM mainframe in a real-time environment.

According to the company, the emulator board now supports IBM's 3270 Personal Computer and IBM Personal Computers using Microplus, Inc.'s Microplus MP01 3278/79 emulator board. It also supports AST Research, Inc.'s AST bisynchronous and Systems Network Architecture/Synchronous Data Link Control boards and Ideassociates' Ideacomm

Continued on page 132

YOU KNOW WHO'S MAINFRAME?

This real life nightmare can make any DP manager lose sleep.

You want to give more people access to your corporate mainframe, so they can get the information they need.

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For example, our PCI protocol converter boxes and PCI-Link add-on communications board both require users to identify themselves with a special password before they can access your host.

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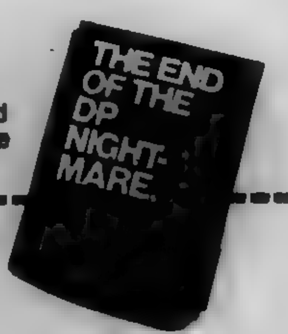

Protocol Computers, Inc.
6150 Canoga Avenue
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CW/[illegible]

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Continued from page 131

3278/79 emulator board, the vendor said.

The price of the product is $9,000 for eight personal computer licenses on IBM's DOS operating system and $12,000 for eight personal computer licenses on IBM's OS operating system, according to the vendor. The cost for each additional micro is $300.

Oxford Software, 174 Blvd., Hasbrouck Heights, N.J. 07604.

INTERNATIONAL BUSINESS INFORMATION SYSTEMS

Utilities for DOS/VSE

International Business Information Systems has announced a series of utility programs for IBM 370, 4300, 3030 and 3080 series mainframes under IBM's DOS/VSE operating system.

The Dump, KSMT, Stat, Open/Shut and KTST programs operate in IBM's CICS/VS environment; Spacemap is a batch program.

According to a spokesman, Dump provides a hexadecimal dump of a given virtual address, any of 16 specific CICS areas and any of 18 DOS/VSE system areas.

KSMT displays statuses and statistics from terminal, program and file tables.

Stat provides statistical summaries of the items provided in the KSMT individual display. The display also shows system initialization time and provides activity counts by second as well as seconds by activity counts from initialization time.

Open/Shut reportedly allows dynamic opening and closing of files and IBM DL/1 data bases by individual file control table identifiers and/or by preassigned groups.

KTST provides a hexadecimal display of individual (keyed) files defined by the CICS file control table. Functions include hexadecimal/decimal and decimal/hexadecimal conversion and the ability to initiate a task at a specified time interval on a list of terminals.

Spacemap reads a Vsam catalog and produces a condensed listing of the most common file specifications.

Each utility program is priced at $300. Discounts are available for purchases of more than one program.

International Business Information Systems, P.O. Box 15780, 828 Royal St., New Orleans, La. 70175.

BOSTON SYSTEMS OFFICE

BSO/C compiler for 6809 and Z80 processors

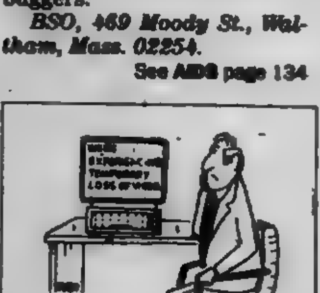
Boston Systems Office (BSO) has introduced a C compiler for Motorola, Inc. 6809 and Zilog, Inc. Z80 microprocessors on Digital Equipment Corp.'s VAX line of computers.

The BSO/C is reportedly an enhanced C compiler that is said to permit easier C language programming for embedded microprocessor systems and applications. It includes optimization functions, microprocessor-oriented interrupt and I/O instructions, recursive and reentrant code programming capabilities and symbolic debugging support, the vendor said.

The BSO/C compiler comes with runtime libraries and is priced at $5,000 when bought with BSO's corresponding assemblers and debuggers.

BSO, 469 Moody St., Waltham, Mass. 02254.

See AIDS page 134



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THE 10 MOST IMPORTANT QUESTIONS YOU SHOULD ASK YOUR SOFTWARE VENDOR

> *"Many questions you would ask prospective application software vendors don't differentiate one vendor from another. The similarities between suppliers are not what's important—it's the differences that count. Here are ten questions you should ask prospective application software vendors before making your selection."*
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> *—John C. Gable,*
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> *for American Software, Inc.*

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2. Can the application software be delivered for VSAM and all popular data base management systems, rather than being tied to the application vendor's data base system—one which could be outmoded by new data base products developed by another vendor in this rapidly-changing high-technology industry?	Yes	?
3. Is the application software implemented using a "native" or direct approach to the operating system, teleprocessing monitor, and data base manager, without the inefficiency associated with "bridges" or the vendor dependencies of a "black box" approach?	Yes	?
4. Is the application product coded in an efficient, widely-used, and industry-standard language such as COBOL, rather than a vendor-dependent language unknown to the general data processing community?	Yes	?
5. Can the application product be "tailored" or streamlined to meet the specific functional and operational needs of a company through purchase of a basic package and selected optional features, thereby avoiding delivery of useless code?	Yes	?
6. Does the vendor retain a source version of each customer's uniquely tailored application software for emergency backup, problem determination, and client assistance?	Yes	?
7. Does the vendor have a broad, completely integrated line of application software which can be demonstrated on a single system instead of merely described?	Yes	?
8. Have all of the vendor's products been integrated by design and developed by a single organization, thus eliminating the need for inefficient interfaces and unknown "black boxes" to tie together unrelated or acquired applications?	Yes	?
9. Does the vendor clearly demonstrate a full commitment to the complex business of application software, rather than offer an incidental addition to its main product line?	Yes	?
10. Has the vendor been in the application software business a minimum of ten years with a successful track record of sustained profits and a strong financial posture?	Yes	?

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AIDS from page 132

INTERACTIVE SOLUTIONS, INC.
Help

Interactive Solutions, Inc. has announced an on-line documentation package for IBM CICS applications. The Help package reportedly gives immediate access to field-level documentation. When the use of a field is questioned or an entry rejected, users place the cursor under the field and hit a Help key. The original screen is replaced with a display describing that field. The enter key restores the screen to its original format.

Permanent license for Help for IBM's OS and DOS operating systems is $9,195 for one CPU.

Interactive Solutions, 140 Rt. 17 N., Paramus, N.J. 07652.

NEC INFORMATION SYSTEMS, INC.
Remote Workstation Adapter

NEC Information Systems, Inc. has introduced a software package that is said to allow any microcomputer that supports Digital Equipment Corp.'s VT100 terminal emulation to act as a remote workstation on NEC's Astra 32-bit minicomputers.

Workstations at remote sites are linked to Astra systems through modems connected by an adapter to the NEC Remote Workstation Adapter controller, the vendor said. Each controller reportedly can support four remote VT100 terminals or emulators. One controller and one adapter costs $2,000.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

ADVANCED SYSTEMS CONCEPTS, INC.
Status/38

Advanced Systems Concepts, Inc. has announced Status/38 for IBM's System/38 under the CPF operating system Release 6.0.

Status is said to help users discover how system resources are being used. The product reportedly provides inquiries, reports, graphics and charts of data accumulated by itself and the CPF operating system.

The accounting features of Status reportedly track facets of system use. A charge-back system is also included, so users can be billed for their use of system resources.

The price for Status/38 is $1,500.

Advanced Systems, Suite S, 1350 Remington Road, Schaumburg, Ill. 60196.

AI from page 129

curred because of the use of a human analogy," he said.

Hecht said his company actually tries to avoid the use of words such as artificial intelligence or expert systems. "The idea is that machines will do things that human beings normally use machines to do," he said.

Another barrier to wide commercial use of AI is the popular perception that it has a "soft character" or that the technology is not really vital, Hecht said. "Because it has a broad range of applications, AI is often viewed as a solution in search of a problem." He added that the misperception will be overcome as more concrete applications come into use.

On the other hand, he said, inaccurate media reports "have helped to create a distorted view of what the field is about." Because the commercial market does not understand the technology, companies that participate in the market will have to offer training, products and help in applying the technology, Hecht said.

AI will be increasingly used in vertical applications, in which the technology will not so readily be apparent to the user, he said. "Artificial intelligence will become invisible."

Another prerequisite to the growth of AI is the need for experienced people to apply the technology. Hecht said he believes the shortage of knowledge engineers eventually will be met by people entering the field from other disciplines and by the creation of better development tools for AI specialists.

AI-related technology is expected to be an $11 billion industry — or about 5% of the total computer industry — by 1990, according to Arthur D. Little, Inc.

STUDY from page 129

■ Combat software piracy by requiring that countries seeking access to the U.S. market respect intellectual property rights and, if necessary, consider trade sanctions against countries that do not provide adequate legal protection.

■ Continue efforts to lower foreign barriers to free trade.

■ In the development of U.S. export control policy, strike a balance between national security and commercial interests so as not to place U.S. suppliers at a disadvantage.

■ Lengthen the term of the current research and development tax credit and broaden coverage to include more software.

While the study concluded that the U.S. software industry currently dominates the world market and should continue to do so over the next three years, it noted that foreign governments have promoted development efforts among their domestic companies that have already resulted in success in certain areas.

"The major negative factors affecting the U.S. software industry overseas are likely to be inadequate legal protection of software and restricted access to key foreign markets," the report said. The agency said Japan is likely to become the strongest competitor to the U.S. software industry.

The full report, stock number 003-009-00436-5, is available from the U.S. Government Printing Office, N. Capitol and H St. NW, Washington, D.C. 20401.

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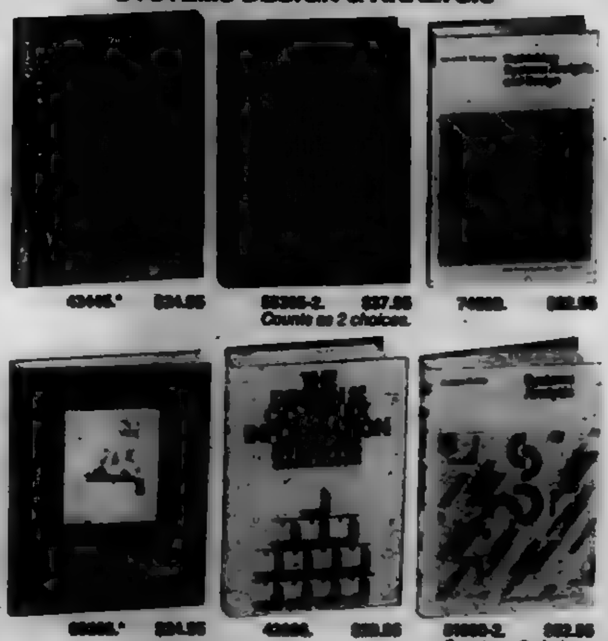

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SOFTWARE & SERVICES

> *"After experience [with a Unix customer base] IBM will have the specifications to implement a replacement system which bypasses the shortcomings of Unix. IBM might decide on such a bold policy realizing that a replacement [to Unix] would provide the strategic glue to unify its disparate product line."*
>
> — International Data Corp. study

UNIX

from page 129

or does not do in the Unix area may have more influence on the future of Unix than all the moves by all the other players.

A significant portion of Unix watchers says that IBM will wage war against AT&T by ignoring Unix, especially on the large systems end of things.

But a study released recently by International Data Corp. (IDC) has some heartening news for Unix supporters.

Favorable signs

According to IDC, the favorable signs from IBM regarding Unix include:

■ IBM is offering Xenix on its product line. In 1985, Xenix will become System V-compatible, bringing IBM products more closely into line with AT&T's System V standardization efforts.

■ The upgrade from System III compatiblity, on which IBM's current Unix product offerings are based, to System V compatibility is easy to do. IBM's positioning with System III puts it in a comfortable position to upgrade to System V compatibility as the System V base becomes more field-proven and as IBM gains experience with Unix. The fact that IBM chose System III rather than a University of California at Berkeley-based version of Unix places IBM more closely in line with AT&T.

■ IBM owns 20% of Intel Corp. Intel is heavily committed to Unix and it is expected to complete the port of System V to its 80286 microprocessor in 1985.

■ The spread of Unix does not threaten an established IBM market segment. The proprietary IBM timesharing systems — TSO and CMS — address DP professionals and not distributed end users. So Unix can address a market segment where IBM has no proprietary product. Thus, by adopting Unix, IBM could take advantage of AT&T's experience in building an operating system for a communicating and portable environment. That would give IBM the means to tie together its different processor technologies.

■ The portability of Unix can work to IBM's advantage. It can be used to attract customers away from another vendor's equipment.

■ Significant market strength could be leveraged against IBM if IBM were not present in the emerging Unix market. AT&T and the scores of hardware and software vendors committed to Unix would be hard to ignore.

■ As the industry focus shifts toward applications, IBM will try to distinguish itself to the end user by quality applications based on a standard operating system. Even IBM does not have the resources to do everything well. Why should it not spend its resources on that which will give its hardware greatest appeal, the applications capabilities?

Policy change possible

If those speculations seem logical, IDC says, look for future IBM products to continue to move toward compatibility with the mainstream of Unix standardization. That's heady news for the Unix aficionado. But wait. Despite the signs that IBM is poised to sanction Unix, IDC warns, Big Blue has the wherewithal to switch strategy in midstream.

IDC notes that IBM has made it clear that its actions are governed by the best interests of, you guessed it, IBM. So if upcoming developments in the Unix marketplace point to a course of action better suited for IBM, look for strategic changes to occur. IDC says that there is debate within IBM over whether it should go strictly with proprietary operating systems. Unfortunately for Unix fans, IDC cautions, many of Big Blue's high-level executives hold with the proprietary strategy.

Finally, IDC conjectures, "IBM has little development experience with Unix or any portable operating system. Offering Unix to its customer base will give IBM a laboratory for learning and observation. After experience in this laboratory, IBM will have the specifications to implement a replacement system which bypasses the shortcomings of Unix. IBM might decide on such a bold policy realizing that a replacement [to Unix] would provide the strategic glue to unify its disparate product line."

As with so many other facets of the computer industry, the cards IBM now holds so closely to its chest will probably influence in a big way the outcome of the Unix game. IBM's moves may hold the key to whether 1985, or any other year, will truly be the year of Unix.

The report is available from IDC, which is located at 5 Speen St., Framingham, Mass. 01701.

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COMMUNICATIONS

Users indifferent to office technology wars

DATA STREAM
John Dix
CW Senior Editor

The past year in communications has been dominated by news of AT&T divestiture which has, by its nature, tended to focus concerns on inter-office communications issues. In looking back, however, it is more telling to examine intra-office communications developments to gauge advances in automation.

Here we find that technology continues to outpace the average user. Even in the face of unprecedented shipments of end-user devices, the need to interconnect this equipment has not materialized as rapidly as once expected.

Ironically, the warring proponents of local networks and private branch exchanges (PBX) — battling over which technology should be incorporated as the electronic spine in the future office — have come to terms before most users are even prepared to hear the arguments. Now the conventional wisdom is that the technologies will coexist. But today, few are using either.

Data switches not sexy, but necessary

In fact, while users praise the merits of PBXs that can handle voice and data simultaneously and local networks that can interconnect anything and provide incredible bandwidth, data switches — the real workhorses DP shops rely on to enable users to access multiple devices — go unsung. Data switches are neither new nor sexy. But they do provide a cost-effective and necessary function similar to the baseline functionality of both PBXs and local nets.

What 1984 lacked in user enthusiasm for intra-office communications data communications technology — measured in products purchased — was made up for by vendors. Most notably, this year AT&T and IBM finally entered the fray.

Local network is no longer a banished word within the hallowed halls of Big Blue. In fact, IBM has been running ads in the industry press explaining its stance on, and approach to local networks.

And it did announce PC Net this year, a broadband network for personal computers. The catch here, though, is that the network software won't be released until sometime next year.

In a statement of direction made when the Cabling System was announced — a building wiring scheme on which IBM said it will base its token passing network — the mainframe manufacturer said it would announce an office net-

See USERS page 140

■ Ideassociates, Inc. has announced a twin-axial communications card designed to link IBM micros to IBM System/34, 36, and 38 minis./140

Bell exec calls local fiber nets key to ISDN

By James Connolly
CW Staff

CAMBRIDGE, Mass. — The extension of fiber-optic cable into the local telephone loop is an important step toward implementation of an Integrated Services Digital Network (ISDN) by 1990, according to an executive for Southern Bell Telephone Co.

Southern Bell, a subsidiary of the Bell South Corp. regional holding company, is concentrating on building local fiber networks, rather than intercity fiber trunks, which is an area offering limited growth, according to Richard K. Snelling, executive vice-president for Southern Bell. Snelling spoke recently at the MIT Communications Forum here.

Southern Bell installed 62,000 kilometers of fiber between local central office switches in 1984, and changed its specifications repeatedly, increasing typical bandwidths from 90K bit/sec to 405K bit/sec in just five months, according to Snelling.

That fiber will someday be extended to households to carry integrated communications as ISDN develops, noted Snelling, who said three real estate developers are interested in installing fiber in major residential developments in Southern Bell's region.

He said that fiber would carry voice, video and data communications, and would be part of an ISDN that develops over the coming years.

> *'Competition drives it all. Competition in the market was what really caused [AT&T's] divestiture, while technology was a factor.'*
>
> — Richard K. Snelling, executive vice-president for Southern Bell Telephone Co.

One feature of ISDN, if the Federal Communications Commission permits it, would be protocol conversion at the local, central office level.

"Competition drives it all. Competition in the market was what really caused [AT&T's] divestiture, while technology was a factor," said Snelling, adding that it also should be market forces, particularly the rich U.S. market, that drive the establishment of international standards.

With the replacement of copper cable with fiber, a few all-fiber cities will begin to appear in the late 1980s and on a large-scale basis in the 1990s, according to Snelling.

Next millennium networks

He also outlined how communications networks will appear at several stages into the next millennium.

- By 1987: Modular fourth-generation central office switches will handle packet switching, circuit switching, more than one million calls an hour, full digital connectivity and dynamic load balancing.
- By 1990: Intelligent networks with common channel signaling will use more than 400,000 kilometers of fiber in the Southern Bell area, will feature customer

See ISDN page 140

Pactel releases Displayphone for accessing remote data bases

WALNUT CREEK, Calif. — Pactel Communications Systems has announced its Pactel Displayphone, an integrated telephone and data terminal designed to ease access to remote data bases for information such as stock market reports, shop-at-home services, electronic banking and airline schedules.

It reportedly allows the user to exchange data with other Displayphone units and features a speakerphone, automatic redial, speed calling and a directory that can be programmed to display and dial up to 81 20-digit numbers.

The device includes an internal AT&T 103-type modem operating at 300 bit/sec and an 8K metal-oxide semiconductor random-access memory with a three-day battery backup. It also has a 7-in. monochrome screen with an alphamosaic character set and graphics said to be suitable for bar graph applications.

The telephone plugs into standard RJ11 or RJ13 jacks, and power is supplied by a 3-lb external power supply. The Displayphone features two ports, a printer port and an RS-232C serial port.

Pactel Communications Systems is located at 201 N. Civic Drive, Walnut Creek, Calif. 94596.

Enhanced protocol converter from Perle GSD targets IBM

CHICAGO — Perle GSD, Ltd. has announced a redesigned protocol converter based on the Perle GSD PDS 300/525 for the IBM System/34, 36 and 38.

The PDS 350/525 reportedly replaces an 8-in. diskette drive with a 5¼-in. drive and incorporates four, eight, 12 or 16 asynchronous ports as well as ports for the host connection and diagnostics. The PDS 350/525 is said to appear to the host as one or two IBM 5251 Model 12 cluster control units with attached workstations or printers.

The protocol converter reportedly features automatic speed detection, dynamic terminal selection, menu-prompted configuration, printer passthrough and security disconnect. Options include teletypewriter support, file transfer and auto-call printer support.

According to the vendor, the unit has been enhanced by the addition of two direct memory access channels to facilitate buffer management and inter-processor communications.

Shipments are scheduled for this month. Prices range from $4,750 to $12,500.

Perle GSD can be reached at Suite 507, 600 S. Dearborn, Chicago, Ill. 60605.

Ideassociates releases IBM link

BILLERICA, Mass. — Ideassociates, Inc. has announced a coaxial communications card designed to link the IBM Personal Computer, Personal Computer AT, Personal Computer XT and Portable Personal Computer to IBM System/34, System/36 and System/38 minicomputers.

According to the vendor, the Ideacomm 5251 reportedly supports a twisted-pair or coaxial cable connection with the IBM systems through IBM 5250 terminal emulation via either a direct connection or an IBM 5251 Model 12 display controller.

Ideassociates also announced the Ideacomm 5251D card, a companion product that replaces the IBM Monochrome Display Adapter and supports the full 32 attributes of the IBM 5251 screen.

The products will be available in January. The price of Ideacomm 5251 is $895, and the price of Ideacomm 5251D is $495.

Ideassociates is located at 35 Dunham Road, Billerica, Mass. 01821.

ISDN

from page 139

control, and will include stored voiceprints for universal credit calling.

■ By 2000: Mobile telephone service will be fully deployed, and there will be interactive computer/voice interfaces, almost no copper wiring and increasing use of light-switch technology.

■ By 2010: With a decentralized society, 35% of workers will have their primary work location in the home, due partly to the decreasing cost of bandwidth. The residential customer will have wideband data links to corporate and public data bases, videophones, holographic meetings and flat wall displays.

■ By 2020: With the optical network fully deployed, telecommunications will replace energy as the leading resource. Fiber running into the home will be at least 45M bit/sec and possibly 135M bit/sec.

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For more information, contact Ed Marecki, National Sales Director, CW Communications, 375 Cochituate Rd., Framingham, MA., 01701, (617) 879-0700. Or call your nearest sales office, listed below.

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USER

from page 139

work within a few years. Until then IBM can stress the data handling capabilities of PBXs from Rolm Corp., the switch vendor that IBM recently acquired.

To complement the data switching capabilities of its PBX equipment, AT&T Information Systems released its first local net this year, the Information Systems Network (ISN). A star topology network that uses twisted-pair wire to support end-user devices and fiber-optic cable between network components, ISN uses what the company calls a short bus to switch packets.

AT&T Information System's ISN was born of the same technology used in AT&T Technologies' Datakit Virtual Circuit Switch. The products were developed separately within AT&T using the same basic theory developed by Bell Laboratories.

The overlap between the products is embarrassing. The separation in the development and marketing of ISN and Datakit was necessitated by the Federal Communications Commission's Computer Inquiry II decision. That ruling specifies that only AT&T Information Systems, a separate subsidiary, can market nonregulated products directly to end users. AT&T's Datakit, not part of the nonregularted part of the company, must be marketed through a third party. This means, however, that AT&T may be competing with itself for some accounts.

Although there may be some validity to the idea that the entrance of IBM and AT&T will stimulate the market for intraoffice local network-like products, the fact remains that most users do not yet need these products.

The need will arise slowly from the personal computer level, where small departmental networks are springing up to provide peripherals sharing. Given that, consider that probably less than 10% of all personal comptuers currently used in business are attached to networks. Commonly accepted, sophisticated intraoffice communications systems are still a while away.

SYSTEMS & PERIPHERALS

No free gifts seen for PCMs in new year

By John Desmond
CW Staff

David Martin, president of National Advanced Systems, Inc. (NAS), recently noted that his salesmen were spending one hour on sales calls prior to the reorganization and layoffs at Storage Technology Corp. (STC). Now, they spend two. "The first hour is to explain what happened to STC, and the second hour is to sell," Martin said.

Users of IBM-compatible mainframes and peripherals may be running scared as a result of STC's problems and perhaps with good reason. With product cycles ever shortening, the ability of plug-compatible manufacturers (PCM) like STC to compete is being clipped.

The Gartner Group, Inc. recently stated that product life cycles have dropped from an average of 48 months in 1975 to 36 months in 1983. The ability of PCMs to respond, meanwhile, has increased from an average of nine months in 1975 to 18 months in 1983. As a result, the PCMs' "profitability window" (life cycle minus response time) has been reduced from 39 months in 1975 to 18 months in 1983, according to the Stamford, Conn.-based consulting firm.

MVS/XA an example

A specific example is the MVS/XA operating system, which IBM announced three years ago for its high-end systems. The PCMs took 15 to 18 months to respond with XA equivalents, hurting their ability to compete with IBM.

Martin responded that XA is an exception, a technological breakthrough that may happen once every six to eight years. The PCMs take longer to match breakthroughs, but Martin said more routine product announcements can be matched in much less time. He acknowledged that product life cycles are shrinking due to a constant push for new technology, but said the true test for competitiveness should be whether a PCM has the ability to respond.

Perhaps it is true, as Martin suggested, that the successful competitive formula for PCMs has changed. In the 1970s, PCMs tried to achieve vertical integration. Each company sought to have design, manufacturing, sales and service staff. In the 1980s, IBM and its competitors are entering into partnerships with other companies and getting away from integration in order to cut costs. Examples of partnerships include NAS and Hitachi Ltd., Amdahl Corp. and Fujitsu Ltd. and IBM and Rolm Corp.

Product partnership

"The model of the '80s is product partnership," according to Martin. "I don't think STC represents a model for what's happening to the rest of the industry." In his view, STC took on too many vertically integrated projects and became too diversified.

What will 1985 bring for the rest of the IBM-compatible vendors? Of course, the best time to make predictions about 1985 will be next Christmas. But right now, the chances that the PCMs will enjoy any dramatic relief from IBM marketing pressure

See PCM page 142

Visa expands processing power with addition of IBM 3083 EXs

By Kathleen Sullivan
CW West Coast Bureau

SAN MATEO, Calif. — Almost two years ago, Visa International laid the plans for a three-year, $16 million expansion of its electronic transaction processing and communications services. In mid-October, Visa said it had accomplished a key step in the process by replacing the mainframe computers in its operations centers, which are located here and in McLean, Va.

At present, all the new processors are functioning, said Roger Peirce, Visa's general manager of systems development.

Included within its expansion scheme was a plan to convert the company's bisynchronous communications system to IBM's System Network Architecture (SNA). According to Peirce, Visa has reached the mid-point in its implementation of SNA.

In the process of replacing its IBM 4341 Model Group 12 mainframes with four IBM 3083 EX systems, Visa more than doubled its processing power, Peirce said.

Using the IBM 3083s, Visa will be able to handle about 400,000 transaction authorization inquiries and responses an hour and 10 million settlement items a day, he said. Before the changeover, the firm's capacity was limited to 178,000 messages an hour and 6 million settlement items per day.

Peirce said the 3083s represent a "logical upgrade in terms of current technology and capacity" for Visa. While Peirce said the firm did some evaluation of competing IBM-compatible systems offered by Amdahl Corp. and National Advanced Systems, Inc., Visa did not discover any signif-

See VISA page 142

Image processing system out

ALAMEDA, Calif. — Integrated Automation, Inc. has announced the Series 200 optical laser disk storage and electronic image processing system, for automating the storage, retrieval and distribution of engineering drawings and technical information.

The Series 200 uses central processors from Digital Equipment Corp. in combination with its own optical disk devices. The system uses 12-in. optical disks, each capable of storing 1G byte of data, or approximately 20,000 letter-size pages. The company's Optical Disk Auto Changer stores up to 100 optical disks.

In addition to storing engineering drawings, the Series 200 can store computer-aided design and manufacturing or word processing-generated data, the company said.

The system is available in three configurations. The Series 200A-C is based on the DEC Microvax I and includes an aperture card scanner, image aperture, dual-image processor, an optical disk read/write unit, two terminals and a Versatec, Inc. 7224 24-in. plotter. The price for Series 200A-C is $478,000, according to the company.

The Series 200A-C/E is based on the DEC VAX-11/730 and includes an image retrieval cluster, four terminals, a Versatec 7236 36-in. plotter and a remote cluster communications interface. The price for the Series 200A-C/E is $756,000.

The high-end Series 200B is based on the DEC VAX-11/750 and includes an additional two Versatec 24-in. plotters, a total of 14 terminals and an Optical Disk Auto Changer. The price for Series 200B is $1.2 million, according to the vendor spokesman.

Additional information is available from Integrated Automation, which is located at 1301 Harbor Bay Pkwy., Alameda, Calif. 94501.

Burroughs unveils free-standing ATMs

Targets supermarkets, gas stations, convenience stores

DETROIT — Burroughs Corp. has introduced the CA 7100 Quick Cash, a free-standing, lobby-style automatic teller machine (ATM) for dispensing cash and providing account balances, aimed at supermarkets, gas stations and convenience store markets.

The CA 7100 can complete a withdrawal transaction in 10 seconds, according to a spokesman for the company. The ATM features a 9-in. video screen for displaying messages and instructions, six function keys, a 13-key alphanumeric keyboard and a swipe magnetic card reader.

The CA 7100 uses emulation software to have the system emulate competitors' ATMs. Emulation software is available for Burroughs' RT 600/RT 750; IBM's 3624; Docutel/Olivetti Corp.'s 2300; NCR Corp.'s 1780; and Diebold, Inc.'s 910.

The device can also be connected to surveillance cameras, alarms, monitors and automatic dialers. The product is available with up to three currency feeders, a spokesman said. Each cash cassette reportedly can dispense 1,800 U.S. notes. A backup system is said to maintain memory for 72 hours following a power failure.

In multiple ATM sites, one CA 7100 can coordinate transactions, control data encryption and handle communications with the host processor for the master and up to two CA 7102 slaves.

The receipt printer prints 40 alphanumeric char./line, with up to 16 lines per receipt. The CA 7100 has a capacity of 4,000 receipts. The audit printer provides a 56-char. line and contains enough paper to print 8,000 transactions between replenishment, the company said.

The price for the CA 7100, to be available for delivery in the first quarter of 1985, is $14,700 for the base unit or $12,500 for a slave unit that ties to a host, according to the vendor.

Additional information is available from Burroughs, which is located at 1 Burroughs Place, Detroit, Mich. 48232.

VISA from page 141

icant reasons for changing [illegible]

Peirce said Visa purchased the 3083s "with some expectation of upward growth" since the system — announced last February — is in the early stages of its technological life cycle.

In each of the operations centers, Visa now has three computer systems in place: two 3083s and one 4341. One of the 3083s, which is used for real-time processing, is primarily dedicated to processing authorization transactions. The system has 8M bytes of main memory and uses IBM's Transaction Processing Facility.

The other 3083 in each data center is used for clearance and settlement processing, Peirce said. These systems have 16M bytes of main memory and use IBM's OS/VS1 running under VM. Visa plans to convert to MVS in the second quarter of 1985.

Each operations center uses its remaining 4341 to relieve the new systems of several off-line batch processing tasks. In California, the remaining 4341 will be used to handle switching and processing for Interlink, a direct debit, point-of-sale program being developed by the five largest banks in California. The service is scheduled to go into effect this month.

Because of the nature of Visa's applications, Peirce explained, each data center is configured as a duplicate of the other, so that in the event of a natural disaster or systems failure at one location, the second center will be brought up within minutes to take over.

Although Peirce said the changeover was transparent to its members, he said Visa did encounter a problem that resulted in a four-week delay in the installation of the real-time system in its California center. Peirce said IBM had implemented the operator console differently on the 4361 than on the 3083. The software "didn't work properly and was full of bugs," Peirce said. So Visa analyzed and reported the incompatibility to IBM, which eventually resolved the problem.

Visa is also in the process of rewriting all its application programs, Peirce said. By 1986, when the project is scheduled for completion, Visa will be able to expand its settlement system to 15 times its current capacity, the company said. In addition, the firm's settlement and authorization systems will be able to share the same communications network, which will lower costs.

The firm has also undertaken what Peirce called the "expensive, laborious and tedious" task of converting to IBM's SNA. He estimated that the conversion, which entails extensive software changes in all the components of the system, will represent about $3 million of Visa's $16 million outlay. But that figure does not include training or new circuit design that will be required, he said.

So far, Visa has converted its traveler's check service completely to SNA. The firm has completed the software conversion for its clearing and settlement system and is now in the process of converting its Series 1 systems, which serve as the access point to the network, to communicate in SNA. By February, Visa will begin field tests to prepare to convert its authorization system, Peirce said.

PCM from page 141

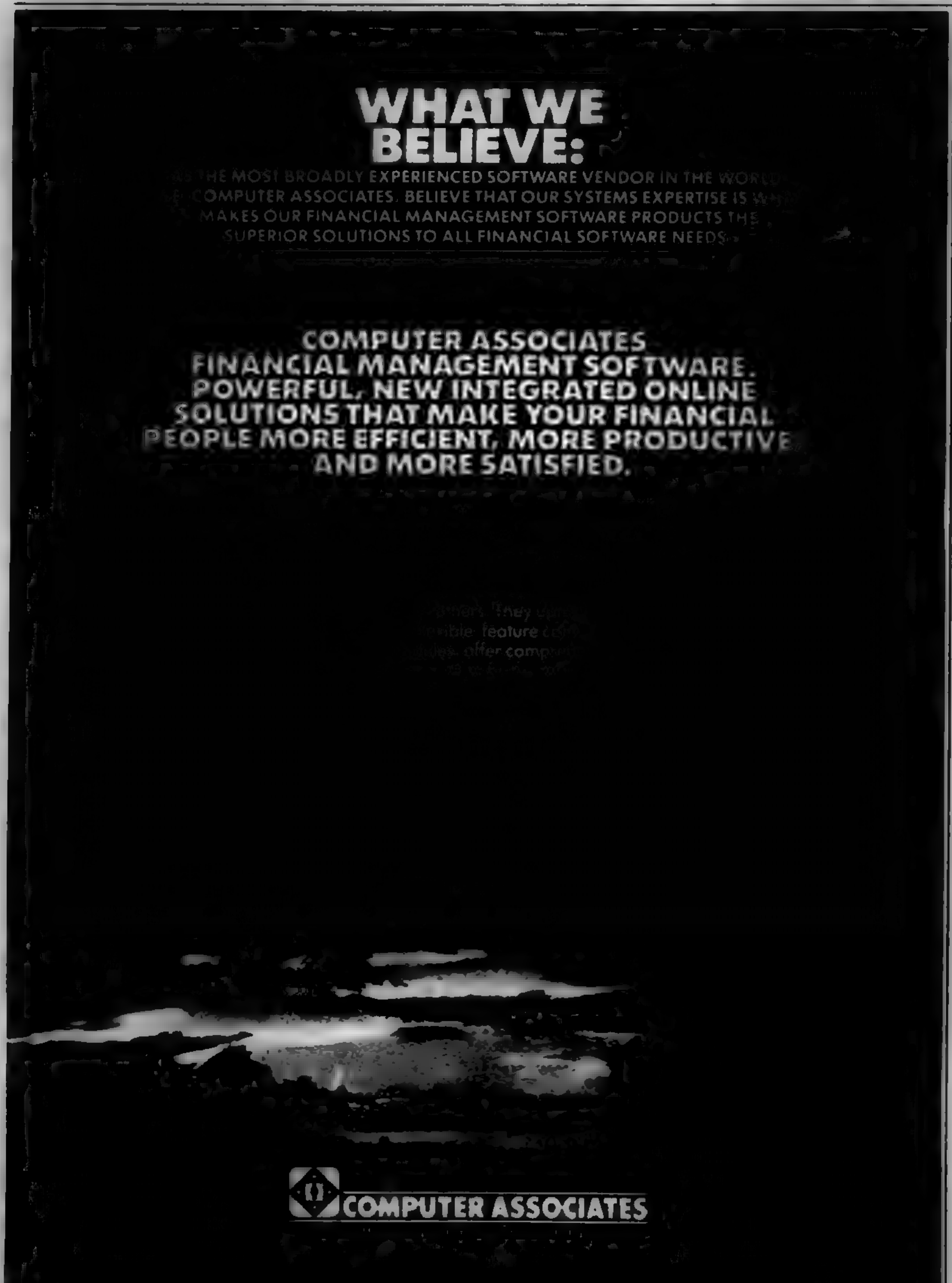
appears slim.

Amdahl and NAS, both of which are heavily influenced by their Japanese hardware suppliers Fujitsu and Hitachi, respectively, may face the short-term problem of how to sell supercomputers manufactured by their Japanese suppliers.

But the real challenge to NAS and Amdahl will not come until IBM unveils its much-publicized Sierra line of mainframes. Then the question will be whether both companies are capable of meeting the high R&D costs to match IBM's top-end mainframe. Of course, much depends on how impressive IBM makes the Sierra.

The vendors competing in the mid-range of IBM's mainframe line also face a tough 1985. In the fourth quarter, IBM significantly enhanced the performance of its 4361 and 4381 processors.

Whether companies like IPL Systems, Inc. and Cambex Corp., which are already feeling the bite of increased IBM competition, can match the performance of the 4361 Model Group 3 and 4381 Model Group 3 remains to be [illegible]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SMALL TALK
Eric Bender
CW Senior Editor

Forecast in '85: Guessing game

Imagine a machine built around Motorola, Inc.'s 68000 chip, with a high-resolution color display and a user interface much like Apple Computer, Inc.'s Macintosh, selling for under $1,000, complete with hard disk drive.

Reports have it that Jack Tramiel's Atari Corp. will unleash a million of these little dynamos on a grateful world in 1985, making this the year in which the high-performance micro really becomes a commodity item.

1985 also is supposed to be the year for laptops, local-area networks, well-tailored micro-to-mainframe links, AT&T's Unix, project management on micros, desktop presentation graphics, the mouse, operating environments and a host of other paraphernalia.

So, of course, was 1984.

As we all take a deep breath and head into 1985, it is a good time to examine why so many predictions for the micro industry have wandered so far afield.

Lack of forecasting ability

One reason is the lack of true forecasting expertise. Market clairvoyance is spread through the industry like the upper Missouri River in flood, a mile wide and an inch deep. This does not prevent a continuing stream of half-baked, scattershot proclamations about the product intentions of IBM or the other big players from "experts" who hail their own occasional triumphs. (As the saying goes, even a broken clock is right twice a day.)

Another stumbling block is that manufacturers still generally do not deliver what they promise on schedule. As one prominent example, Tramiel has built his meteoric career on pioneering both low-cost manufacturing and vaporware.

But a greater factor is general turmoil in the industry, which is slowly settling down but still packs a lot of random noise and motion. A look backwards shows how much has changed during the past year.

One year ago

In early January 1984, the IBM Personal Computer AT was merely a dubious rumor floating around under the Popcorn label. The highest performance desktop machine making a bid for the mainstream was Tandy Corp.'s Model 2000. But like the dozen other machines based on the Intel Corp. 80186 chip that were also making their debuts, the Tandy 2000 never set the market on fire.

Hardware prices were high. A Personal Computer XT with 256K bytes of internal memory went for roughly $6,000 retail, almost twice what you would pay now after a little shopping, and IBM could not roll them out fast enough.

Rumors were flying that IBM would soon put some version of Unix on the Personal Computer. The single-user PC/IX made its debut in mid-January and then vanished from the spot-

See YEAR page 148

Desktop manager debuts

Smartdesk IBM-based turnkey system features word processing, calendar, calculator functions

ATLANTA, Ga. — Jacore Systems has released Smartdesk, a turnkey desktop management system that incorporates an IBM Personal Computer XT or Personal Computer AT.

Smartdesk software reportedly includes word processing, calendar, phone book, clock and calculator functions. The package allows a user to move from an application such as Lotus Development Corp.'s 1-2-3 to Smartdesk software by pressing one function key, the vendor said.

Smartdesk's word processor is said to allow an executive to draft memos and letters, print the documents or save them in a confidential file. Its calendar feature tracks appointments and provides space for notes and reminders concerning specific meetings, the vendor said.

The phone book stores telephone numbers and when coupled with a modem automatically dials a number, according to the vendor. The clock reportedly displays the current time and has an alarm function that beeps when set.

A Smartdesk system includes a monochrome display, IBM's PC-DOS 3.0 operating system, communications software, an internal modem, a phone connector, cable and IBM 5251 terminal emulation capability that allows a user to connect to an IBM System/36 minicomputer.

A Personal Computer AT system with 20M bytes of storage costs $8,373, and a Personal Computer XT system with 10M bytes of storage sells for $6,995.

Jacore Systems is located at 1640 Powers Ferry Road, Marietta, Ga. 30067.

■ Research, a package integrating data base management with statistical analysis, is introduced by Economic Software, Inc./146

■ Lifeboat Associates offers a version of Microsoft Corp.'s MS-DOS for S-100 computers/146

■ Gateway Microsystems, Inc. announces terminal emulation products for the IBM Personal Computer AT/146

INSIDE

Software/147

Digital Research announces Cobol compiler for IBM micro

MONTEREY, Calif. — Digital Research, Inc. has announced DR Level II Cobol, a Cobol compiler designed for the IBM Personal Computer.

The compiler reportedly has been certified by the Federal Software Testing Center and meets full American National Standards Institute 1974 specifications for high-level compilers.

According to the vendor, the product includes two utilities: Display Manager and Access Manager. Display Manager allows programmers to create a number of screen displays, Digital Research said. Access Manager reportedly is a file-access method that enhances maintenance of data records.

DR Level II Cobol completes the Sieve of Erastosthenes, an alogorithm for finding prime numbers, in 311 seconds and MS-Sieve, a modified version of the sieve, in 40 seconds, the vendor said.

The compiler has no runtime licensing fee, meaning software developers who develop applications with the compiler do not have to pay a license fee to Digital Research.

DR Level II Cobol is priced at $700.

Digital Research is located at Box DRI, Monterey, Calif. 93942.

Lotus files third suit over copying

DECATUR, Ill. — Lotus Development Corp. has filed suit in the U.S. District Court for the Central District of Illinois against Mueller Co., Inc. for allegedly producing unauthorized copies of Lotus' 1-2-3 integrated package.

The suit asked for compensatory damages of $800,000 for eight illegal copies of the product, punitive damages and statutory damages of $1 million each and any profits made from the activity, according to Bernard J. Bonn, senior litigation partner at the Boston firm of Testa, Hurwitz and Thibeault.

Bonn said that Lotus' special investigative unit, formed in 1984 to monitor illegal copying of its products, uncovered the activity.

Jim Manzi, president of Lotus, maintained, "Lotus actively supports industry efforts to develop new methods of software authorization. However, in instances where individuals intentionally violate our rights for economic gain, we will vigorously defend our rights by using all legal means available."

Mueller, a metal valve and fitting manufacturer, is the third company against which Lotus has filed suit this year. Earlier suits against Rixon, Inc. and the Heath Group were settled out of court.

Need for data backup often ignored

By Richard Gorgens
Special to CW

Corporate computer centers provide mainframe data backup as a standard procedure, regularly copying data onto magnetic tape and storing extra copies in secure, off-site locations. But similar procedures are seldom used with personal computers, for which the need to secure data is just as important.

Catastrophes such as fires, hardware failures, damaged disks and errant commands pose as much potential danger to desktop computers as they do to mainframes.

Most personal computer users realize the fallibility of floppy disks, and they often make backup copies.

But many personal computer users do not back up

See COPY page 142

Gorgens is president and general manager of Alloy Computer Products, Inc., a Framingham, Mass.-based firm that manufactures personal computer peripherals.

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Microgate emulators available for IBM micro

AUSTIN, Texas — Gateway Microsystems, Inc. has introduced a series of Microgate terminal emulation products for the IBM Personal Computer AT.

The Microgate/WS is said to be an integrated workstation emulating IBM 2780, 3780 and 3270 series terminals. It reportedly provides both batch and interactive micro-to-mainframe communications. Microgate 2780/3780 is an IBM 2780/3780 data communications terminal emulator that uses Binary Synchronous Protocol, according to Gateway.

The Microgate II reportedly is a bisynchronous communications subsystem with a programmable interface to Micro-Focus Cobol and IBM's PC Cobol, compiled Basic and Pascal and assembly languages.

The Microgate 6530 is said to be an enhanced emulator of the Tandem Computers, Inc. Model 6530/20 terminal. The Microgate 940 emulates the Texas Instruments, Inc. Model 940/931 terminal, allowing personal computers to be used on TI's DS990 and Business System series minicomputers, the vendor said.

The Microgate 940 is priced from $250 to $495; Microgate 6530 from $495 to $1,095; Microgate II, $895; Microgate 2780/3780, $895; and Microgate/WS, $995.

Gateway Microsystems is located at Suite 105, 9501 Capital of Texas Highway N., Austin, Texas 78759.

S-100 units gain MS-DOS version

NEW YORK — Lifeboat Associates has introduced SB-86, a version of Microsoft Corp.'s MS-DOS 2.11 operating system for computers based on the S-100 bus architecture. SB-86 reportedly is compatible with IBM's PC-DOS and runs on two CPU boards, the CPU 8085/88 and the CPU 86/87, made by Compupro, Inc. located in Hayward, Calif.

Lifeboat said that its entire line of MS-DOS software — including compilers, assemblers, linkers and business applications such as WP and spreadsheet packages — is available immediately for the new operating system.

The SB-86 requires the CPU card, a Compupro System Support I card, a Disk 1 or 1A controller and disk drive and at least 64K bytes of 24-bit addressable random-access memory, the vendor said. The system is said to support both interrupt-driven and noninterrupt-driven console I/O.

The SB-86 is priced at [illegible]. Lifeboat Associates is located at 1651 Third Ave., New York, N.Y. 10128.

Research software announced

EUGENE, Ore. — Economic Software, Inc. has introduced Research, software that integrates data base management with color graphics and statistical analysis capabilities.

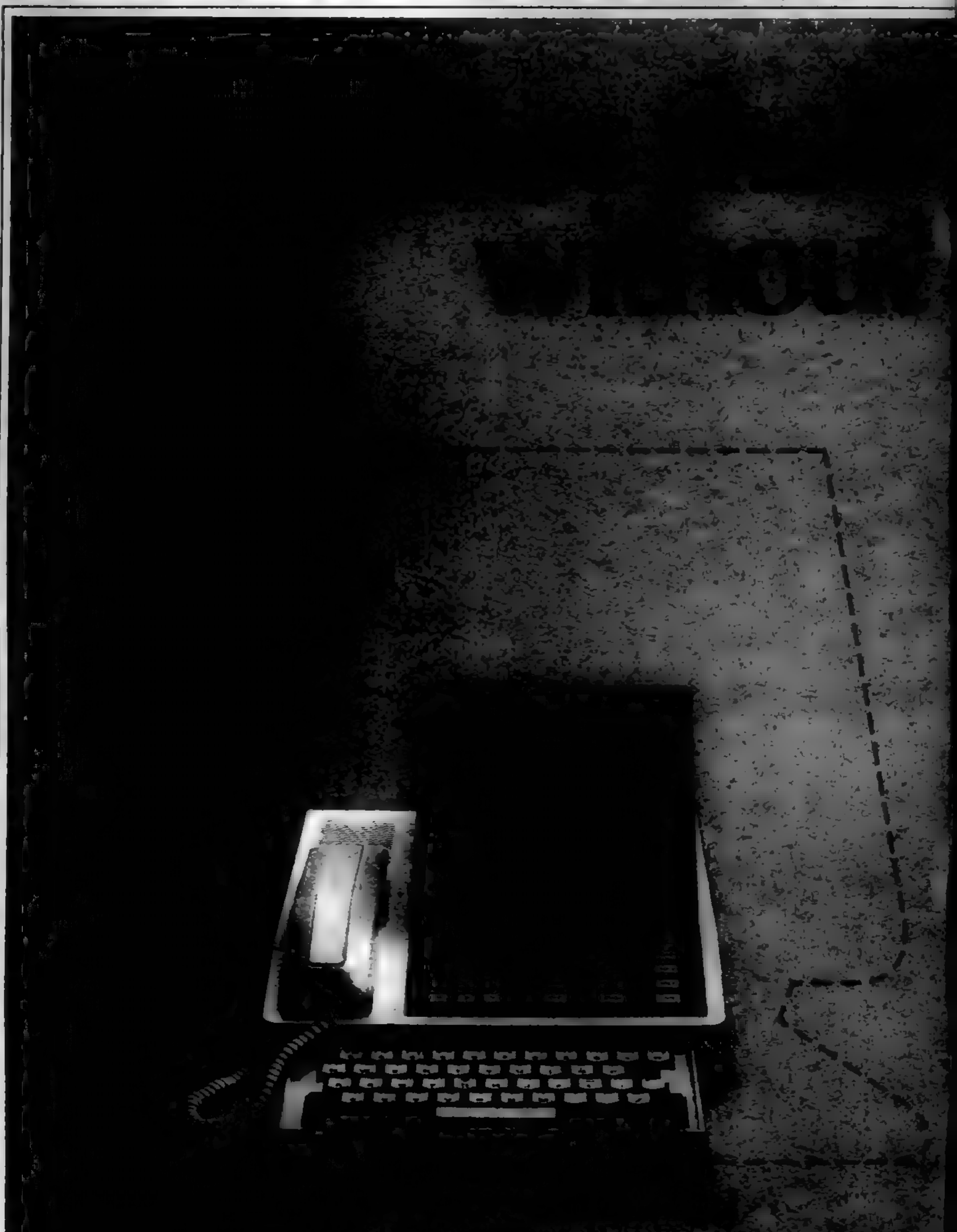
The package reportedly permits users to plot on one screen several different data types, such as correlations between daily interest rates, weekly money supply and monthly inflation rates, Economic Software said.

Research also generates a calendar of days automatically and allows data transfer from various programs, including Lotus Development Corp.'s 1-2-3, the company said.

The software runs on the IBM Personal Computer, Personal Computer XT and Personal Computer AT with 256K bytes of random-access memory.

The program is provided with 325 weeks of data on 40 major economic measures and is priced at $695. A demonstration diskette is priced at $17.95.

Economic Software can be reached at P.O. Box 10925, Eugene, Ore. 97440.



SOFTWARE

POLYGON SOFTWARE CORP.
Easypath 1.0

Polygon Software Corp. has announced a facility that allows users of IBM Personal Computers and compatibles to locate files in subdirectories other than the ones they are working with.

Easypath 1.0 reportedly allows use of the hierarchical subdirectory structure in IBM PC-DOS and Microsoft, Inc. MS-DOS without copying files back and forth. Search paths reportedly can be specified separately for particular files or for groups of files.

The product is said to come with predefined specifications for most major programs and to require PC-DOS or MS-DOS 2.0 or higher.

The list price is $100.

Polygon Software, 363 Seventh Ave., New York, N.Y. 10001.

PRO/TEM SOFTWARE
Notebook II

Pro/Tem Software had introduced its Notebook II data base management system for the IBM Personal Computer line and for the Hewlett-Packard Co. HP 150 and HP 110.

Notebook II reportedly includes a text editor with word wrap, automatic reformatting and screen update. It is said to be able to read files from word processors and public data bases and to accept control and extended characters.

Each Notebook II record is said to be able to include up to 28,000 characters and up to 50 fields.

Field and records sizes are not predefined, the vendor said.

Notebook II is priced at $189, according to a vendor spokesman.

Pro/Tem Software, 2363 Boulevard Circle, Walnut Creek, Calif. 94595.

DURANGO SYSTEMS, INC.
Poppy OS

Durango Systems, Inc. has released Poppy OS, which allows Microsoft Corp.'s MS-DOS programs to run under Microsoft's Xenix operating system.

Poppy OS allows the MS-DOS system calls to speak to the Xenix interpreter, thus enabling MS-DOS-based software to function on the Durango Poppy 286/186 Xenix-based systems. Poppy 286/186 supports up to 12 users with a multitasking operating system.

Poppy OS allows users to run single-user MS-DOS applications programs — such as Micropro International Corp.'s Wordstar, Microsoft's Multi-Plan and Ashton-Tate's Dbase II on a multiuser system.

Poppy OS costs $200.

Durango Systems, 3003 N. First St., San Jose, Calif. [illegible]

MCDONNELL DOUGLAS SOFTWARE
Tym/Vsam

McDonnell Douglas Software has introduced Tym/Vsam for the IBM Personal Computer AT/370.

Tym/Vsam reportedly offers users most functions of IBM's Vsam mainframe software, including data storage and retrieval capabilities. It is said to allow the AT/370 to be used as a workstation for the development and testing of programs.

Tym/Vsam also is said to free users from having to return files to the mainframe for testing and to support random or sequential storage and data retrieval.

Tym/Vsam costs $695.

McDonnell Douglas Software, 20705 Valley Green Drive, Cupertino, Calif. 95014.

NEC INFORMATION SYSTEMS, INC.
DR Draw, DR Graph versions

NEC Information Systems, Inc. has announced versions of Digital Research, Inc.'s DR Draw and DR Graph for NEC's Advanced Personal Computer (APC).

The APC's graphics capabilities reportedly allow users to take full advantage of the two products.

DR Graph can be used to create graphs and charts from information in data files, the vendor said. It reportedly also can create line, bar, pie, step, stick and scatter graphs.

DR Draw can be used for creating presentation-quality charts and diagrams, NEC said.

DR Graph is priced at $295. DR Draw is priced at $395, the vendor said.

NEC Information Systems, 1414 Massachusetts Ave., Boxborough, Mass. 01719.

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MICROCOMPUTERS

COPY

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hard disks. Backing up even a small, 10M-byte hard disk can require more than two dozen floppies. The inconvenience deters most users.

Cartridge tape drives that provide adequate backup for micros have been available for several years. They cost about the same as a hard disk drive, and some users consider the price to be high.

Users who keep vital data on hard disks should consider the value or replacement cost of the protected data. When users investigate backup capabilities, they should look for:

- **Data capacity.** The backup medium should hold all data on one or — at most — a few volumes.
- **Data transfer speed.** A backup should not be time-consuming.
- **Cost.** Cost considerations include the cost of both the media and the device.
- **Available software support.** A backup device should provide the capabilities a user needs.

The standard for micro backup devices is the cartridge tape drive. The physical design provides storage capability in a package the size of a paperback novel. Cartridge tapes range in capacity from 10M to 50M bytes and cost $35 to $45 each.

During the past year, several removable cartridge units that use hard or floppy disks have been introduced. The products now available have limited storage capacities and cost two to four times more than higher capacity tape cartridges.

Users interested in cartridge tape backup have several choices. Cartridge tape drives operate in two modes, start-stop and streaming.

Start-stop drives, the older of the two technologies, physically start and stop the tape for each recording. This allows the controlling software to write a series of individual files to the tape. The penalty is a slow transfer rate.

With streaming tape drives, the tape moves continuously, streaming across the tape head. This allows faster data transfer and greater storage capacity.

The newest generation of streaming cartridge tape systems have software to provide complete file-oriented operations while essentially keeping the tape streaming.

The final step toward security lies with the user. Users must develop a set of procedures to ensure that data is backed up, that copies are kept both in the office and off-site and that proper cataloging lets users know where the data is when they need it.

YEAR

from page 143

light, apparently forever.

A year ago Apple was still announcing products for the Apple III. More importantly, it was busily leaking details of the Macintosh, creating tremendous interest and considerable debate about whether the machine would be suitable for the corporate environment.

Also last January, the industry was watching AT&T slowly wheel its guns around toward the computer market. In 1985, we are still waiting for signs of a successful attack by the giant firm, with most interest in the voice/data workstations now poised for entry.

Twelve months ago, there were many more micro companies but no cheap desktop laser printers, no next-generation integrated packages such as Lotus Development Corp.'s Symphony, almost no IBM-developed micro software and less "mindware." Sometimes it seems a long time ago.

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NCR Comten, Inc.

Tandem moves to reposition itself

Aims to hold down costs, put low-end system on market

By David Gimes
CW Staff

PALM SPRINGS, Calif. — After broadening its product line and enacting cost-cutting measures and tighter management controls last year, Tandem Computers, Inc. is aiming to recapture the momentum it seemed to be losing.

"We grew our people faster than our revenues last year," James Treybig, Tandem's president and chief executive officer, admitted in a recent interview here. "The fundamental thing we're doing is not hiring people until our revenues catch up."

At the same time, Treybig said, the company, which manufactures fault-tolerant, on-line transaction processing systems, has "moved to reposition ourselves and offer low-end systems as well [as high-end ones], which was something we should always have done." He said the company's strategy now is to offer a broader range of products while striving to maintain its position in larger systems.

Financial performance improving

Tandem's financial performance has been unsteady during the past couple of years. With revenue growth slowing and operating margins down, the company began about a year ago to increase its focus on costs and profitability. The number of employees has been reduced, although the company has increased its sales force.

Industry analysts who follow Tandem said the near-term prospects for the company are good.

"They seem to be determined to get back into the mainstream of major growth and get close to their historical margins," said Fred Cohen, an analyst with L.F. Rothschild, Unterberg, Towbin, a New York brokerage firm. Cohen said the company could have have been faster in improving its hardware and reducing its costs.

Treybig said Tandem had a strong fourth quarter for the period ended Sept. 30, reporting a 30% increase in revenue and a 35% gain in profit over the year-earlier period. "If we have good growth this quarter, then we'll be back to approaching our historical margins," he said.

See TANDEM page 160

Informatics to counter losses with organizational changes

By Kathleen Burton
CW West Coast Bureau

WOODLAND HILLS, Calif. — There is a newly intensified corporate tone in evidence these days at Informatics General Corp., an information processing services and software company attempting to recover from severe financial losses sustained in 1984.

Lemons

To do so, and to meet its goal of becoming a $1 billion company by 1990, Informatics is reshuffling management, revamping its corporate strategy and repositioning several newly announced products to target the microcomputer market, according to executives interviewed here recently.

Other organizational changes include selling ailing divisions and repositioning languishing product lines, such as insurance, to target the micro market. "We're getting back to basics," said Walter F. Bauer, the firm's cofounder, chairman and chief executive officer.

Informatics posted depressed financial figures for 1984. Profits fell, and net income plummeted 87% to $546,000, compared with $4.2 million for the same period in 1983. The reasons, according to company insiders, were losses of $4 million in the company's $30 million life insurance operation, $2 million in the $34 million applications software products group and flattened sales of its flagship Mark V applications development product.

Industry analysts indicated that Informatics' poor financial showing last year was due to a chronic lack of focus. In the past, Informatics has offered a potpourri of services, ranging from customized programming to project management and systems, to a widely diversified array of customers including Fortune 1,000 corporations, the federal government and small businesses.

See RECOVER page 158

ITT consolidates credit divisions to offer expanded finance service

By Peter Bartolik
CW Staff

ST. LOUIS — Through ongoing consolidation of various credit divisions, ITT Corp.'s ITT Commercial Finance group hopes to build its early lead in retail computer financing into a position as the dominant one-stop financing service, including lease underwriting, for business computer equipment sold at the retail level.

The credit group, an operating unit of the $5 billion ITT Financial Corp., over recent months has absorbed four divisions of the former ITT Industrial Credit Co. under the direction of Melvin F. Brown, the Commercial Finance group's president and chief executive officer.

In a recent interview, Brown said the objective of the consolidated operation is to provide full-service commercial financing to leading computer retail operations. Those services currently provide about one-sixth of the

See ITT page 159

- Kaypro Corp.'s annual financial report showed that a $10 million profit, built up over the first three quarters, had been wiped out/151

- Digital Equipment Corp. has filed suit against C. Itoh & Co. America, Inc., asking a federal court to halt sales of C. Itoh's display terminal, which DEC alleges copies some of its VT220 terminal traits/153

- 3Com Corp. has set up an applications software division under the direction of company founder and chairman Bob Metcalf/156

Absence of tax reform may disappoint industry in '85

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

The most significant business-pertinent policy issues raised recently in Washington, D.C., are, first, the federal budget and, second, tax reform.

The Reagan administration cannot seem to get its act together on a comprehensive budget reduction package and therefore is going to have a big problem trying to sell a tax simplification package.

The waffling and wavering that has dampened Cabinet-level budget meetings leaves the impression that the executive branch is running around headless. The inability to develop a comprehensive budget package with a military budget cut significant enough to make it salable in Congress can only detract from the momentum and leadership that should be present in the White House during the beginning of a second presidential term.

Trade groups call for freeze

Recently, the American Electronics Association joined with other major national trade associations to call for a budget freeze, including a freeze in defense spending.

While many people see a budget cutback and tax reform ideally going hand in hand, the folly being played out in the budget process will undoubtedly carry over to the tax-writing process. Where the lack of leadership results in special dispensations in the budget, so surely will special interests smell an opening and flock to influence a new tax act. The end result will more than likely turn into another morass of loophole-ridden amendments, leaving the tax code in even worse shape than at present.

Unless the government gets its house in order, 1985 could turn out to be a very disappointing year for American industries.

●

A fatality earlier this summer stemming from chemicals located at the M/A-Com, Inc. gallium arsenide semiconductor laboratory was in no way job-related, according to a verbal report the company said it has received from the U.S. Department of Labor's Occupational Safety and Health Administration (Osha).

Joseph C. Bothwell, senior vice-president of the Burlington, Mass., company, said he was told by Osha that the death of employee John Zemotel from the inhalation of arsine gas in June was not job-related.

However, as a result of an intensive investigation following the fatality, Osha issued two citations alleging inadequate records of baseline airborne monitoring for inorganic arsenide and for concerns over certain written procedures, eyewash facilities, housekeeping and training programs. "Neither of these citations is related to Mr. Zemotel's tragic death," Bothwell said.

Entered lab without authorization

Zemotel reportedly entered the laboratories June 11 without authorization and inhaled arsine gas that was stored in a cylinder. He went into a coma later in the day and died on June 12.

M/A-Com had initially termed the death a possible suicide but later retracted its statement following complaints from Zemotel's relatives.

The Osha report, which has not yet been received in final written form, followed an earlier, similar report from the Massachusetts Department of Occupational Hygiene.

Intercompany discrepancies yield costly export errors

OUTSIDE LINES
Arthur Bardehagen
and Joseph Colleran

First of a two-part article

Manufacturers of computer hardware and software expend so much effort making and marketing their products that they are not always aware that their work is sometimes unwittingly sabotaged by other units of their companies, thus costing the companies money. This occurs most often, perhaps, when the manufacturers export their products.

How do we know all this? In the first seven months of 1984, Irving Trust Co. made nearly 21,000 payments to a variety of American exporters under letters of credit issued by overseas buyers of their products. In order to obtain payment under these credits, the exporters had to present the bank with various documents showing, among other things, that they had shipped the goods they said they would.

Records of the presentations made by these exporters indicated that 34.[illegible]% contained discrepancies of one kind or another. In other words, in more than one case in three the exporters erred in preparing the documents or else did not provide all those that were required. This experience is neither unique nor unusual in the banking industry.

What was the result of these errors? In a few cases the exporters lost their sales altogether. Because of discrepancies in the documents, the overseas buyers canceled their orders.

Usually, however, the discrepancies were corrected, and the sales were consummated. Even so, the exporters were not paid until the discrepancies were rectified and thus lost the use of their money for a day, a week, even two weeks or more. And often they were charged a fee. Over the last few years, banks have routinely levied such fees when presented with documents that contained discrepancies that could not be corrected and on which waivers had to be sought from the goods' importers.

On Oct. 1, the International Chamber of Commerce effected changes in the Uniform Customs and Practice for Documentary Credits, the rules governing the use of letters of credit in international trade. Some casual observers may think that these changes will reduce the discrepancies banks find so often in this area. We think no such thing.

In general, the changes merely streamline the use of letters of credit in international trade and recognize current practices fostered by the use of new technologies. For example, they sanction the use of photocopies, in lieu of original documents, as well as facsimile transmissions and other means of electronic communications.

The fact is a reduction in errors can only be achieved by exporters themselves. Before studying their most common mistakes, let's look briefly at letters of credit and how they are used.

In international trade, an exporter may wish to be paid as soon as he ships his goods, while the importer may not wish to make payment until he has received them. A letter of credit serves to reconcile the interests of both parties.

It is a binding agreement that specifies what the exporter is to ship, what is to be paid for the shipment, when it is to be paid and any other conditions on which the buyer and seller agree. In addition, the letter of credit guarantees that money is available to pay for the shipment.

The letter of credit is is-

See TRADE page 151

Bardehagen is a vice-president in the Trade Finance division and Colleran is a vice-president in the Credit Services division of Irving Trust Co. in New York.

"I RELY ON AST FOR

Earnings adjustments mark Kaypro's fiscal statement

Refusal to reveal fourth-quarter figures could mean problems, analysts say

By Kathleen Burton
CW West Coast Bureau

SOLANO BEACH, Calif. — Portable computer manufacturer Kaypro Corp. recently released its annual financial statement without revealing fourth-quarter results that wiped out a $10 million profit it built over the first nine months of the fiscal year.

Kaypro reported a $267,683 loss for the fiscal year ended Aug. 31 after a series of unspecified year-end earnings adjustments. Kaypro officials would not reveal fourth-quarter financial figures or disclose earnings adjustments made to figures in the earlier periods.

Kaypro reported earlier that it expected to break even for the year. For the first three quarters, Kaypro reported net income of $10 million, compared with a 1983 net income of $8.3 million.

A company spokesman said Kaypro is now investigating an unexpected end-of-the-year inventory adjustment. Earlier in the year, David Kay, Kaypro's director of marketing, claimed that several million dollars of inventory parts were missing, possibly because of a theft from a circus tent on Kaypro's grounds, where the parts had been stored.

Management problem?

Bob Katzive, vice-president of Gnostic Concepts, Inc., a market research firm in Palo Alto, Calif., said Kaypro's secretiveness about the details of the write-down, its late Securities and Exchange Commission filing and restatement of profit margins suggest a fundamental management problem.

"It indicates that Kaypro's management is out of control and doesn't want to air out their dirty financial laundry," he said.

According to Katzive, the widely varying financial picture painted by Kaypro between the third and fourth quarters is suspicious. "Finances don't change that radically over one quarter," he said.

A company spokesman said the earnings adjustments were caused by a drop in gross margins from 43.4% in 1983 to 25.7% in 1984, by increases in reserves, by price discounting because of a highly competitive market, by higher than expected advertising and manufacturing costs and by reserves of inventory excesses.

Jan Lewis, an analyst at Infocorp, a Cupertino, Calif.-based market research firm, said Kaypro's 1984 losses were not significant over the long term because of the firm's stable position in the retail channel and its constant market share. Kaypro is "still a solid company," Lewis said.

TRADE

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sued by the importer's bank, which irrevocably commits itself to pay for the goods if the exporter presents the documents required by the credit.

The exporter's bank examines the documents, determines that they meet the requirements of the credit and so advises the importer's bank, which then forwards payment.

Typically these documents include an invoice, a packing or weight list, a bill of lading and perhaps an insurance form and a customs (or consular) invoice permitting entry of the goods into the importer's country.

Note that neither the exporter's nor the importer's bank actually inspects the goods that are shipped. Only the relevant documents are examined.

It all sounds relatively simple — and should be.

Next week: 10 common errors and ways to avoid them.

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We expect those new sales offices to grow rapidly. When they do, I'll be adding AST cluster functions so we can use PCs, and VT-100™ or compatible terminals in our configuration. All of them can communicate to headquarters over a shared phone line to reduce our telecommunications costs.

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Durango, Molecular Computer plan consolidation

By Kathleen Burton
CW West Coast Bureau

SAN JOSE, Calif. — Merger talks were recently concluded between Molecular Computer, Inc. and Durango Systems, Inc., both based here and both seeking protection in a market rapidly becoming more competitive.

"Consolidation is the only way companies like us can survive against giants like IBM, Hewlett-Packard Co. and Data General Corp.," said Barry Dearborn, Durango's vice-president of sales. "By ourselves," he said, "we can't play on the same section of the playing field as IBM and AT&T." Dearborn predicted the future will hold more such consolidations in lieu of a shakeout for mid-size, entrepreneurially oriented multiuser vendors.

The two privately held companies began merger talks in November after solidifying a one- to two-year OEM agreement for Durango to supply Molecular with 100 to 150 of its Poppy 80286 computers per month. The Poppy 80286, Durango's flagship product, offers limited compatibility with the IBM Personal Computer AT, and can run MS-DOS, CP/M 86 or Zenix 3.0 operating systems.

The proposed merger would create a company with combined revenues of about $50 million and give Durango access to Molecular's well-established direct sales force, aimed at the Fortune 1,000, Dearborn said.

Molecular's newly appointed President and Chief Executive Officer Frank Zurcher, a former executive vice-president at Televideo Systems, Inc., said that before the merger talks began the firm had been looking to expand into the Zenix area.

Jim Renalds, an analyst with Dataquest, a market research firm in San Jose, Calif., said the potential merger will shore up the relatively weak financial positions of Durango and Molecular, which had been relying on a weakened venture capital base. The two companies are reviewing their product strategies now, Renalds said, and focusing on new target markets. "In this business though," he warned, "there's not a lot of time to reposition, so if they plan to refocus product lines, they'd better make their move within the next six months."

But some analysts question whether Durango should tamper with its short-term winning strategy at all. According to Robert Lefkowitz, an Infocorp analyst and former Durango employee, Durango's strength is in the vertically oriented niche occupied by value-added dealers and resellers.

Lefkowitz also said that IBM's recently announced inability to meet first-quarter Personal Computer AT production demands should work in Durango's favor, giving it a substantial lead time in the marketplace.

Second term sees profits

SANTA CLARA, Calif. — National Semiconductor Corp. recently reported a second-quarter profit of $8.5 million, or 10 cents per share, down from the year-earlier profit of $13.2 million, or 15 cents per share.

The company experienced an almost 18% increase in revenues to $435.4 million in the quarter, compared with $[illegible]69 million one year ago, but capital spending of $120 million was almost triple the year-earlier level. The company also increased spending on research and development.

The spending has positioned the company for strong growth when order rates in the industry strengthen, asserted Charles E. Sporck, president and chief executive officer. But he noted that order rates declined in the second quarter and said, "We feel it will be difficult to maintain the company's financial performance in the near term."

DEC files suit against C. Itoh

NEWARK, N.J. — Digital Equipment Corp. announced late last month that it has filed suit in U.S. District Court here seeking an injunction to prohibit C. Itoh & Co. America, Inc. from further marketing, selling or distribution of the C. Itoh CIT-220+ video display terminal.

DEC charged that the C. Itoh & Co. product is a direct and unauthorized copy of the "distinct external appearance" of DEC's VT220 terminal and that C. Itoh copied DEC's VT220 documentation and set up screen formats in violation of DEC's copyright protection.

The suit seeks treble damages from C. Itoh, based on the gains and profits the company has received through sales of the CIT-220+ products.

Also named in the suit was the company's parent company, C. Itoh & Co. Ltd. of Japan, along with C. Itoh Electronics, Inc. and CIE Terminals, Inc. C. Itoh Electronics, Inc. and CIE Terminals, Inc. are both located in Irvine, Calif.

Booz Allen exec joins Broadview Associates

FORT LEE, N.J. — Harvey L. Poppel, formerly senior vice-president of Booz, Allen & Hamilton and in charge of its information industry practice, recently announced he has joined Broadview Associates, a firm specializing in mergers and acquisitions in the information services industry.

With the addition of Poppel, according to Broadview founder Gil Mintz, "we will be able to specialize in the hardware and telecommunications sectors of the information industry" in addition to Broadview's traditional focus on computer services and software.

Poppel, 46, was with Booz Allen for 18 years and previously held information management and technology positions with Western Union Telegraph Co. and Westinghouse Electric Corp.

Convergent appoints director

SANTA CLARA, Calif. — Convergent Technologies, Inc. reported recently that William G. Ouchi has been appointed to its board of directors.

The company also announced that David I. Caplan has resigned as president and general manager of the firm's data systems division.

Ouchi is a professor of management and vice-chairman of the Graduate School of Management at the University of California at Los Angeles.

Caplan, who joined Convergent in April, is leaving to take a position as president and chief executive officer at Tolerant Systems Corp.

Intel to sell tools to SAS

AUSTIN, Texas — Intel Corp. said last month that it will sell part of its software operations here to SAS Institute, Inc.

SAS Institute, a Cary, N.C., software company, will acquire the design information, source code, product rights and support responsibilities for Intel's System 2000 data base management system, including the System 2000, Quest, Plex and Report Writer products. Intel's Idis data base information system and the Fast 38xx semiconductor disk products are not included in the agreement.

SAS Institute said the research and development staff for System 2000 will operate as a wholly owned subsidiary and will remain in Austin.

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Bull

Ztel in leadership change taps execs from investors

WILMINGTON, Mass. — Ztel Corp., a start-up private branch exchange manufacturer, has reported that two of its top executives have been replaced with representatives from two of the firm's four primary investors.

Peter S. Anderson, president and chief executive officer (CEO) of Ztel since April 1983, is said to have resigned from the company on Dec. 14 for personal reasons. Gerald R. Birr, vice-president and chief financial officer, also left the company, a company spokeswoman said.

Ztel's board of directors elected James E. Long as chief operations officer and Harry T. Rein as the company's new chairman of the board. Long, an employee of Adler and Co., a venture capital firm headquartered in New York and one of Ztel's major investors, has reportedly served on Ztel's board since February 1983. Rein will reportedly be working closely with Long until a new CEO can be elected sometime in the near future. Long would neither confirm nor deny whether the so-called "changing of the guard" had anything to do with the company's present financial situation.

AT&T plans megabit chip production by end of year

ALLENTOWN, Pa. — AT&T announced recently it plans to manufacture a megabit memory chip within a year and to be in full production in 1986. The company announced that Bell Laboratories here has produced working chips "that are essentially ready for the production line."

The megabit chip is seen by many as the next big frontier in the production of semiconductors, with varied applications including large storage capacities for 32-bit microprocessors and rapid expansion of portable machine capabilities.

Thomas R. Thomsen, president of AT&T Technology Systems Group said "AT&T intends to continue a leadership position" in the semiconductor area. In combination with 32-bit chips, Thomsen said, megabit chips in the near future could "help put a superminicomputer in business, industrial or other special environments where space is at a premium or for that matter in your lap."

Ian Ross, president of Bell Labs, said his group had successfully simulated the complete production process of the chip "so that there would be no surprises when we put the chip into production."

IBM announced last April that it had produced a megabit chip on an existing production line, indicating it, too, could quickly move into production when a market for the chips develops.

Additionally, at least two Japanese semiconductor companies are believed to have developed prototype megabit chips. AT&T said it will release details on the chip at the International Solid State Circuits Conference in New York this February.

Hitachi said not ready for U.S.

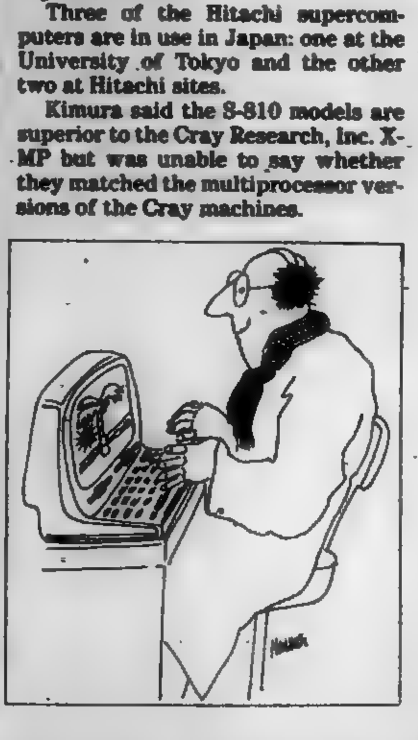
NEW YORK — The marketing director of Hitachi, Ltd. of Japan recently said his company wants "to gain more experience" with its supercomputers before trying to market them in the U. S. or Europe.

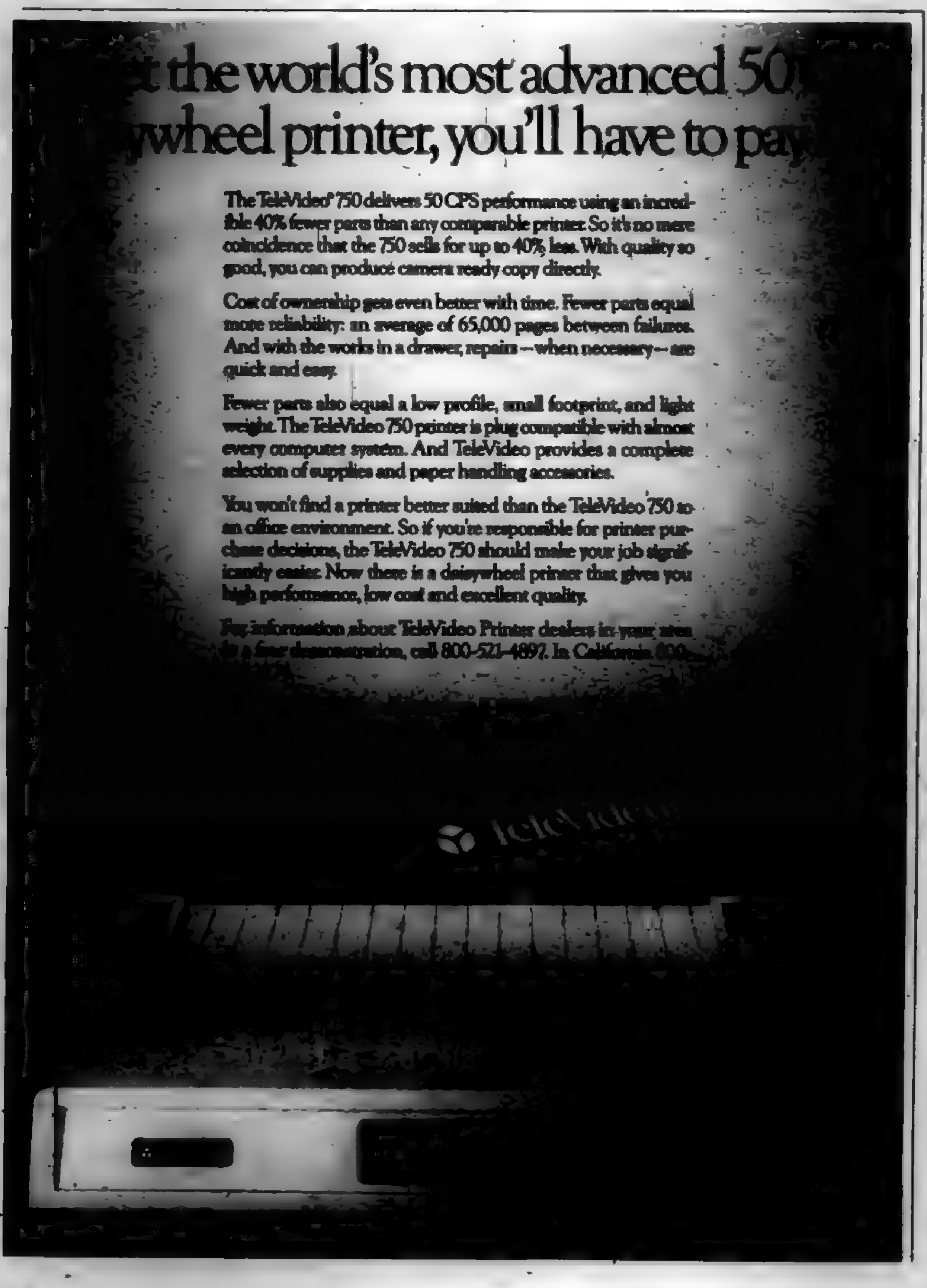
When asked for a target date at a recent press conference here, Atsu Kimura said, "We are not considering too much about it right now."

The Hitachi S810-10 is being offered at a lease rate of 50 million yen, or about $200,000, a month in Japan. The S810-20, leases for 70 million yen, or about $285,000, a month. Kimura was unable to say what the computer would sell for in Japan. Few companies have considered buying one, he said.

Three of the Hitachi supercomputers are in use in Japan: one at the University of Tokyo and the other two at Hitachi sites.

Kimura said the S-810 models are superior to the Cray Research, Inc. X-MP but was unable to say whether they matched the multiprocessor versions of the Cray machines.





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3Com software division to target micro net market

By Eric Bender
CW Staff

MOUNTAIN VIEW, Calif. — 3Com Corp. this month formed an Applications Software Division to develop and market software for networked personal computers and announced revenues of $13.2 million for the quarter ended Nov. 30.

The new division, headed by Robert Metcalfe, 3Com's founder and chairman, will offer both application development tools for system integrators and multiuser productivity packages for end users. With the upgrading of the unit, which was formed last June, to division status, 3Com has marked "the establishment of a critical mass" for applications software and taken the first step in a plan to restructure into divisions, Metcalfe said. He noted that 3Com now has about 260 employees.

According to Metcalfe, the new division will work with outside suppliers in offering software development tools. As one example, he said, "we don't plan to do a data base ourselves, but we will make it work on the net."

On the application software side, "we will be focusing on multiuser productivity tools — not spreadsheets or word processors or data bases, but rather productivity tools for more than one user," Metcalfe said. "The prime example is Ethermail." Planned enhancements for Ethermail include greater reach to external environments, boosted memory capability and tighter integration with other applications such as calendars and file managers, according to Metcalfe.

3Com's $13.2 million second-quarter revenues represented a 222% increase from $4.1 million in the same quarter last year, the company reported. Net income for the quarter rose to $1.4 million from $664,000 a year ago. Quarterly earnings per share climbed from 6 cents in 1984 to 10 cents this year.

For the first half of the current fiscal year, 3Com's net revenues were $22.1 million, up from $6.3 million in the first half of last year, the company said. Net income for the first half was $2.6 million, up from $910,000. Earnings per share for the first half climbed to 19 cents, up from 8 cents for the same period last year.

Despite rapid growth in this period, 3Com President L. William Krause commented, "Our incoming order rate was lower than expected" and said that IBM's introduction of its PC Network may have caused some customers to review their network purchasing plans.

Head vendor cuts back business

CHATSWORTH, Calif. — Magnetic Information Technology, Inc., a maker of magnetic heads for floppy disk drives, recently announced that it was curtailing its business and that its president, John Daste, has resigned.

Pete Sidhu, chairman and chief executive officer, said the company plans to continue operation in the U.S. and India on a limited basis. A search has begun for a new president, he said.

Sidhu, noting that 1984 has been a difficult year for the floppy disk business, said the company plans to move into other areas, including Winchester-type magnetic heads.

'And this is our most popular executive model.'

SCIENCE/SCOPE

Military commanders can get a detailed picture of tactical situations and the current status of their resources with a new display terminal. Hughes Aircraft Company's HMD-8000 has two display screens, one of which produces seven-color graphics with about twice the resolution of commercial TV. An innovative touch panel controlled by computer software lets an operator retrieve and display data very quickly. Commands that combine several complicated processes can be made in one touch. The system is built in modular form and is so flexible that it can be reconfigured to meet changing needs immediately. In an air defense command and control system it normally would display tactical air battle data and tactical air force resource data. As a battle grew and more information was needed, additional screens could be used to provide that data. Later the display screens could be returned to regular tasks.

A MIDAS touch will create the factory of the future by introducing computer technology throughout one Hughes manufacturing division. The new Manufacturing Information Distribution and Acquisition System (MIDAS) is a flexible, high-speed data communication network. It will transmit and gather millions of bits of data per day by linking computer terminals, laser printers, bar-code scanners, and other equipment. MIDAS will serve graphic workstations and facilitate paperless planning. Similarly, it will relay numerical-control programs from main computers to machines in the factory, eliminating the need for paper tape. MIDAS will let all users share important peripherals, such as a laser printer, which now is impossible due to the incompatibility of equipment from different manufacturers.

A new TV image processor should find many applications in such fields as electronics, medicine, chemistry, and manufacturing. The Hughes Model 793 processor, which features built-in computer control and a wide range of software options, is a fully integrated system that provides real-time image enhancement. It is intended for use where image retention, enhancement, or comparison is required, and where high image quality is essential. In addition to an image processor, the system has a keyboard, disk drive, joystick, line printer, and optional plotter.

A head-up display (HUD) that provides a wide field of view can be retrofited on fighter aircraft to give pilots critical sensor and steering information, even in low-altitude flights at night and under poor visibility conditions. The display saves pilots from looking down into the cockpit to read instruments because information such as airspeed, heading, and target data is superimposed on a diffraction optics combiner mounted at the pilot's eye level. Compared with conventional, mirrored glass displays, the HUD has a wider field of view, is more transparent, has brighter symbology, and reduces glare and sunballs. Hughes pioneered the technology used in its display, which incorporates diffraction optics made through a process involving holographic techniques and lasers. The Hughes HUD is in production for Sweden's JAS-39 and is undergoing evaluation for several U.S. aircraft.

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The growth in importance of online systems in recent years has indirectly caused a new concern: there is less and less time each night to complete batch processing – time known as the "Batch Window." And, when the batch schedule is not completed on time, the online system suffers dramatically – often causing a delay in bringing up IMS or CICS. The loss of productivity and revenue to your company can be significant, particularly if this situation occurs frequently or unexpectedly.

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COMPUTER INDUSTRY

NICKELS AND DIMES

Analog Devices, Inc. recently reported that its profits rose 57% to $10.2 million, or 38 cents a share, from $6.5 million, or 25 cents a share, for the fourth quarter ended Nov. 3. Revenues for the latest quarter rose 39% to $84.5 million from $60.8 million during the corresponding year-earlier period.

■

Panasophic Systems, Inc. reported revenues for its second fiscal quarter of $16.6 million, compared with $11.4 million for the same period a year ago. Profits were $3 million, or 35 cents per share, compared with $1.8 million, or 23 cents per share, in the comparable quarter last year.

■

Computer Automation, Inc. announced a net loss of $589,000, or 29 cents per share, on revenues of $14.2 million for the first quarter of 1985, ended Sept. 30. A year earlier, the company reported a first-quarter loss of $2.8 million, or $1.40 per share, and revenues of $12.1 million.

■

Computer Communications, Inc. announced that revenues for the first quarter ended Sept. 30 declined 19% to $2.3 million from $2.9 million reported in the same period one year earlier. The company reported a net loss in the current quarter of $175,656, or 2 cents per share, compared with $246,295, or 5 cents per share, in the same quarter one year earlier.

■

Sterling Software, Inc. reported revenues in 1984 rose 103% to $18.7 million, up from $9.2 million last year. Profits for the quarter amounted to $1.1 million, or 25 cents per share, compared with $1.2 million, or 40 cents per share, last year.

■

Icot Corp. announced revenues for the three months ended Oct. 27 of $5.9 million, compared with $3.5 million in the corresponding period last year. Profits were $67,000, or 1 cent per share, compared with a loss of $986,000, or 11 cents per share, for the comparable period one year earlier.

■

The MacNeal-Schwendler Corp. reported revenues for the nine months ended Oct. 31 of $10.2 million, compared with $8.2 million for the same period last year. Profits were $2.2 million, or 38 cents per share, compared with $1.8 million, or 32 cents per share, for the comparable quarter one year earlier.

■

Bishop Graphics, Inc. announced revenues for the fourth quarter of fiscal 1984 were $3.2 million, compared with $3.2 million in the same period one year ago. Profits were $243,000, or 12 cents per share, compared with $288,000 or 14 cents per share, in the year-earlier quarter.

■

Floating Point Systems, Inc. reported revenues for the fourth quarter of $32.4 million, compared with $29 million in the same quarter last year. Profits were $4.4 million, or 55 cents per share, compared with $4.4 million, or 50 cents per share, in the corresponding period a year earlier.

■

RECOVER

from page 149

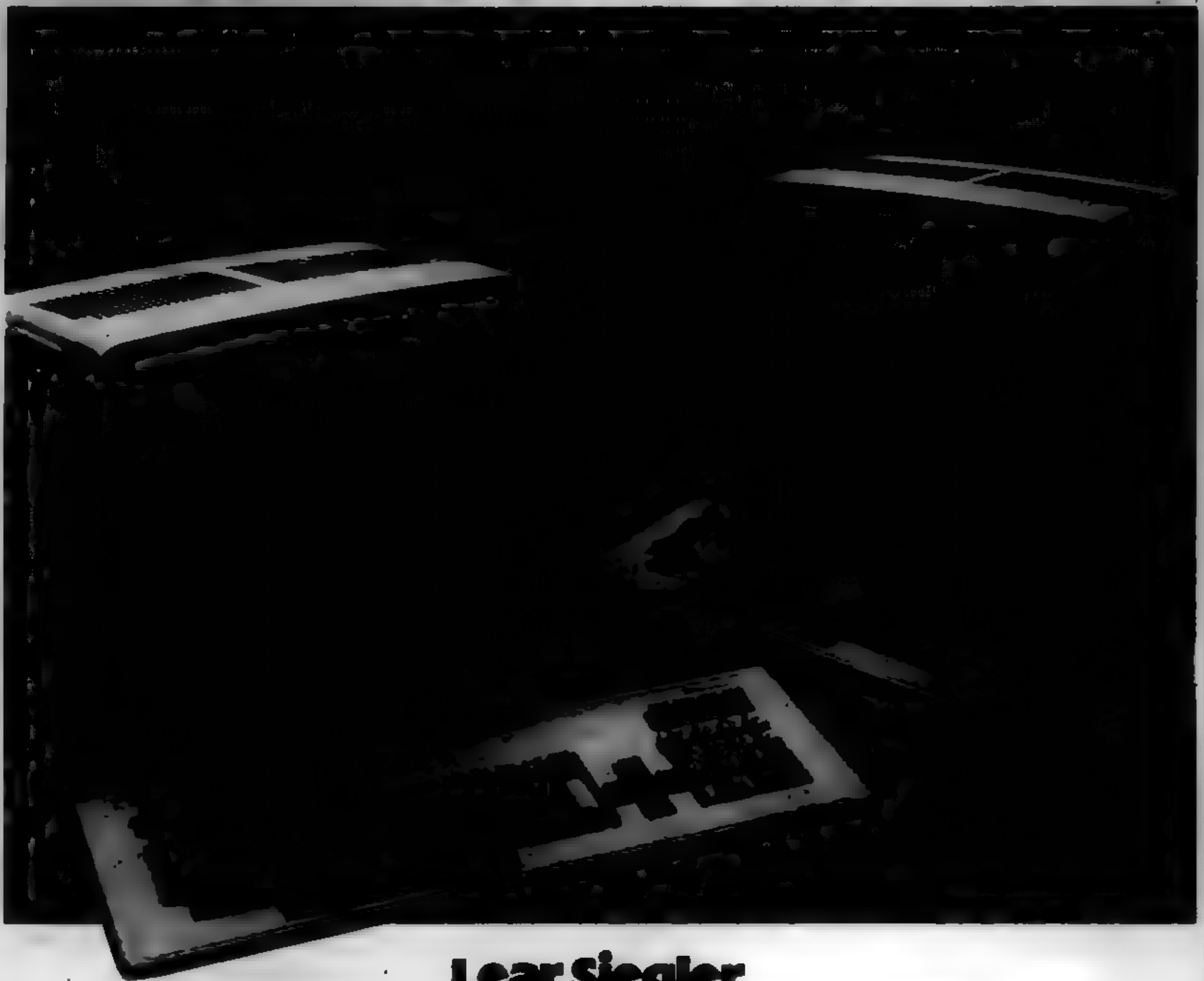
Bauer said he plans to avoid this diffusion of corporate energies in the future. With this in mind, he recently consolidated the company into eight divisions, all housed under the newly formed Systems and Applications groups. Both groups have distinct purposes, he said. The Applications Group, which accounts for half of Informatics' revenues through its sale of software in corporate vertical markets such as legal, accounting, insurance and distribution, now shares a common sales and marketing team and is aiming to beef up its dealer base to 150 value-added resellers. The newly consolidated Systems Group, Bauer explained, will allow the company to position itself as a prime contractor for its federal clients — a sector of the firm's business that already is worth $35 million a year — and serve as a one-stop shopping center for corporate programming needs.

Bauer

Informatics plans more acquisitions in the services area, noted Richard Lemons, Informatics' executive vice-president of information. Lemons said that aggressive international expansion is projected for 1985, based on a recently established European major accounts program and an Informatics division in France.

Brian Boyle, an analyst with Gnostic Concepts, Inc., a market research firm in Palo Alto, Calif., said that Informatics' financial problems in 1984 were caused by the company's having "too many eggs in their Mark V basket," a product he called "obsolete before its time." To move out of its financial slump, he said, the company has to move ahead in 1985 with new products. However, Informatics' value-added orientation and high overhead costs make such a move difficult in the micro area, he added.

According to Peter Lowber, a senior market analyst at the Yankee Group in Boston, Informatics lacks the basic foundation software to grow into future vertical markets and address future DP concerns. The key products he sees missing from Informatics' arsenal are fourth-generation language system capabilities, MIS' future alternative to Cobol, and a full relational data base management product, the model for data bases of the future.



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Systems Associates, Inc. reported revenues for the third quarter ended October 31 of $8.1 million, up 29% from $6.3 million one year ago. Profits were $747,000, or 30 cents per share, compared with $716,000, or 31 cents per share, in the corresponding quarter a year earlier.

■

Gerber Scientific, Inc. announced second-quarter profits of $6.4 million, or 37 cents per share, compared with $3.4 million, or 24 cents per share in the same period one year earlier. Revenues were $52.6 million, compared with $42.7 million in the corresponding quarter one year ago.

■

Tektronix, Inc. announced profits for the second quarter ended Nov. 10 of $22 million, or $1.14 per share, compared with $1.6 million, or 66 cents per share, in the year-earlier quarter. Revenues were $333.4 million, up 17% from $285 million in the comparable quarter one year ago.

■

Denelcor, Inc. announced a third-quarter loss of $2.9 million, or 38 cents per share, compared with a loss of $2.7 million, or 37 cents per share in the same period one year earlier. Revenues for the quarter were $411,000, compared with $191,000 in the corresponding quarter one year ago.

■

Applied Magnetics Corp. a net loss for the fourth quarter of $1.9 million, or 30 cents per share, compared with a profit of $2.6 million, or 39 cents per share for the same quarter last year. Revenues were $35.1 million, compared with $31.8 million in the same quarter one year ago.

■

Cognos reported consolidated revenue for its wholly owned subsidiaries in the UK and the U.S. reached $26.3 million (Canadian) in 1984, a 47% increase from $17.9 million during the previous year. Profits increased 123% to $1.9 million compared with $892,615 in the corresponding period one year earlier.

ITT

from page 149

group's total portfolio, he added. Specifically, ITT Commercial Finance has about $200 million worth of computer financing instruments due at any one moment and for the first 11 months of 1984 generated a volume of $860 million.

Brown claimed his company was, in 1980, the first to jump into providing financial services to retail computer dealers. He said it began by offering floor-plan financing — financing of retail dealers' shop floor inventory — for dealers of Apple Computer, Inc. equipment.

Currently, according to John Dobson, the ITT group's senior vice-president, the group provides 75% of the national retail financing market, dealing with almost 2,000 retailers.

In a move to expand beyond its original floor plan financing and related business services, Commercial Finance, as part of the consolidation, created two new divisions.

One, the Equipment Lease and Finance Division, will provide installment loans and leases for new and used computer systems and other capital equipment. The second, the Automated Finance and Lease Division, will provide dealers, distributors and manufacturers with a computer-linked credit check and finance authorization service that reportedly can approve financing within three to four hours.

'Requires steady nerves'

Brown noted that rapid inventory turnover, product volatility in the retail computer market and increasing competition among dealers "requires steady nerves" in signing up dealers. He said his company has developed a profile and product turnover ratios that are used to evaluate good risks.

The company has also developed a specialized staff that is able to differentiate among various products and manufacturers and will only back retail operations selling leading products, he added.

ITT Commercial Finance is intent on capturing an early lead in the leasing of low-end equipment, an area regarded with scepticism by traditional lessors because of the rapid product cycles and price cuts that have accompanied the expansion of the micro market.

Dobson acknowledged that leasing of low-end equipment has not caught on yet. However, he claimed, as competition at the retail level intensifies, dealers looking for an edge "will have to turn to end-user financing."

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SUPERSHORTS

Triumph-Adler AG confirmed **Pertec Computer Corp.** of Irvine, Calif., will remain part of Triumph-Adler North America, Inc., Hartford, Conn., ending plans to sell Pertec.

■

Information Solutions, Inc. (ISI) reported that **Prime Computer, Inc.** and ISI have agreed in principle to enter into a joint venture to market turnkey computer hardware and software systems to the lodging industry.

Under the terms of the tentative agreement, Prime will assume the primary and exclusive responsibility for marketing ISI's hospitality systems to property management companies, hotels and motels as well as resorts.

■

Relational Technology, Inc. has signed two separate joint development and marketing agreements, making Ingres available on Amdahl Corp.'s UTS operating system and on Pyramid Technology Corp.'s computer systems.

■

Tandberg Data, Inc. announced plans to consolidate its Armonk, N.Y.-based terminal division and its data storage division into one central location at the data storage division's new manufacturing facility in Anaheim, Calif.

■

Tandem Computers, Inc. and **On-Line Software International, Inc.** announced they have settled their litigation involving the Guardian trademark used for computer software products.

In accordance with the settlement, the New Jersey lawsuit will be dismissed as well as a related administrative proceeding in the United States Patent and Trademark Office.

Under the terms of the agreement, On-Line Software has agreed to abandon its federal trademark application and not to oppose Tandem's application seeking federal trademark registration of the trademark Guardian.

■

Honeywell, Inc. has formed a marketing support group to improve the availability of application software for DPS 8 and DPS 88 large-scale computers operating under Gcos. The applications marketing group will focus on scientific and commercial cross-industry packages, with initial emphasis on financial, distribution and engineering support applications.

■

The Association of Data Processing Service Organizations has reached an agreement with **National Information Systems** to provide joint purchasing of computer peripherals with **Data Securities International** to provide a new protection service to safeguard software.

■

Control Data Corp. announced that it will donate up to 10 Cyber 180/810 superminicomputer systems totaling $5 million to universities which are selected for the National Science Foundation's (NSF) Engineering Research Center program. NSF applicants had the option of requesting the Cyber 180 systems in their proposals.

TANDEM

from page 149

He declined to discuss specific new products that the company may introduce during the coming year. He said Tandem has not canceled any development projects recently but has "redirected" some of them.

He said the company plans this year to introduce some low-end products aimed at an office-type environment. The company's systems have been used widely for on-line transaction processing by users such as banks, airlines and telephone companies. Conceding that the company "didn't concentrate" on its relationships with software houses in the past, Treybig said Tandem has worked to correct that deficiency. "We made the mistake of not realizing that we had become a big company and that we had a lot of benefit for software houses," he said. The company has established a business alliance program in which it encourages and provides support for software developers.

Software is vital to Tandem's fault-tolerant computers, which rely on parallel processors and sophisticated software to allow the computers to work together, as well as work around a unit that may have failed.

As the company has grown from no revenue in 1976 to more than $500 million for the last fiscal year, Treybig said he has tried to maintain the progressive, people-oriented corporate culture for which the Cupertino, Calif., company is well known.

"There are things we've done well and haven't done well," he said. "I think we went through lots of transitions, but I don't think it affected our goals from a people or management point of view."

On the subject of start-up companies that have tried to challenge Tandem in the fault-tolerant market, Treybig noted that most have failed for a variety of reasons. He believes the availability of venture capital funds for some of the start-ups created a crowded market in which only a few firms could survive.

When Tandem started, he noted, there were no other companies in the fault-tolerant market.

"The start-ups have so much money, and they're all competing against one another, that it's difficult to make a profit. So a situation that appears to be much better, because there's a lot of money, is really a disadvantage, because you're going to have lots of other competitors just like you," he said.

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The offer is made only by the Prospectus.

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Analyze data processing problems and develop systems. Have knowledge and experience with large scale IBM main frame computers and other manufacturers hardware. Have experience with 4th generation program language, application systems, data bases and development tools. Have thorough knowledge of banking, financial and insurance industries as related to development of application experience and ability to coordinate teams comprising of software specialists, application programmers, etc. 5 years experience, B.S. in Computer Science or equivalent, job site Culver City, $55,000 per year. Send this advertisement and resume to job #8362 P.O. Box 865, Sacramento, CA. 95804 not later than January 21st, 1985.

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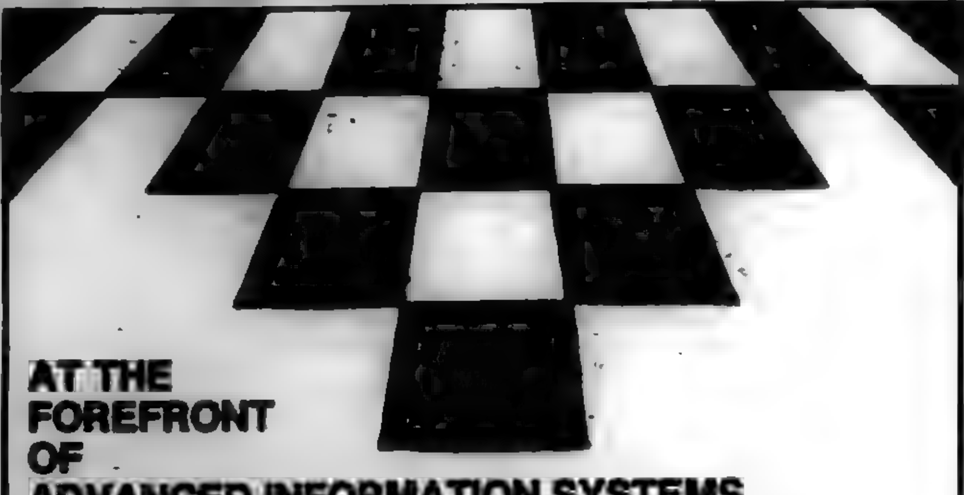

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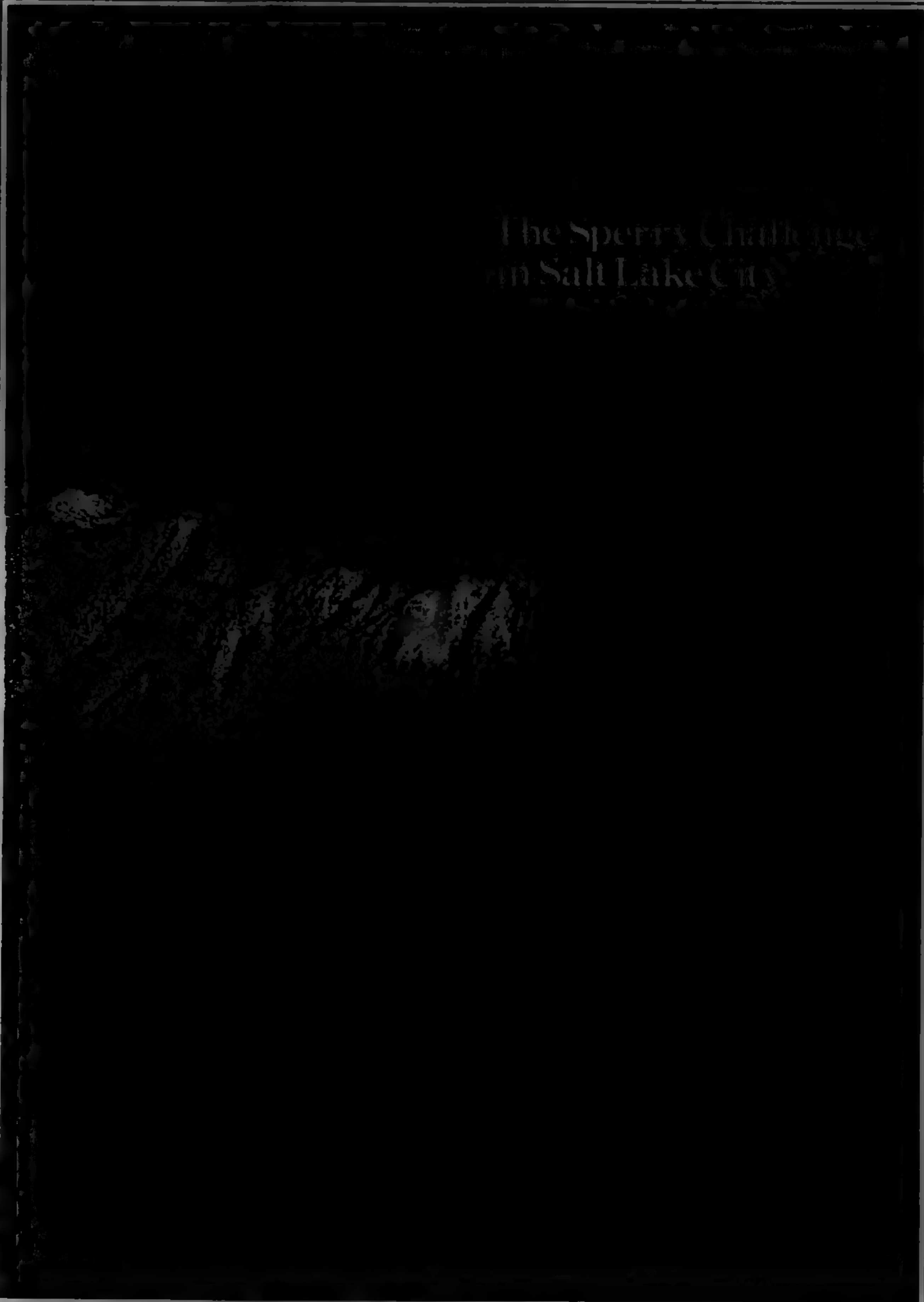

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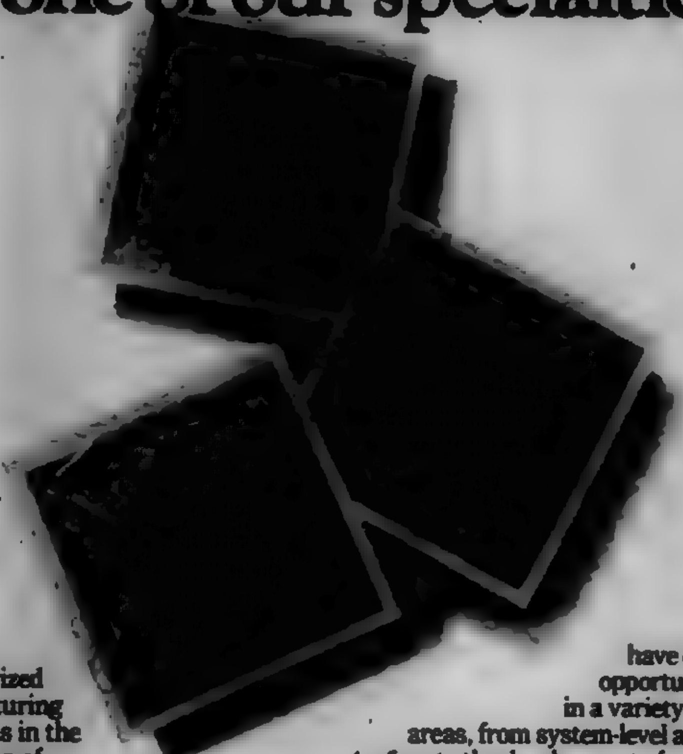

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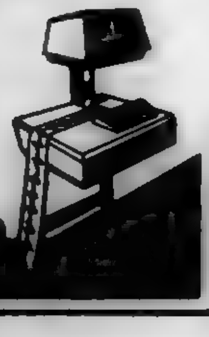

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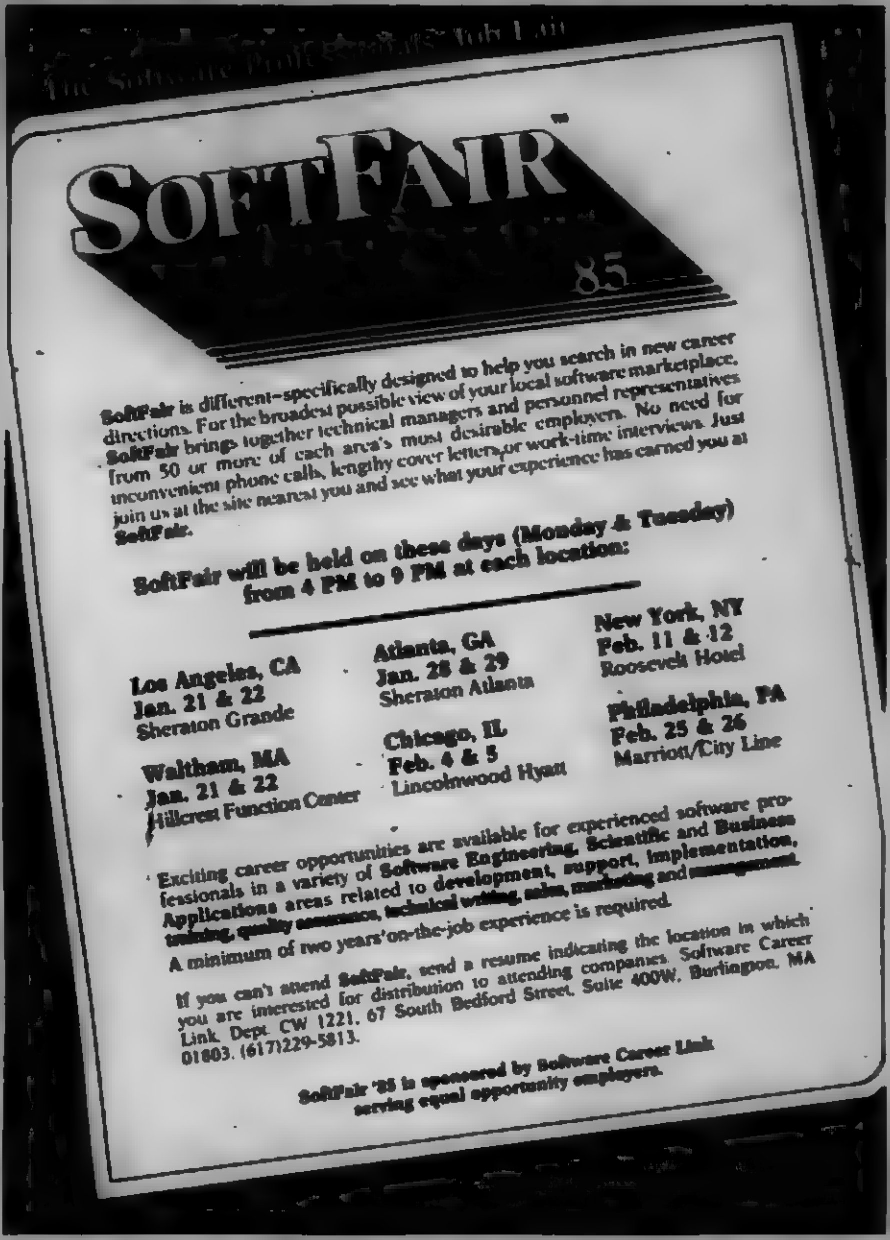

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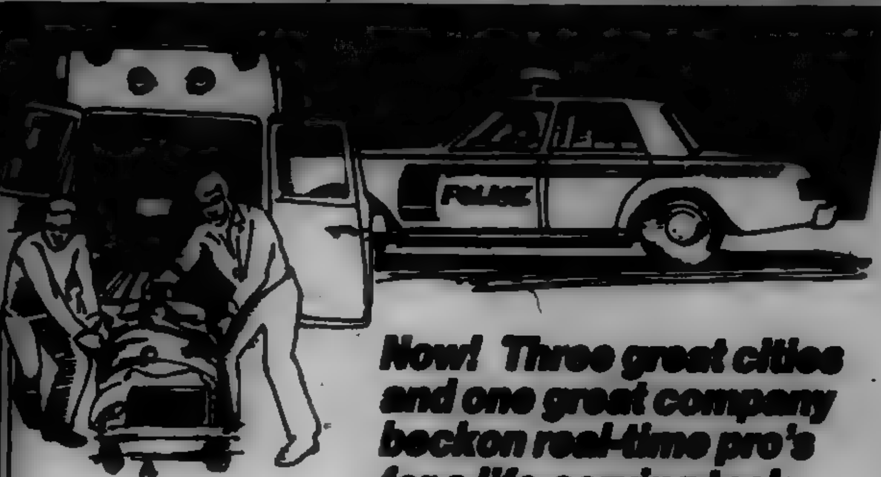

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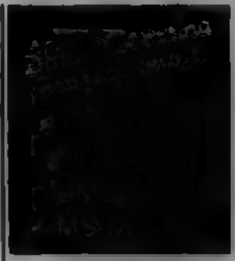

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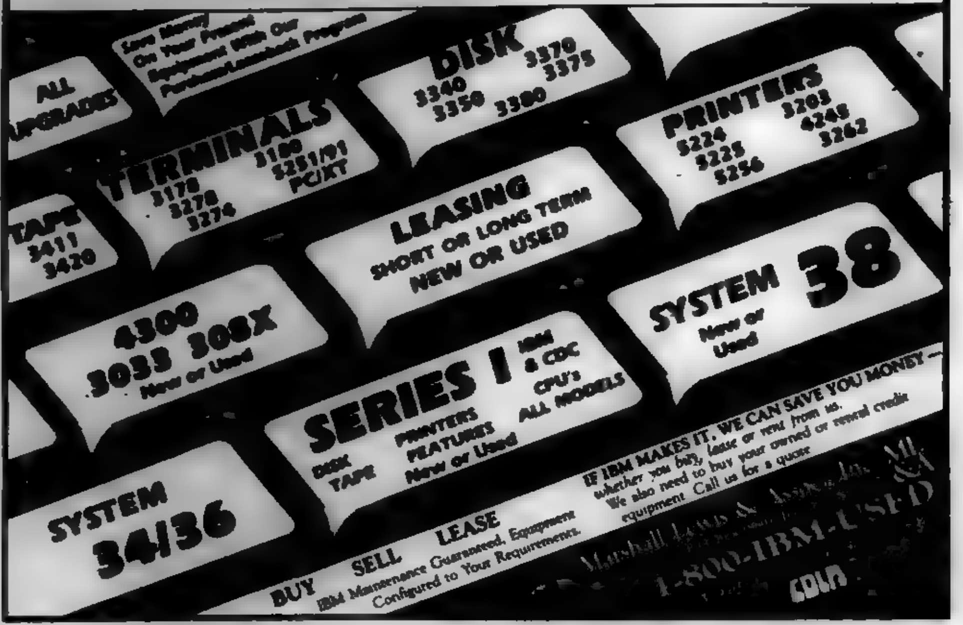
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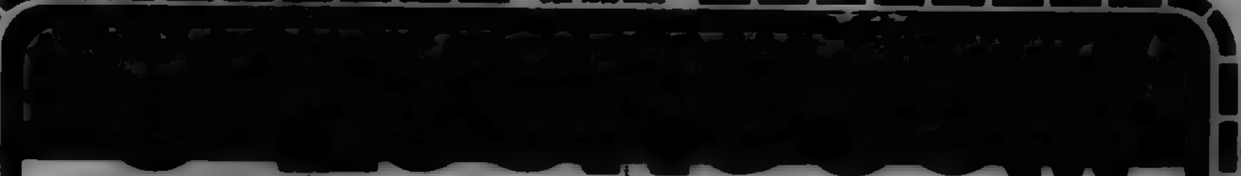

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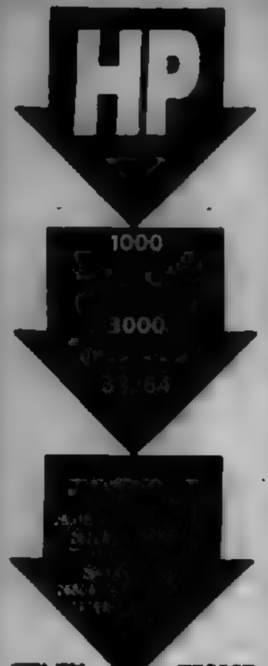

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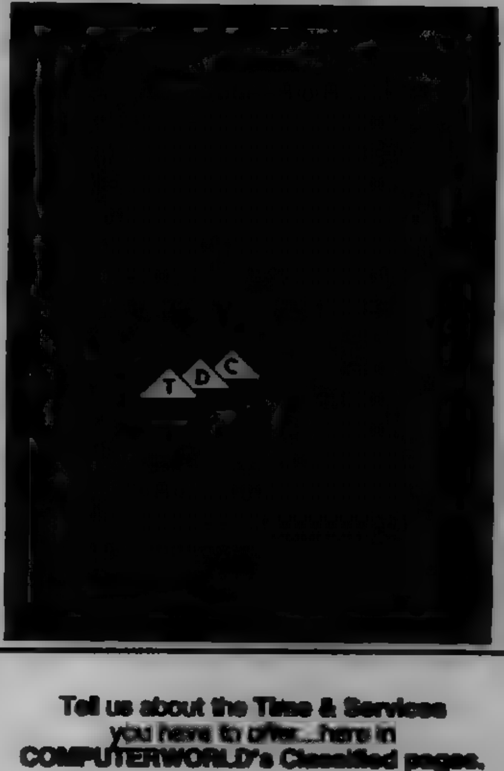

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Microgate emulators available for IBM micro

AUSTIN, Texas — Gateway Microsystems, Inc. has introduced a series of Microgate terminal emulation products for the IBM Personal Computer AT.

The Microgate/WS is said to be an integrated workstation emulating IBM 2780, 3780 and 3270 series terminals. It reportedly provides both batch and interactive micro-to-mainframe communications. Microgate 2780/3780 is an IBM 2780/3780 data communications terminal emulator that uses Binary Synchronous Protocol, according to Gateway.

The Microgate II reportedly is a bisynchronous communications subsystem with a programmable interface to Micro-Focus Cobol and IBM's PC Cobol, compiled Basic and Pascal and assembly languages.

The Microgate 6530 is said to be an enhanced emulator of the Tandem Computers, Inc. Model 6530/20 terminal. The Microgate 940 emulates the Texas Instruments, Inc. Model 940/931 terminal, allowing personal computers to be used on TI's DS990 and Business System series minicomputers, the vendor said.

The Microgate 940 is priced from $250 to $495; Microgate 6530 from $495 to $1,095; Microgate II, $895; Microgate 2780/3780, $895; and Microgate/WS, $995.

Gateway Microsystems is located at Suite 105, 9501 Capital of Texas Highway N., Austin, Texas 78759.

Research software announced

EUGENE, Ore. — Economic Software, Inc. has introduced Research, software that integrates data base management with color graphics and statistical analysis capabilities.

The package reportedly permits users to plot on one screen several different data types, such as correlations between daily interest rates, weekly money supply and monthly inflation rates, Economic Software said.

Research also generates a calendar of days automatically and allows data transfer from various programs, including Lotus Development Corp.'s 1-2-3, the company said.

The software runs on the IBM Personal Computer, Personal Computer XT and Personal Computer AT with 256K bytes of random-access memory.

The program is provided with 325 weeks of data on all major economic measures and is priced at $695. A demonstration diskette is priced at $17.95.

Economic Software can be reached at P.O. Box 10925, Eugene, Ore. 97440.

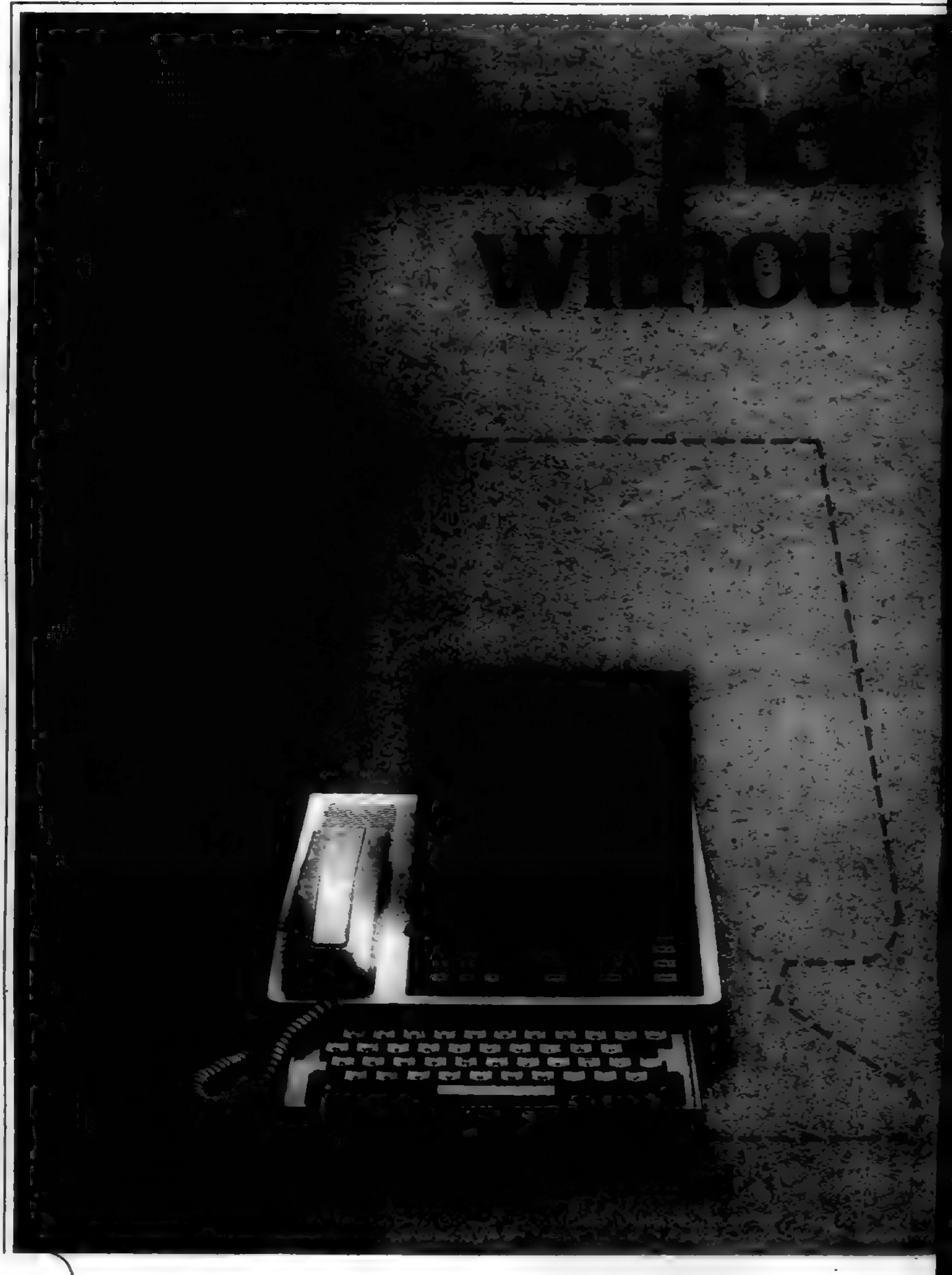
S-100 units gain MS-DOS version

NEW YORK — Lifeboat Associates has introduced SB-86, a version of Microsoft Corp.'s MS-DOS 2.11 operating system for computers based on the S-100 bus architecture. SB-86 reportedly is compatible with IBM's PC-DOS and runs on two CPU boards, the CPU 8085/88 and the CPU 86/87, made by Compupro, Inc. located in Hayward, Calif.

Lifeboat said that its entire line of MS-DOS software — including compilers, assemblers, linkers and business applications such as WP and spreadsheet packages — is available immediately for the new operating system.

The SB-86 requires the CPU card, a Compupro System Support I card, a Disk 1 or 1A controller and disk drive and at least 64K bytes of 24-bit addressable random-access memory, the vendor said. The system is said to support both interrupt-driven and noninterrupt-driven console I/O.

The SB-86 is priced at $275. Lifeboat Associates is located at 1651 Third Ave., New York, N.Y. 10128.



SOFTWARE

POLYGON SOFTWARE CORP.
Easypath 1.0

Polygon Software Corp. has announced a facility that allows users of IBM Personal Computers and compatibles to locate files in subdirectories other than the ones they are working with.

Easypath 1.0 reportedly allows use of the hierarchical subdirectory structure in IBM PC-DOS and Microsoft, Inc. MS-DOS without copying files back and forth. Search paths reportedly can be specified separately for particular files or for groups of files.

The product is said to come with predefined specifications for most major programs and to require PC-DOS or MS-DOS 2.0 or higher.

The list price is $100.

Polygon Software, 363 Seventh Ave., New York, N.Y. 10001.

PRO/TEM SOFTWARE
Notebook II

Pro/Tem Software had introduced its Notebook II data base management system for the IBM Personal Computer line and for the Hewlett-Packard Co. HP 150 and HP 110.

Notebook II reportedly includes a text editor with word wrap, automatic reformatting and screen update. It is said to be able to read files from word processors and public data bases and to accept control and extended characters.

Each Notebook II record is said to be able to include up to 28,000 characters and up to 50 fields.

Field and records sizes are not predefined, the vendor said.

Notebook II is priced at $189, according to a vendor spokesman.

Pro/Tem Software, 2363 Boulevard Circle, Walnut Creek, Calif. 94595.

DURANGO SYSTEMS, INC.
Poppy OS

Durango Systems, Inc. has released Poppy OS, which allows Microsoft Corp.'s MS-DOS programs to run under Microsoft's Xenix operating system.

Poppy OS allows the MS-DOS system calls to speak to the Xenix interpreter, thus enabling MS-DOS-based software to function on the Durango Poppy 286/186 Xenix-based systems. Poppy 286/186 supports up to 12 users with a multitasking operating system.

Poppy OS allows users to run single-user MS-DOS applications programs — such as Micropro International Corp.'s Wordstar, Microsoft's Multi-Plan and Ashton-Tate's Dbase II on a multiuser system.

Poppy OS costs $250.

Durango Systems, 3003 N. First St., San Jose, Calif. 95134.

MCDONNELL DOUGLAS SOFTWARE
Tym/Vsam

McDonnell Douglas Software has introduced Tym/Vsam for the IBM Personal Computer AT/370.

Tym/Vsam reportedly offers users most functions of IBM's Vsam mainframe software, including data storage and retrieval capabilities. It is said to allow the AT/370 to be used as a workstation for the development and testing of programs.

Tym/Vsam also is said to free users from having to return files to the mainframe for testing and to support random or sequential storage and data retrieval.

Tym/Vsam costs $695.

McDonnell Douglas Software, 20705 Valley Green Drive, Cupertino, Calif. 95014.

NEC INFORMATION SYSTEMS, INC.
DR Draw, DR Graph versions

NEC Information Systems, Inc. has announced versions of Digital Research, Inc.'s DR Draw and DR Graph for NEC's Advanced Personal Computer (APC).

The APC's graphics capabilities reportedly allow users to take full advantage of the two products.

DR Graph can be used to create graphs and charts from information in data files, the vendor said. It reportedly also can create line, bar, pie, step, stick and scatter graphs.

DR Draw can be used for creating presentation-quality charts and diagrams, NEC said.

DR Graph is priced at $295. DR Draw is priced at $395, the vendor said.

NEC Information Systems, 1414 Massachusetts Ave., Boxborough, Mass. 01719.

COPY from page 143

hard disks. Backing up even a small, 10M-byte hard disk can require more than two dozen floppies. The inconvenience deters most users.

Cartridge tape drives that provide adequate backup for micros have been available for several years. They cost about the same as a hard disk drive, and some users consider the price to be high.

Users who keep vital data on hard disks should consider the value or replacement cost of the protected data. When users investigate backup capabilities, they should look for:

- Data capacity. The backup medium should hold all data on one or — at most — a few volumes.
- Data transfer speed. A backup should not be time-consuming.
- Cost. Cost considerations include the cost of both the media and the device.
- Available software support. A backup device should provide the capabilities a user needs.

The standard for micro backup devices is the cartridge tape drive. The physical design provides storage capability in a package the size of a paperback novel. Cartridge tapes range in capacity from 10M to 50M bytes and cost $35 to $45 each.

During the past year, several removable cartridge units that use hard or floppy disks have been introduced. The products now available have limited storage capacities and cost two to four times more than higher capacity tape cartridges.

Users interested in cartridge tape backup have several choices. Cartridge tape drives operate in two modes, start-stop and streaming.

Start-stop drives, the older of the two technologies, physically start and stop the tape for each recording. This allows the controlling software to write a series of individual files to the tape. The penalty is a slow transfer rate.

With streaming tape drives, the tape moves continuously, streaming across the tape head. This allows faster data transfer and greater storage capacity.

The newest generation of streaming cartridge tape systems have software to provide complete file-oriented operations while essentially keeping the tape streaming.

The final step toward security lies with the user. Users must develop a set of procedures to ensure that data is backed up, that copies are kept both in the office and off-site and that proper cataloging lets users know where the data is when they need it.

YEAR from page 143

light, apparently forever.

A year ago Apple was still announcing products for the Apple III. More importantly, it was busily leaking details of the Macintosh, creating tremendous interest and considerable debate about whether the machine would be suitable for the corporate environment.

Also last January, the industry was watching AT&T slowly wheel its guns around toward the computer market. In 1985, we are still waiting for signs of a successful attack by the giant firm, with most interest in the voice/data workstations now poised for entry.

Twelve months ago, there were many more micro companies but no cheap desktop laser printers, no next-generation integrated packages such as Lotus Development Corp.'s Symphony, almost no IBM-developed micro software and less "mindware." Sometimes it seems a long time ago.

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COMPUTER INDUSTRY

Tandem moves to reposition itself

Aims to hold down costs, put low-end system on market

By David Gimes
CW Staff

PALM SPRINGS, Calif. — After broadening its product line and enacting cost-cutting measures and tighter management controls last year, Tandem Computers, Inc. is aiming to recapture the momentum it seemed to be losing.

"We grew our people faster than our revenues last year," James Treybig, Tandem's president and chief executive officer, admitted in a recent interview here. "The fundamental thing we're doing is not hiring people until our revenues catch up."

At the same time, Treybig said, the company, which manufactures fault-tolerant, on-line transaction processing systems, has "moved to reposition ourselves and offer low-end systems as well [as high-end ones], which was something we should always have done." He said the company's strategy now is to offer a broader range of products while striving to maintain its position in larger systems.

Financial performance improving

Tandem's financial performance has been unsteady during the past couple of years. With revenue growth slowing and operating margins down, the company began about a year ago to increase its focus on costs and profitability. The number of employees has been reduced, although the company has increased its sales force.

Industry analysts who follow Tandem said the near-term prospects for the company are good.

"They seem to be determined to get back into the mainstream of major growth and get close to their historical margins," said Fred Cohen, an analyst with L.F. Rothschild, Unterberg, Towbin, a New York brokerage firm. Cohen said the company could have have been faster in improving its hardware and reducing its costs.

Treybig said Tandem had a strong fourth quarter for the period ended Sept. 30, reporting a 30% increase in revenue and a 35% gain in profit over the year-earlier period. "If we have good growth this quarter, then we'll be back to approaching our historical margins," he said.

See TANDEM page 160

Informatics to counter losses with organizational changes

By Kathleen Burton
CW West Coast Bureau

WOODLAND HILLS, Calif. — There is a newly intensified corporate tone in evidence these days at Informatics General Corp., an information processing services and software company attempting to recover from severe financial losses sustained in 1984.

Lemons

To do so, and to meet its goal of becoming a $1 billion company by 1990, Informatics is reshuffling management, revamping its corporate strategy and repositioning several newly announced products to target the microcomputer market, according to executives interviewed here recently.

Other organizational changes include selling ailing divisions and repositioning languishing product lines, such as insurance, to target the micro market. "We're getting back to basics," said Walter F. Bauer, the firm's cofounder, chairman and chief executive officer.

Informatics posted depressed financial figures for 1984. Profits fell, and net income plummeted 87% to $546,000, compared with $4.2 million for the same period in 1983. The reasons, according to company insiders, were losses of $4 million in the company's $30 million life insurance operation, $2 million in the $34 million applications software products group and flattened sales of its flagship Mark V applications development product.

Industry analysts indicated that Informatics' poor financial showing last year was due to a chronic lack of focus. In the past, Informatics has offered a potpourri of services, ranging from customized programming to project management and systems, to a widely diversified array of customers including Fortune 1,000 corporations, the federal government and small businesses.

See RECOVER page 158

ITT consolidates credit divisions to offer expanded finance service

By Peter Bartolik
CW Staff

ST. LOUIS — Through ongoing consolidation of various credit divisions, ITT Corp.'s ITT Commercial Finance group hopes to build its early lead in retail computer financing into a position as the dominant one-stop financing service, including lease underwriting, for business computer equipment sold at the retail level.

The credit group, an operating unit of the $5 billion ITT Financial Corp., over recent months has absorbed four divisions of the former ITT Industrial Credit Co. under the direction of Melvin F. Brown, the Commercial Finance group's president and chief executive officer.

In a recent interview, Brown said the objective of the consolidated operation is to provide full-service commercial financing to leading computer retail operations. Those services currently provide about one-sixth of the

See ITT page 159

- Kaypro Corp.'s annual financial report showed that a $10 million profit, built up over the first three quarters, had been wiped out/151
- Digital Equipment Corp. has filed suit against C. Itoh & Co. America, Inc., asking a federal court to halt sales of C. Itoh's display terminal, which DEC alleges copies some of its VT220 terminal traits/153
- 3Com Corp. has set up an applications software division under the direction of company founder and chairman Bob Metcalf/156

Absence of tax reform may disappoint industry in '85

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

The most significant business-pertinent policy issues raised recently in Washington, D.C., are, first, the federal budget and, second, tax reform.

The Reagan administration cannot seem to get its act together on a comprehensive budget reduction package and therefore is going to have a big problem trying to sell a tax simplification package.

The waffling and wavering that has dampened Cabinet-level budget meetings leaves the impression that the executive branch is running around headless. The inability to develop a comprehensive budget package with a military budget cut significant enough to make it salable in Congress can only detract from the momentum and leadership that should be present in the White House during the beginning of a second presidential term.

Trade groups call for freeze

Recently, the American Electronics Association joined with other major national trade associations to call for a budget freeze, including a freeze in defense spending.

While many people see a budget cutback and tax reform ideally going hand in hand, the folly being played out in the budget process will undoubtedly carry over to the tax-writing process. Where the lack of leadership results in special dispensations in the budget, so surely will special interests smell an opening and flock to influence a new tax act. The end result will more than likely turn into another morass of loophole-ridden amendments, leaving the tax code in even worse shape than at present.

Unless the government gets its house in order, 1985 could turn out to be a very disappointing year for American industries.

■

A fatality earlier this summer stemming from chemicals located at the M/A-Com, Inc. gallium arsenide semiconductor laboratory was in no way job-related, according to a verbal report the company said it has received from the U.S. Department of Labor's Occupational Safety and Health Administration (Osha).

Joseph C. Bothwell, senior vice-president of the Burlington, Mass., company, said he was told by Osha that the death of employee John Zemotel from the inhalation of arsine gas in June was not job-related.

However, as a result of an intensive investigation following the fatality, Osha issued two citations alleging inadequate records of baseline airborne monitoring for inorganic arsenide and for concerns over certain written procedures, eyewash facilities, housekeeping and training programs. "Neither of these citations is related to Mr. Zemotel's tragic death," Bothwell said.

Entered lab without authorization

Zemotel reportedly entered the laboratories June 11 without authorization and inhaled arsine gas that was stored in a cylinder. He went into a coma later in the day and died on June 22.

M/A-Com had initially termed the death a possible suicide but later retracted its statement following complaints from Zemotel's relatives.

The Osha report, which has not yet been received in final written form, followed an earlier, similar report from the Massachusetts Department of Occupational Hygiene.

Intercompany discrepancies yield costly export errors

OUTSIDE LINES
Arthur Bardehagen
and Joseph Colleran

First of a two-part article

Manufacturers of computer hardware and software expend so much effort making and marketing their products that they are not always aware that their work is sometimes unwittingly sabotaged by other units of their companies, thus costing the companies money. This occurs most often, perhaps, when the manufacturers export their products.

How do we know all this? In the first seven months of 1984, Irving Trust Co. made nearly 21,000 payments to a variety of American exporters under letters of credit issued by overseas buyers of their products. In order to obtain payment under these credits, the exporters had to present the bank with various documents showing, among other things, that they had shipped the goods they said they would.

Records of the presentations made by these exporters indicated that 34.2% contained discrepancies of one kind or another. In other words, in more than one case in three the exporters erred in preparing the documents or else did not provide all those that were required. This experience is neither unique nor unusual in the banking industry.

What was the result of these errors? In a few cases the exporters lost their sales altogether. Because of discrepancies in the documents, the overseas buyers canceled their orders.

Usually, however, the discrepancies were corrected, and the sales were consummated. Even so, the exporters were not paid until the discrepancies were rectified and thus lost the use of their money for a day, a week, even two weeks or more. And often they were charged a fee. Over the last few years, banks have routinely levied such fees when presented with documents that contained discrepancies that could not be corrected and on which waivers had to be sought from the goods' importers.

On Oct. 1, the International Chamber of Commerce effected changes in the Uniform Customs and Practice for Documentary Credits, the rules governing the use of letters of credit in international trade. Some casual observers may think that these changes will reduce the discrepancies banks find so often in this area. We think no such thing.

In general, the changes merely streamline the use of letters of credit in international trade and recognize current practices fostered by the use of new technologies. For example, they sanction the use of photocopies, in lieu of original documents, as well as facsimile transmissions and other means of electronic communications.

The fact is a reduction in errors can only be achieved by exporters themselves. Before studying their most common mistakes, let's look briefly at letters of credit and how they are used.

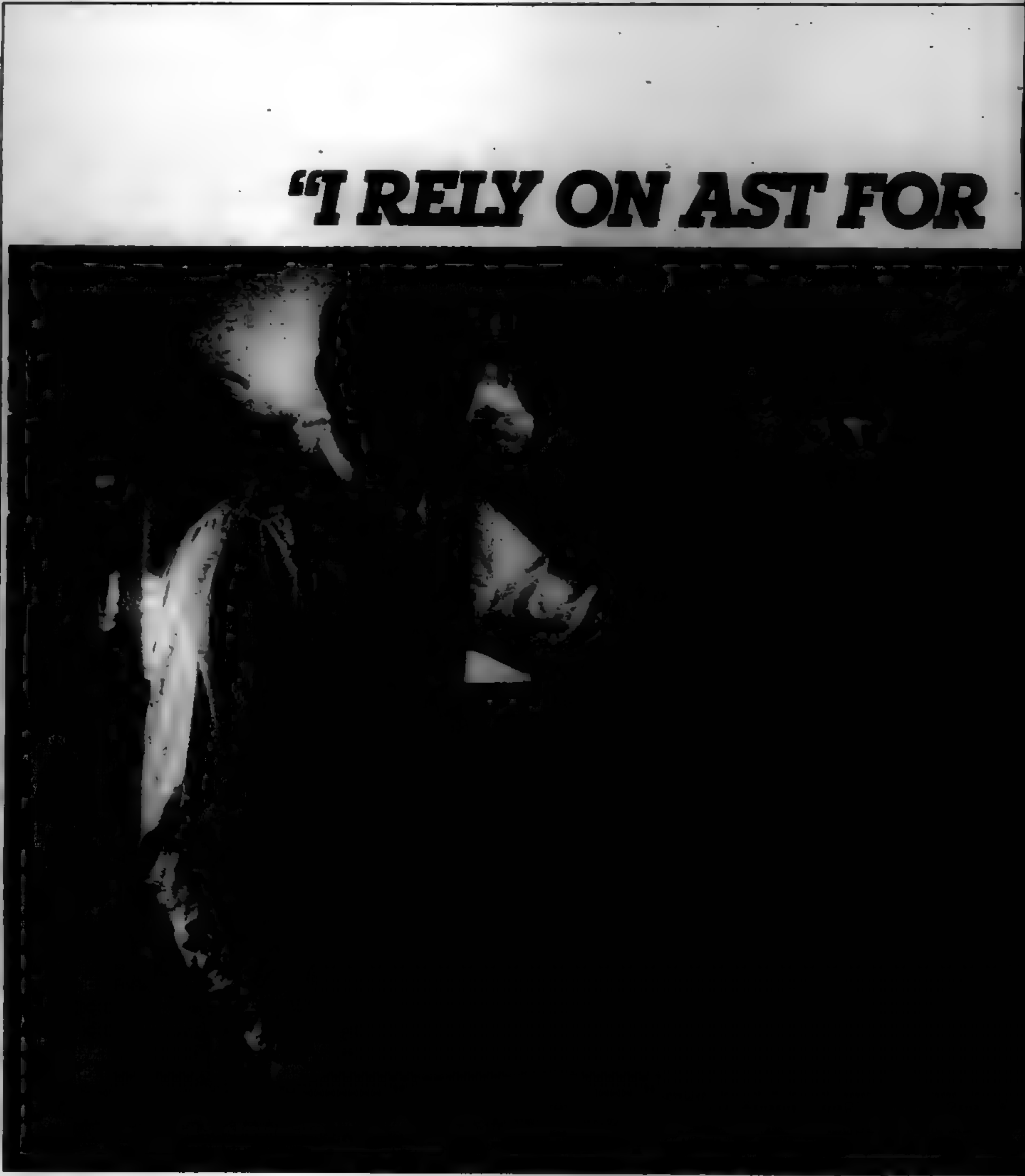
In international trade, an exporter may wish to be paid as soon as he ships his goods, while the importer may not wish to make payment until he has received them. A letter of credit serves to reconcile the interests of both parties.

It is a binding agreement that specifies what the exporter is to ship, what is to be paid for the shipment, when it is to be paid and any other conditions on which the buyer and seller agree. In addition, the letter of credit guarantees that money is available to pay for the shipment.

The letter of credit is is-

See TRADE page 151

Bardehagen is a vice-president in the Trade Finance division and Colleran is a vice-president in the Credit Services division of Irving Trust Co. in New York.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COMPUTER INDUSTRY

Earnings adjustments mark Kaypro's fiscal statement

Refusal to reveal fourth-quarter figures could mean problems, analysts say

By Kathleen Burton
CW West Coast Bureau

SOLANO BEACH, Calif. — Portable computer manufacturer Kaypro Corp. recently released its annual financial statement without revealing fourth-quarter results that wiped out a $10 million profit built over the first nine months of the fiscal year.

Kaypro reported a $267,683 loss for the fiscal year ended Aug. 31 after a series of unspecified year-end earnings adjustments. Kaypro officials would not reveal fourth-quarter financial figures or disclose earnings adjustments made to figures in the earlier periods.

Kaypro reported earlier that it expected to break even for the year. For the first three quarters, Kaypro reported net income of $10 million, compared with a 1983 net income of $8.3 million.

A company spokesman said Kaypro is now investigating an unexpected end-of-the-year inventory adjustment. Earlier in the year, David Kay, Kaypro's director of marketing, claimed that several million dollars of inventory parts were missing, possibly because of a theft from a circus tent on Kaypro's grounds, where the parts had been stored.

Management problem?

Bob Katzive, vice-president of Gnostic Concepts, Inc., a market research firm in Palo Alto, Calif., said Kaypro's secretiveness about the details of the write-down, its late Securities and Exchange Commission filing and restatement of profit margins suggest a fundamental management problem.

"It indicates that Kaypro's management is out of control and doesn't want to air out their dirty financial laundry," he said.

According to Katzive, the widely varying financial picture painted by Kaypro between the third and fourth quarters is suspicious. "Finances don't change that radically over one quarter," he said.

A company spokesman said the earnings adjustments were caused by a drop in gross margins from 43.4% in 1983 to 25.7% in 1984, by increases in reserves, by price discounting because of a highly competitive market, by higher than expected advertising and manufacturing costs and by reserves of inventory excesses.

Jan Lewis, an analyst at Infocorp, a Cupertino, Calif.-based market research firm, said Kaypro's 1984 losses were not significant over the long term because of the firm's stable position in the retail channel and its constant market share. Kaypro is "still a solid company," Lewis said.

TRADE

from page 150

sued by the importer's bank, which irrevocably commits itself to pay for the goods if the exporter presents the documents required by the credit.

The exporter's bank examines the documents, determines that they meet the requirements of the credit and so advises the importer's bank, which then forwards payment.

Typically these documents include an invoice, a packing or weight list, a bill of lading and perhaps an insurance form and a customs (or consular) invoice permitting entry of the goods into the importer's country.

Note that neither the exporter's nor the importer's bank actually inspects the goods that are shipped. Only the relevant documents are examined.

It all sounds relatively simple — and should be.

Next week: 10 common errors and ways to avoid them.

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We expect those new sales offices to grow rapidly. When they do, I'll be adding AST cluster functions so we can use PCs, and VT-100™ or compatible terminals in our configuration. All of them can communicate to headquarters over a shared phone line to reduce our telecommunications costs.

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Durango, Molecular Computer plan consolidation

By Kathleen Burton
CW West Coast Bureau

SAN JOSE, Calif. — Merger talks were recently concluded between Molecular Computer, Inc. and Durango Systems, Inc., both based here and both seeking protection in a market rapidly becoming more competitive.

"Consolidation is the only way companies like us can survive against giants like IBM, Hewlett-Packard Co. and Data General Corp.," said Barry Dearborn, Durango's vice-president of sales. "By ourselves," he said, "we can't play on the same section of the playing field as IBM and AT&T." Dearborn predicted the future will hold more such consolidations in lieu of a shakeout for mid-size, entrepreneurially oriented multiuser vendors.

The two privately held companies began merger talks in November after solidifying a one- to two-year OEM agreement for Durango to supply Molecular with 100 to 150 of its Poppy 80286 computers per month. The Poppy 80286, Durango's flagship product, offers limited compatibility with the IBM Personal Computer AT, and can run MS-DOS, CP/M 86 or Zenix 3.0 operating systems.

The proposed merger would create a company with combined revenues of about $50 million and give Durango access to Molecular's well-established direct sales force, aimed at the Fortune 1,000, Dearborn said.

Molecular's newly appointed President and Chief Executive Officer Frank Zurcher, a former executive vice-president at Televided Systems, Inc., said that before the merger talks began the firm had been looking to expand into the Zenix area.

Jim Renalds, an analyst with Dataquest, a market research firm in San Jose, Calif., said the potential merger will shore up the relatively weak financial positions of Durango and Molecular, which had been relying on a weakened venture capital base. The two companies are reviewing their product strategies now, Renalds said, and focusing on new target markets. "In this business though," he warned, "there's not a lot of time to reposition, so if they plan to refocus product lines, they'd better make their move within the next six months."

But some analysts question whether Durango should tamper with its short-term winning strategy at all. According to Robert Lefkowitz, an Infocorp analyst and former Durango employee, Durango's strength is in the vertically oriented niche occupied by value-added dealers and resellers.

Lefkowitz also said that IBM's recently announced inability to meet first-quarter Personal Computer AT production demands should work in Durango's favor, giving it a substantial lead time in the marketplace.

Second term sees profits

SANTA CLARA, Calif. — National Semiconductor Corp. recently reported a second-quarter profit of $8.5 million, or 10 cents per share, down from the year-earlier profit of $13.2 million, or 15 cents per share.

The company experienced an almost 18% increase in revenues to $436.4 million in the quarter, compared with $ 69 million one year ago, but capital spending of $120 million was almost triple the year-earlier level. The company also increased spending on research and development.

The spending has positioned the company for strong growth when order rates in the industry strengthen, asserted Charles E. Sporck, president and chief executive officer. But he noted that order rates declined in the second quarter and said, "We feel it will be difficult to maintain the company's financial performance in the near term."

DEC files suit against C. Itoh

NEWARK, N.J. — Digital Equipment Corp. announced late last month that it has filed suit in U.S. District Court here seeking an injunction to prohibit C. Itoh & Co. America, Inc. from further marketing, selling or distribution of the C. Itoh CIT-220+ video display terminal.

DEC charged that the C. Itoh & Co. product is a direct and unauthorized copy of the "distinct external appearance" of DEC's VT220 terminal and that C. Itoh copied DEC's VT220 documentation and set up screen formats in violation of DEC's copyright protection.

The suit seeks treble damages from C. Itoh, based on the gains and profits the company has received through sales of the CIT-220+ products.

Also named in the suit was the company's parent company, C. Itoh & Co. Ltd. of Japan, along with C. Itoh Electronics, Inc. and CIE Terminals, Inc. C. Itoh Electronics, Inc. and CIE Terminals, Inc. are both located in Irvine, Calif.

Booz Allen exec joins Broadview Associates

FORT LEE, N.J. — Harvey L. Poppel, formerly senior vice-president of Booz, Allen & Hamilton and in charge of its information industry practice, recently announced he has joined Broadview Associates, a firm specializing in mergers and acquisitions in the information services industry.

With the addition of Poppel, according to Broadview founder Gil Mintz, "we will be able to specialize in the hardware and telecommunications sectors of the information industry" in addition to Broadview's traditional focus on computer services and software.

Poppel, 46, was with Booz Allen for 18 years and previously held information management and technology positions with Western Union Telegraph Co. and Westinghouse Electric Corp.

Convergent appoints director

SANTA CLARA, Calif. — Convergent Technologies, Inc. reported recently that William G. Ouchi has been appointed to its board of directors.

The company also announced that David I. Caplan has resigned as president and general manager of the firm's data systems division.

Ouchi is a professor of management and vice-chairman of the Graduate School of Management at the University of California at Los Angeles.

Caplan, who joined Convergent in April, is leaving to take a position as president and chief executive officer at Tolerant Systems Corp.

Intel to sell tools to SAS

AUSTIN, Texas — Intel Corp. said last month that it will sell part of its software operations here to SAS Institute, Inc.

SAS Institute, a Cary, N.C., software company, will acquire the design information, source code, product rights and support responsibilities for Intel's System 2000 data base management system, including the System 2000, Quest, Plex and Report Writer products. Intel's Idis data base information system and the Fast 38xx semiconductor disk products are not included in the agreement.

SAS Institute said the research and development staff for System 2000 will operate as a wholly owned subsidiary and will remain in Austin.

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Ztel in leadership change taps execs from investors

WILMINGTON, Mass. — Ztel Corp., a start-up private branch exchange manufacturer, has reported that two of its top executives have been replaced with representatives from two of the firm's four primary investors.

Peter S. Anderson, president and chief executive officer (CEO) of Ztel since April 1983, is said to have resigned from the company on Dec. 14 for personal reasons. Gerald R. Birr, vice-president and chief financial officer, also left the company, a company spokeswoman said.

Ztel's board of directors elected James E. Long as chief operations officer and Harry T. Rein as the company's new chairman of the board. Long, an employee of Adler and Co., a venture capital firm headquartered in New York and one of Ztel's major investors, has reportedly served on Ztel's board since February 1983. Rein will reportedly be working closely with Long until a new CEO can be elected sometime in the near future. Long would neither confirm nor deny whether the so-called "changing of the guard" had anything to do with the company's present financial situation.

AT&T plans megabit chip production by end of year

ALLENTOWN, Pa. — AT&T announced recently it plans to manufacture a megabit memory chip within a year and to be in full production in 1986. The company announced that Bell Laboratories here has produced working chips "that are essentially ready for the production line."

The megabit chip is seen by many as the next big frontier in the production of semiconductors, with varied applications including large storage capacities for 32-bit microprocessors and rapid expansion of portable machine capabilities.

Thomas R. Thomsen, president of AT&T Technology Systems Group said "AT&T intends to continue a leadership position" in the semiconductor area. In combination with 32-bit chips, Thomsen said, megabit chips in the near future could "help put a superminicomputer in business, industrial or other special environments where space is at a premium or for that matter in your lap."

Ian Ross, president of Bell Labs, said his group had successfully simulated the complete production process of the chip "so that there would be no surprises when we put the chip into production."

IBM announced last April that it had produced a megabit chip on an existing production line, indicating it, too, could quickly move into production when a market for the chips develops.

Additionally, at least two Japanese semiconductor companies are believed to have developed prototype megabit chips. AT&T said it will release details on the chip at the International Solid State Circuits Conference in New York this February.

Hitachi said not ready for U.S.

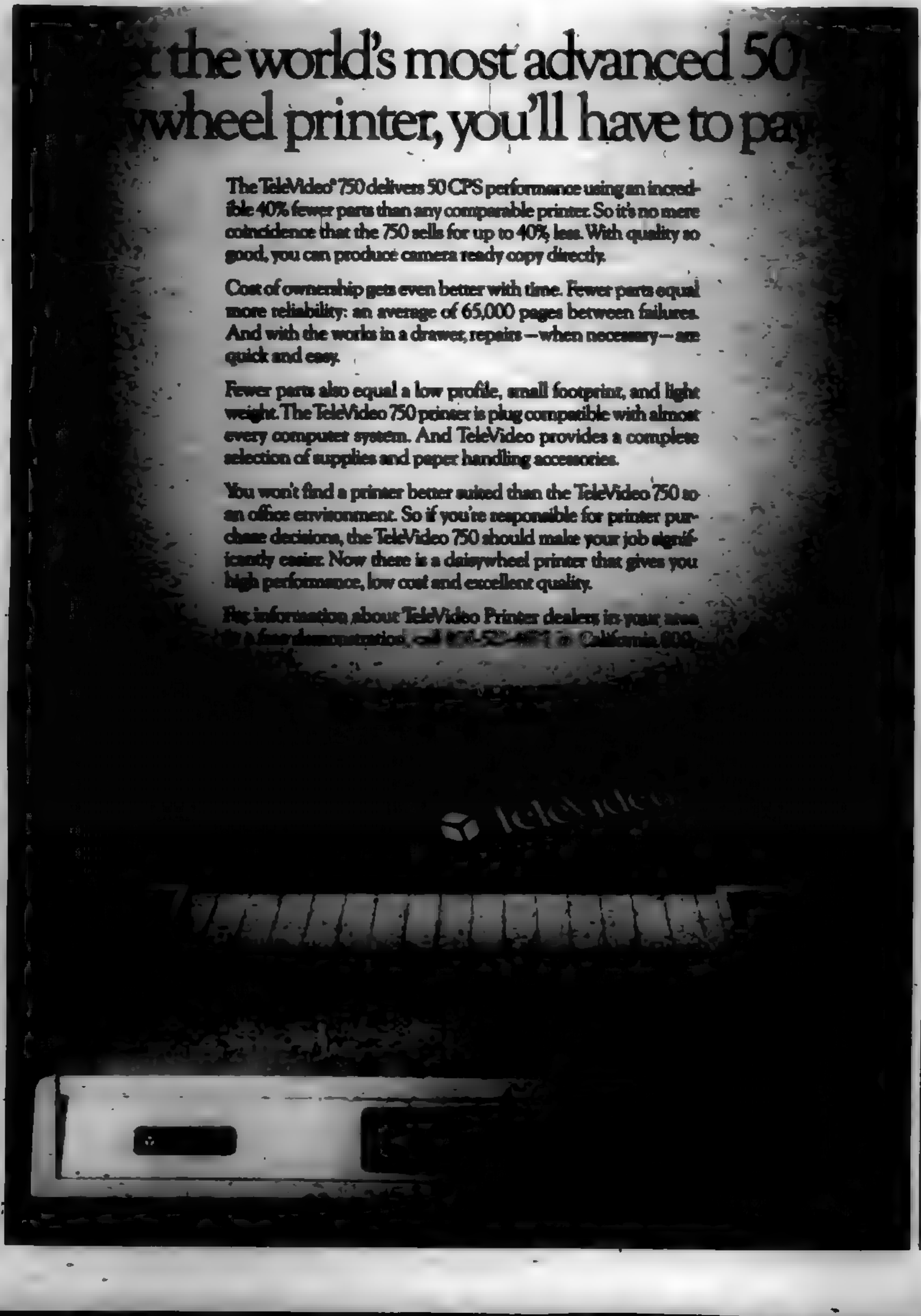
NEW YORK — The marketing director of Hitachi, Ltd. of Japan recently said his company wants "to gain more experience" with its supercomputers before trying to market them in the U. S. or Europe.

When asked for a target date at a recent press conference here, Atsu Kimura said, "We are not considering too much about it right now."

The Hitachi S810-10 is being offered at a lease rate of 50 million yen, or about $200,000, a month in Japan. The S810-20, leases for 70 million yen, or about $285,000, a month. Kimura was unable to say what the computer would sell for in Japan. Few companies have considered buying one, he said.

Three of the Hitachi supercomputers are in use in Japan: one at the University of Tokyo and the other two at Hitachi sites.

Kimura said the S-810 models are superior to the Cray Research, Inc. X-MP but was unable to say whether they matched the multiprocessor versions of the Cray machines.



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3Com software division to target micro net market

By Eric Bender
CW Staff

MOUNTAIN VIEW, Calif. — 3Com Corp. this month formed an Applications Software Division to develop and market software for networked personal computers and announced revenues of $13.2 million for the quarter ended Nov. 30.

The new division, headed by Robert Metcalfe, 3Com's founder and chairman, will offer both application development tools for system integrators and multiuser productivity packages for end users. With the upgrading of the unit, which was formed last June, to division status, 3Com has marked "the establishment of a critical mass" for applications software and taken the first step in a plan to restructure into divisions, Metcalfe said. He noted that 3Com now has about 260 employees.

According to Metcalfe, the new division will work with outside suppliers in offering software development tools. As one example, he said, "we don't plan to do a data base ourselves, but we will make it work on the net."

On the application software side, "we will be focusing on multiuser productivity tools — not spreadsheets or word processors or data bases, but rather productivity tools for more than one user," Metcalfe said. "The prime example is Ethermail." Planned enhancements for Ethermail include greater reach to external environments, boosted memory capability and tighter integration with other applications such as calendars and file managers, according to Metcalfe.

3Com's $13.2 million second-quarter revenues represented a 222% increase from $4.1 million in the same quarter last year, the company reported. Net income for the quarter rose to $1.4 million from $664,000 a year ago. Quarterly earnings per share climbed from 6 cents in 1984 to 10 cents this year.

For the first half of the current fiscal year, 3Com's net revenues were $22.1 million, up from $6.3 million in the first half of last year, the company said. Net income for the first half was $2.6 million, up from $910,000. Earnings per share for the first half climbed to 19 cents, up from 8 cents for the same period last year.

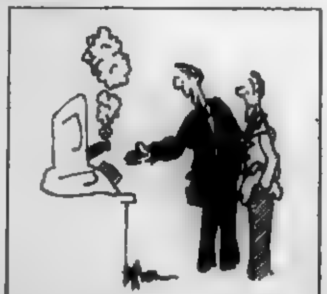
Despite rapid growth in this period, 3Com President L. William Krause commented, "Our incoming order rate was lower than expected" and said that IBM's introduction of its PC Network may have caused some customers to review their network purchasing plans.

Head vendor cuts back business

CHATSWORTH, Calif. — Magnetic Information Technology, Inc., a maker of magnetic heads for floppy disk drives, recently announced that it was curtailing its business and that its president, John Daste, has resigned.

Pete Sidhu, chairman and chief executive officer, said the company plans to continue operation in the U.S. and India on a limited basis. A search has begun for a new president, he said.

Sidhu, noting that 1984 has been a difficult year for the floppy disk business, said the company plans to move into other areas, including Winchester-type magnetic heads.



'And this is our most popular executive model.'

SCIENCE/SCOPE

Military commanders can get a detailed picture of tactical situations and the current status of their resources with a new display terminal. Hughes Aircraft Company's HMD-8000 has two display screens, one of which produces seven-color graphics with about twice the resolution of commercial TV. An innovative touch panel controlled by computer software lets an operator retrieve and display data very quickly. Commands that combine several complicated processes can be made in one touch. The system is built in modular form and is so flexible that it can be reconfigured to meet changing needs immediately. In an air defense command and control system it normally would display tactical air battle data and tactical air force resource data. As a battle grew and more information was needed, additional screens could be used to provide that data. Later the display screens could be returned to regular tasks.

A MIDAS touch will create the factory of the future by introducing computer technology throughout one Hughes manufacturing division. The new Manufacturing Information Distribution and Acquisition System (MIDAS) is a flexible, high-speed data communication network. It will transmit and gather millions of bits of data per day by linking computer terminals, laser printers, bar-code scanners, and other equipment. MIDAS will serve graphic workstations and facilitate paperless planning. Similarly, it will relay numerical-control programs from main computers to machines in the factory, eliminating the need for paper tape. MIDAS will let all users share important peripherals, such as a laser printer, which now is impossible due to the incompatibility of equipment from different manufacturers.

A new TV image processor should find many applications in such fields as electronics, medicine, chemistry, and manufacturing. The Hughes Model 793 processor, which features built-in computer control and a wide range of software options, is a fully integrated system that provides real-time image enhancement. It is intended for use where image retention, enhancement, or comparison is required, and where high image quality is essential. In addition to an image processor, the system has a keyboard, disk drive, joystick, line printer, and optional plotter.

A head-up display (HUD) that provides a wide field of view can be retrofited on fighter aircraft to give pilots critical sensor and steering information, even in low-altitude flights at night and under poor visibility conditions. The display saves pilots from looking down into the cockpit to read instruments because information such as airspeed, heading, and target data is superimposed on a diffraction optics combiner mounted at the pilot's eye level. Compared with conventional, mirrored glass displays, the HUD has a wider field of view, is more transparent, has brighter symbology, and reduces glare and sunballs. Hughes pioneered the technology used in its display, which incorporates diffraction optics made through a process involving holographic techniques and lasers. The Hughes HUD is in production for Sweden's JAS-39 and is undergoing evaluation for several U.S. aircraft.

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Do "Batch Window" Problems Cause Your Online Systems to Come Up Late?

When your online system doesn't come up on time, the impact to your online users is the same as if your CPU were down: LOST PRODUCTIVITY

The growth in importance of online systems in recent years has indirectly caused a new concern: there is less and less time each night to complete batch processing – time known as the "Batch Window." And, when the batch schedule is not completed on time, the online system suffers dramatically – often causing a delay in bringing up IMS or CICS. The loss of productivity and revenue to your company can be significant, particularly if this situation occurs frequently or unexpectedly.

Candle's answer to managing the "Batch Window" is EPILOG®/MVS, the Installation Performance Management System. EPILOG/MVS provides analysis on performance data by sampling performance at user specified intervals and writing the data to an EPILOG data base. You can then compare the performance of today's run of a job or group of jobs with their performance when run last week or last month. Once you have determined that a job is now taking abnormally long to complete, EPILOG/MVS can be used to pinpoint the reason why – moreover, this can all be done using TSO or batch reports.

You can also use EPILOG/MVS on an exception basis. When a performance threshold has been exceeded, use EPILOG/MVS to analyze performance for that particular time interval. This allows you to concentrate on *only* the problem areas, thereby achieving your greatest payback.

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NICKELS AND DIMES

Analog Devices, Inc. recently reported that its profits rose 57% to $10.2 million, or 38 cents a share, from $6.5 million, or 25 cents a share, for the fourth quarter ended Nov. 3. Revenues for the latest quarter rose 39% to $84.5 million from $60.8 million during the corresponding year-earlier period.

■

Panasophic Systems, Inc. reported revenues for its second fiscal quarter of $16.6 million, compared with $11.4 million for the same period a year ago. Profits were $3 million, or 35 cents per share, compared with $1.8 million, or 23 cents per share, in the comparable quarter last year.

■

Computer Automation, Inc. announced a net loss of $589,000, or 29 cents per share, on revenues of $14.2 million for the first quarter of 1985, ended Sept. 30. A year earlier, the company reported a first-quarter loss of $2.8 million, or $1.40 per share, and revenues of $12.1 million.

■

Computer Communications, Inc. announced that revenues for the first quarter ended Sept. 30 declined 19% to $2.3 million from $2.9 million reported in the same period one year earlier. The company reported a net loss in the current quarter of $175,656, or 2 cents per share, compared with $246,295, or 5 cents per share, in the same quarter one year earlier.

■

Sterling Software, Inc. reported revenues in 1984 rose 103% to $18.7 million, up from $9.2 million last year. Profits for the quarter amounted to $1.1 million, or 25 cents per share, compared with $1.2 million, or 40 cents per share, last year.

■

Icot Corp. announced revenues for the three months ended Oct. 27 of $5.9 million, compared with $3.5 million in the corresponding period last year. Profits were $67,000, or 1 cent per share, compared with a loss of $986,000, or 11 cents per share, for the comparable period one year earlier.

■

The MacNeal-Schwendler Corp. reported revenues for the nine months ended Oct. 31 of $10.2 million, compared with $8.2 million for the same period last year. Profits were $2.2 million, or 38 cents per share, compared with $1.8 million, or 32 cents per share, for the comparable quarter one year earlier.

■

Bishop Graphics, Inc. announced revenues for the fourth quarter of fiscal 1984 were $3.2 million, compared with $3.2 million in the same period one year ago. Profits were $243,000, or 12 cents per share, compared with $288,000 or 14 cents per share, in the year-earlier quarter.

■

Floating Point Systems, Inc. reported revenues for the fourth quarter of $32.4 million, compared with $29 million in the same quarter last year. Profits were $4.4 million, or 55 cents per share, compared with $4.4 million, or 50 cents per share, in the corresponding period a year earlier.

■

RECOVER

from page 149

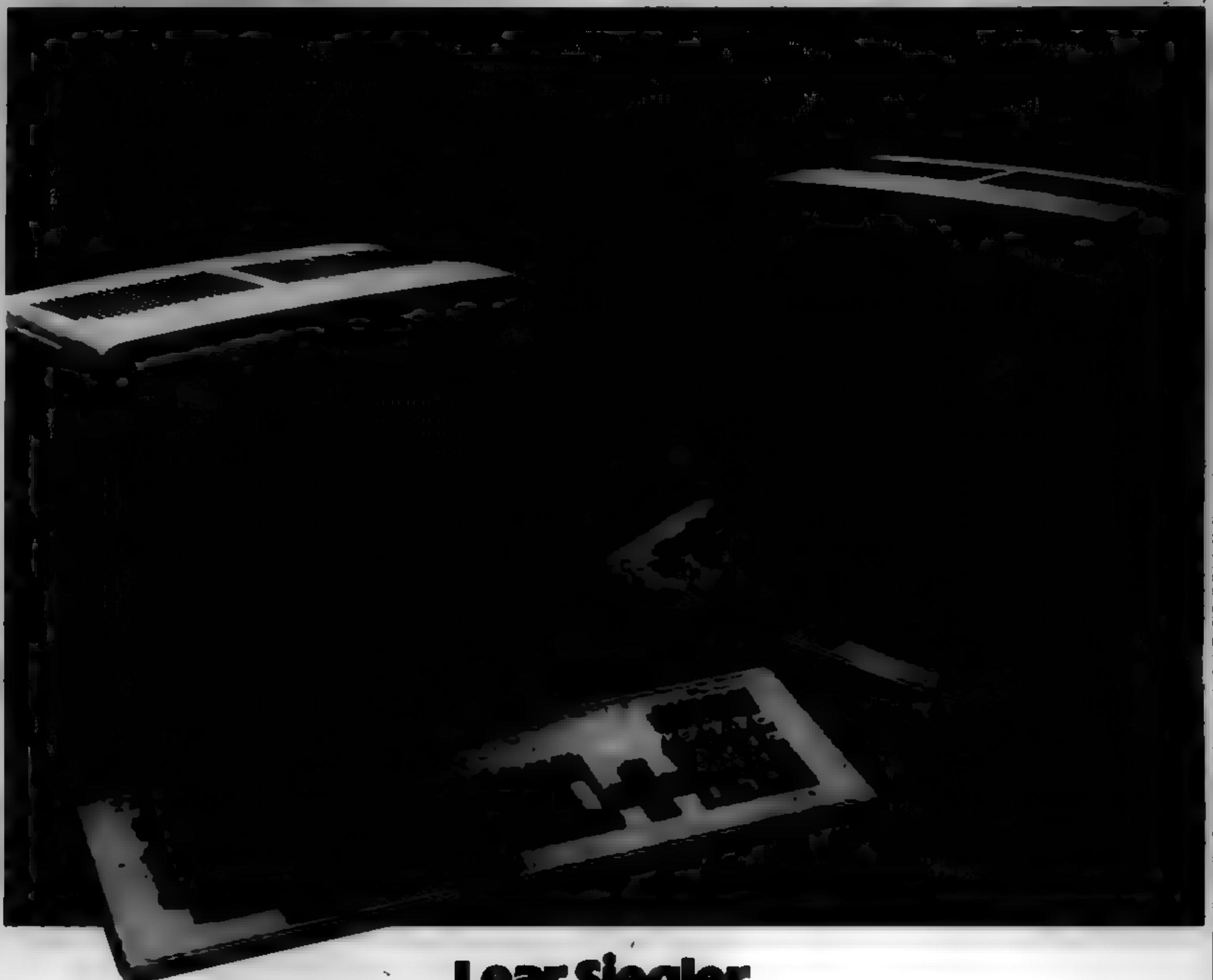
Bauer said he plans to avoid this diffusion of corporate energies in the future. With this in mind, he recently consolidated the company into eight divisions, all housed under the newly formed Systems and Applications groups. Both groups have distinct purposes, he said. The Applications Group, which accounts for half of Informatics' revenues through its sale of software in corporate vertical markets such as legal, accounting, insurance and distribution, now shares a common sales and marketing team and is aiming to beef up its dealer base to 150 value-added resellers. The newly consolidated Systems Group, Bauer explained, will allow the company to position itself as a prime contractor for its federal clients — a sector of the firm's business that already is worth $35 million a year — and serve as a one-stop shopping center for corporate programming needs.

Bauer

Informatics plans more acquisitions in the services area; noted Richard Lemons, Informatics' executive vice-president of information. Lemons said that aggressive international expansion is projected for 1985, based on a recently established European major accounts program and an Informatics division in France.

Brian Boyle, an analyst with Gnostic Concepts, Inc., a market research firm in Palo Alto, Calif., said that Informatics' financial problems in 1984 were caused by the company's having "too many eggs in their Mark V basket," a product he called "obsolete before its time." To move out of its financial slump, he said, the company has to move ahead in 1985 with new products. However, Informatics' value-added orientation and high overhead costs make such a move difficult in the micro area, he added.

According to Peter Lowber, a senior market analyst at the Yankee Group in Boston, Informatics lacks the basic foundation software to grow into future vertical markets and address future DP concerns. The key products he sees missing from Informatics' arsenal are fourth-generation language system capabilities, MIS' future alternative to Cobol, and a full relational data base management product, the model for data bases of the future.



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Systems Associates, Inc. reported revenues for the third quarter ended October 31 of $8.1 million, up 29% from $6.3 million one year ago. Profits were $747,000, or 30 cents per share, compared with $716,000, or 31 cents per-share, in the corresponding quarter a year earlier.

■

Gerber Scientific, Inc. announced second-quarter profits of $6.4 million, or 37 cents per share, compared with $3.4 million, or 24 cents per share in the same period one year earlier. Revenues were $52.6 million, compared with $42.7 million in the corresponding quarter one year ago.

■

Tektronix, Inc. announced profits for the second quarter ended Nov. 10 of $22 million, or $1.14 per share, compared with $1.6 million, or 66 cents per share, in the year-earlier quarter. Revenues were $333.4 million, up 17% from $285 million in the comparable quarter one year ago.

■

Dunsilcor, Inc. announced a third-quarter loss of $2.9 million, or 38 cents per share, compared with a loss of $2.7 million, or 37 cents per share in the same period one year earlier. Revenues for the quarter were $411,000, compared with $191,000 in the corresponding quarter one year ago.

■

Applied Magnetics Corp. a net loss for the fourth quarter of $1.9 million, or 30 cents per share, compared with a profit of $2.6 million, or 39 cents per share for the same quarter last year. Revenues were $35.1 million, compared with $31.8 million in the same quarter one year ago.

■

Cognos reported consolidated revenue for its wholly owned subsidiaries in the UK and the U.S. reached $26.3 million (Canadian) in 1984, a 47% increase from $17.9 million during the previous year. Profits increased 123% to $1.9 million compared with $892,615 in the corresponding period one year earlier.

ITT

from page 149

group's total portfolio, he added. Specifically, ITT Commercial Finance has about $200 million worth of computer financing instruments due at any one moment and for the first 11 months of 1984 generated a volume of $860 million.

Brown claimed his company was, in 1980, the first to jump into providing financial services to retail computer dealers. He said it began by offering floor-plan financing — financing of retail dealers' shop floor inventory — for dealers of Apple Computer, Inc. equipment.

Currently, according to John Dobson, the ITT group's senior vice-president, the group provides 75% of the national retail financing market, dealing with almost 2,000 retailers.

In a move to expand beyond its original floor plan financing and related business services, Commercial Finance, as part of the consolidation, created two new divisions.

One, the Equipment Lease and Finance Division, will provide installment loans and leases for new and used computer systems and other capital equipment. The second, the Automated Finance and Lease Division, will provide dealers, distributors and manufacturers with a computer-linked credit check and finance authorization service that reportedly can approve financing within three to four hours.

'Requires steady nerves'

Brown noted that rapid inventory turnover, product volatility in the retail computer market and increasing competition among dealers "requires steady nerves" in signing up dealers. He said his company has developed a profile and product turnover ratios that are used to evaluate good risks.

The company has also developed a specialized staff that is able to differentiate among various products and manufacturers and will only back retail operations selling leading products, he added.

ITT Commercial Finance is intent on capturing an early lead in the leasing of low-end equipment, an area regarded with scepticism by traditional lessors because of the rapid product cycles and price cuts that have accompanied the expansion of the micro market.

Dobson acknowledged that leasing of low-end equipment has not caught on yet. However, he claimed, as competition at the retail level intensifies, dealers looking for an edge "will have to turn to end-user financing."

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SUPERSHORTS

Triumph-Adler AG confirmed **Pertec Computer Corp.** of Irvine, Calif., will remain part of Triumph-Adler North America, Inc., Hartford, Conn., ending plans to sell Pertec.

■

Information Solutions, Inc. (ISI) reported that **Prime Computer, Inc.** and ISI have agreed in principle to enter into a joint venture to market turnkey computer hardware and software systems to the lodging industry.

Under the terms of the tentative agreement, Prime will assume the primary and exclusive responsibility for marketing ISI's hospitality systems to property management companies, hotels and motels as well as resorts.

■

Relational Technology, Inc. has signed two separate joint development and marketing agreements, making Ingres available on Amdahl Corp.'s UTS operating system and on Pyramid Technology Corp.'s computer systems.

■

Tandberg Data, Inc. announced plans to consolidate its Armonk, N.Y.-based terminal division and its data storage division into one central location at the data storage division's new manufacturing facility in Anaheim, Calif.

■

Tandem Computers, Inc. and **On-Line Software International, Inc.** announced they have settled their litigation involving the Guardian trademark used for computer software products.

In accordance with the settlement, the New Jersey lawsuit will be dismissed as well as a related administrative proceeding in the United States Patent and Trademark Office.

Under the terms of the agreement, On-Line Software has agreed to abandon its federal trademark application and not to oppose Tandem's application seeking federal trademark registration of the trademark Guardian.

■

Honeywell, Inc. has formed a marketing support group to improve the availability of application software for DPS 8 and DPS 88 large-scale computers operating under Gcos. The applications marketing group will focus on scientific and commercial cross-industry packages, with initial emphasis on financial, distribution and engineering support applications.

■

The Association of Data Processing Service Organizations has reached an agreement with **National Information Systems** to provide joint purchasing of computer peripherals with **Data Securities International** to provide a new protection service to safeguard software.

■

Control Data Corp. announced that it will donate up to 10 Cyber 180/810 superminicomputer systems totaling $5 million to universities which are selected for the National Science Foundation's (NSF) Engineering Research Center program. NSF applicants had the option of requesting the Cyber 180 systems in their proposals.

TANDEM

from page 149

He declined to discuss specific new products that the company may introduce during the coming year. He said Tandem has not canceled any development projects recently but has "redirected" some of them.

He said the company plans this year to introduce some low-end products aimed at an office-type environment. The company's systems have been used widely for on-line transaction processing by users such as banks, airlines and telephone companies. Conceding that the company "didn't concentrate" on its relationships with software houses in the past, Treybig said Tandem has worked to correct that deficiency. "We made the mistake of not realizing that we had become a big company and that we had a lot of benefit for software houses," he said. The company has established a business alliance program in which it encourages and provides support for software developers.

Software is vital to Tandem's fault-tolerant computers, which rely on parallel processors and sophisticated software to allow the computers to work together, as well as work around a unit that may have failed.

As the company has grown from no revenue in 1976 to more than $500 million for the last fiscal year, Treybig said he has tried to maintain the progressive, people-oriented corporate culture for which the Cupertino, Calif., company is well known.

"There are things we've done well and haven't done well," he said. "I think we went through lots of transitions, but I don't think it affected our goals from a people or management point of view."

On the subject of start-up companies that have tried to challenge Tandem in the fault-tolerant market, Treybig noted that most have failed for a variety of reasons. He believes the availability of venture capital funds for some of the start-ups created a crowded market in which only a few firms could survive.

When Tandem started, he noted, there were no other companies in the fault-tolerant market.

"The start-ups have so much money, and they're all competing against one another, that it's difficult to make a profit. So a situation that appears to be much better, because there's a lot of money, is really a disadvantage, because you're going to have lots of other competitors just like you," he said.

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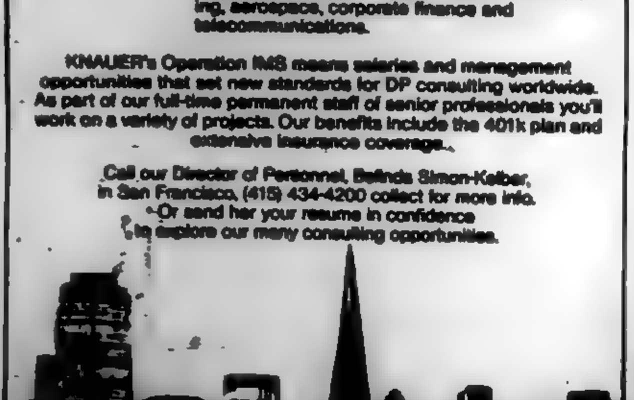

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[illegible]
Secretary of the Association
Middle States Association
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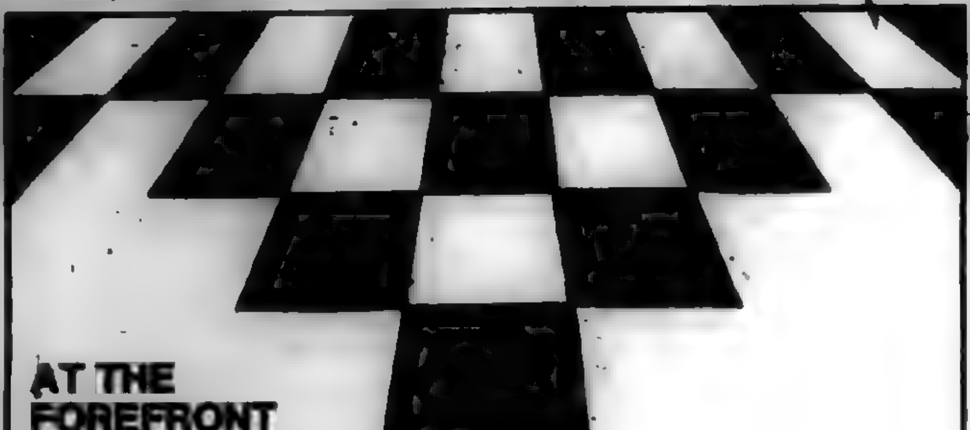

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Data Processing

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- Online systems development under CICS with basic mapping and/or command level processing.
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- Intensive use of COBOL in writing applications software.
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If selected, you will have a minimum of 6-8 years experience, a four year degree, previous experience in performing all functions related to complex system design, development, modification, maintenance, and implementation, as well as experience working independently or as a project team leader in business management application. Background in development of a new systems as well as system analysis techniques of existing systems is required.

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If you need further information, please call collect (617) 229-2300. Or contact The CAREER Symposium, 83 Cambridge Street, Suite 2B, Burlington, MA 01803. The Burlington Marriott is located at exit 41N off Route 128.

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January 14th & 15th
12 pm to 9 pm
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NASA

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Responsible for strategic ADP planning, including determination of overall technical requirements, design and integration approaches, identifying needed resources, and budget forecasting and tracking. Defines goals and objectives for integrating the functions of the organization with the computational activities at Ames and NASA Headquarters. Provides technical planning and monitoring of major projects. Manages the Center's master programming contracts. Staff includes approximately 8 members. Undergraduate degree in computer science, mathematics, or related engineering field combined with advanced degrees and broad computer technology management background is desired.

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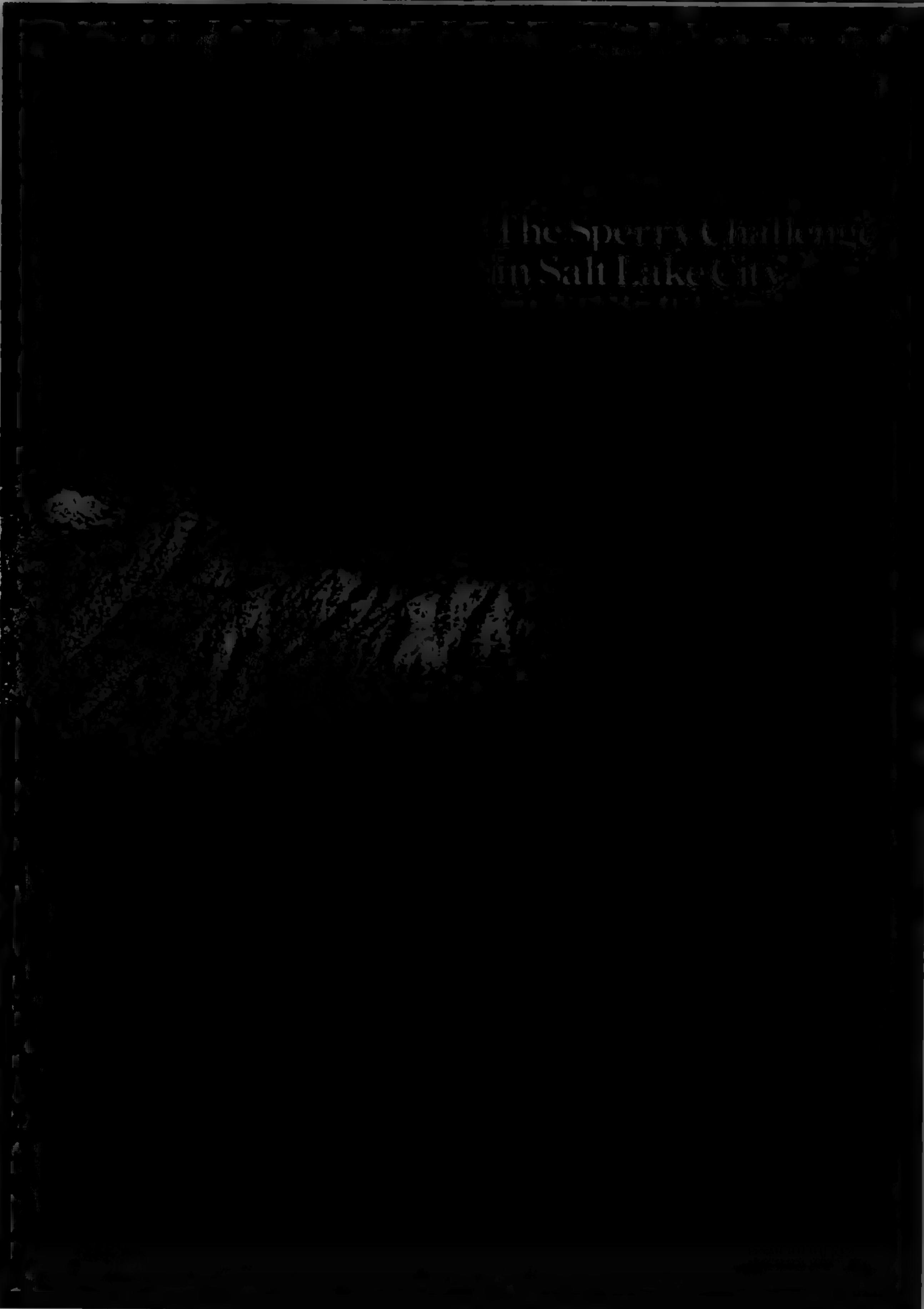

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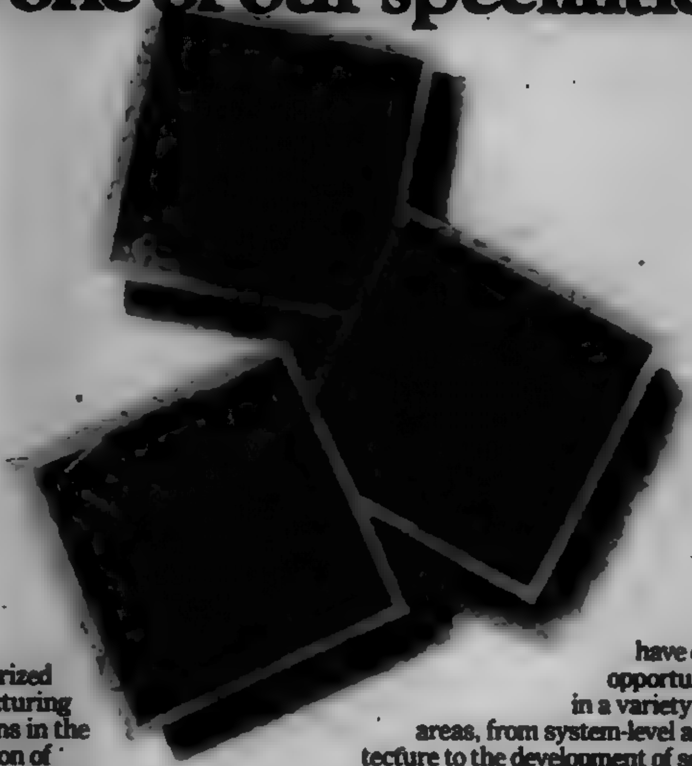

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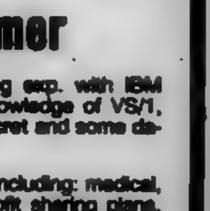

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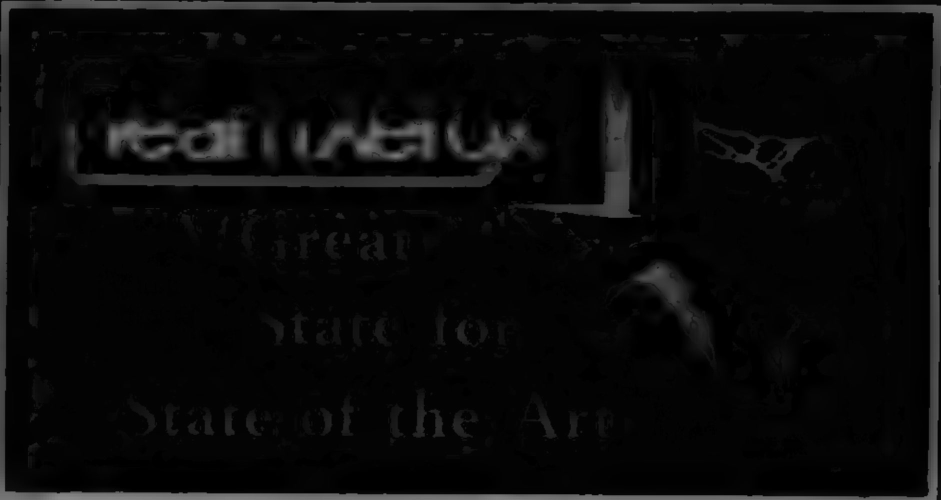

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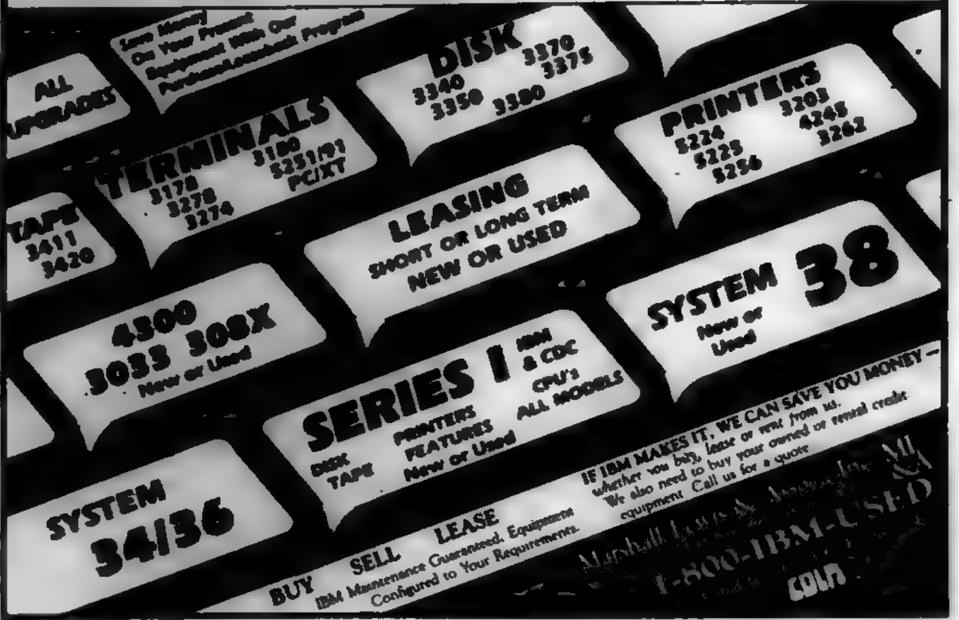
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Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $140.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s):____________________
Signature:____________________
Name:____________________
Title:____________________
Company:____________________
Address:____________________
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Send this form to:

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375 Cochituate Road, Box 880,
Framingham, MA 01701

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LA36 Console
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DZ11-B	875
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LA120-DA	1,800
MS750-CA	1,850
RUA81-CA	18,000
RA81-AA	14,500
TGU78	28,500
VT100	890

LAKEWOOD COMPUTER CORP.
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San Jose, CA [illegible]
[illegible]

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CDC 9762, Refurb	$2,499
LA120-DA, New	1,695
L0006, Used	3,000
LP14-CA, New	6,900
RA80-AA, Unused	9,800
RM05-AC, Used	12,000
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1173	KMC11-B	RM05-AC
11725	LA180-EA	RM05-C
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DL11-W	[illegible]
DR780-AA	[illegible]
FP11	$1,175
FP11A	[illegible]
MK11-A	[illegible]
MK11-CE	[illegible]
MS11-LD	[illegible]
MS11-MB	[illegible]
MS11-PB	[illegible]
MS750-CD	[illegible]
MSV11-LF	[illegible]
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2020 (Unused)	$15,995
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S/34-C23 [illegible]
S/34 Memory (Any Increment)
Upgrades or [illegible]
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5251-031 S/34 & 3610
[illegible]
DATAMARC [illegible]
[illegible] Rd., Atlanta, GA [illegible]

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S/34 • S/36

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3-B2304-1 Disk Pack Control
1-B2341-1 Console Display Control
1-B2351-2 Single Line Control
1-B2394-4 Mag Tape Control 4[illegible]
1-B3957-1 Data comm Line Adapter
1-B9111 800 CPM Card Reader
1-B9247-14 1100 LPM Train Printer
1-B9348-2 Operator Display Console
1-B9383-7 Dual DPD/Control 174 [illegible]
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PRINTERS
CONTROL DATA
QANTEL
TERMINALS

HEWLETT PACKARD

HEWLETT PACKARD
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[illegible]
YOUR COMPANY NAME
[illegible]

YOUR COMPANY NAME
[illegible]
HEWLETT PACKARD
[illegible]
11111

HEWLETT PACKARD
· SERVICE ·
[illegible]
YOUR COMPANY NAME
[illegible]

NCR

[illegible] DISK UNITS
YOUR COMPANY NAME
[illegible]

FOR SALE OR LEASE
BY OWNER
(1) 8575 CRITERION
[illegible]
YOUR COMPANY NAME
[illegible]

[illegible]-201 ([illegible] LPM)
[illegible]-201 ([illegible] LPM)
[illegible]-201 ([illegible] LPM)
[illegible]
YOUR COMPANY NAME
[illegible]

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[illegible]
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[illegible]

[illegible]
YOUR COMPANY NAME
[illegible]

FOR LEASE
UNIVAC [illegible]
[illegible]
YOUR COMPANY NAME
[illegible]

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CDC DISK
ALL MODELS
IN
STOCK SALE
[illegible]
SAVE - SAVE - SAVE
[illegible]
Your Company Name

DISK PACKS-TAPE
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YOUR COMPANY NAME
[illegible]

HONEYWELL

The Bulletin Board

Our Low-Cost Way to Sell Your Equipment in Computerworld

What is The Bulletin Board?

We have a classified section designed to help you buy or sell individual software and hardware. It's especially suited to companies with a piece of used equipment for sale. For one low price, you can advertise to over half a million Computerworld readers nationwide.

How Does The Bulletin Board Work?

- The Bulletin Board is designed to advertise only one piece of equipment or software per unit.
- Units are one column wide by one inch deep at a cost of $ 140.00 per column inch. Although several units may be purchased for one advertisement, there will be no quantity discount.
- All ads are standard in format and typeface. No special typeface, borders or logos are allowed. Copy may be up to 25 words per unit.
- The Bulletin Board ads are listed by manufacturer or by product type under appropriate headlines.
- Ads are set on a six-column page in our classified section under "The Bulletin Board"

How to Place an Ad in the Bulletin Board:

- We suggest you prepare your ad before contacting us. Here are some guidelines:
  The first line is set in larger, bold type and should contain standard equipment identification.
  The body copy should describe the equipment and state the price.
  The closing should supply the seller's name and telephone number.
  This is all the information an interested buyer needs for follow up.
- Ads are accepted by mail, phone or by telecopier.
- Deadline is 7 days in advance of Monday issue.
- If you have never advertised with Computerworld, we request a check with your order.
- The Bulletin Board ads are not agency commissionable nor may they be applied to contract advertisers inch count.
- We assume no liability for errors beyond the price of the ad.

Here's the Address and Phone.

The Bulletin Board
Classified Advertising
Computerworld
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Framingham, MA 01701
Toll-free (800) 343-6474
(In Mass., call 617-879-0700)

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IBM
[illegible]
FOR SALE
[illegible]
YOUR COMPANY NAME
[illegible]

For Sale
8809-1A
8809-2
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Call John Doe
[illegible]

Must Buy
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System/38
[illegible]

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2501 B1 3340 A2 [illegible]
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[illegible]
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[illegible]
YOUR COMPANY NAME
[illegible]

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370 115 168
Call John Doe
[illegible]

MISC.

[illegible]
HONEYWELL
[illegible]
YOUR COMPANY NAME
[illegible]

FOR SALE
[illegible]
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(1) 2200 10 MB System [illegible]
[illegible]
YOUR COMPANY NAME
[illegible]

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IMMEDIATE DELIVERY
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SOFTWARE WANTED

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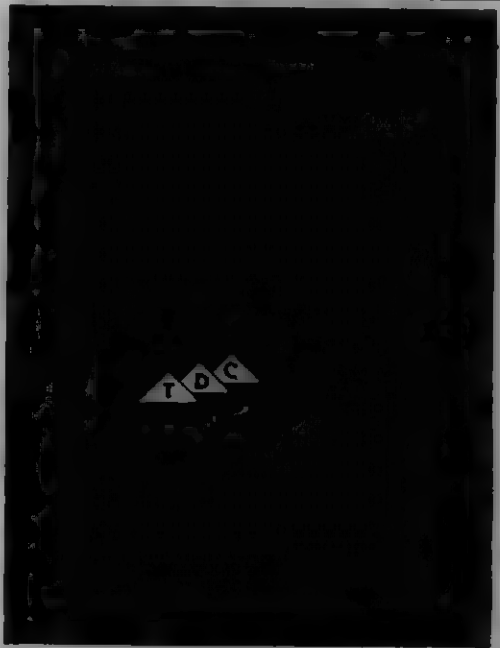

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Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Costs: Our rates are $144.90 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $289.80 per insertion. Extra space is available in half-inch increments and costs $72.45. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: ____________ columns wide by ____________ inches deep.

Issue Date(s): ____________

Section: ____________

Signature: ____________

Name: ____________

Company: ____________

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Address: ____________

Telephone: ____________

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING,
375 Cochituate Road, Box 880,
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Foreign Editorial/ Sales Offices

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5563/5584. Telex: 22644.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

England: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London WC1 8UT. Phone: 01-831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

France: Axel Leblois, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.1, Via Rosellini 12, 20124 Milano.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiyama, Tokyo Representative Group, Sanshin Kogyo Bldg. 3F, 2-10 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101. Phone: (03) 230-4117/8. Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Norway: Mr. Morton Hansen, Gen. Mgr., CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 7647725.

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6510690. Telex: (928) 401205.

Southeast Asia: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-4444. Telex: (786) RS 37003

Melvyn Bennett, Regional Sales Mgr., Asia Computerworld Pte. Ltd., 2023 Swire House, 9 Connaught Rd. Central, Hong Kong. Phone: 210395. Telex: (780) 72827 HX COMWR.

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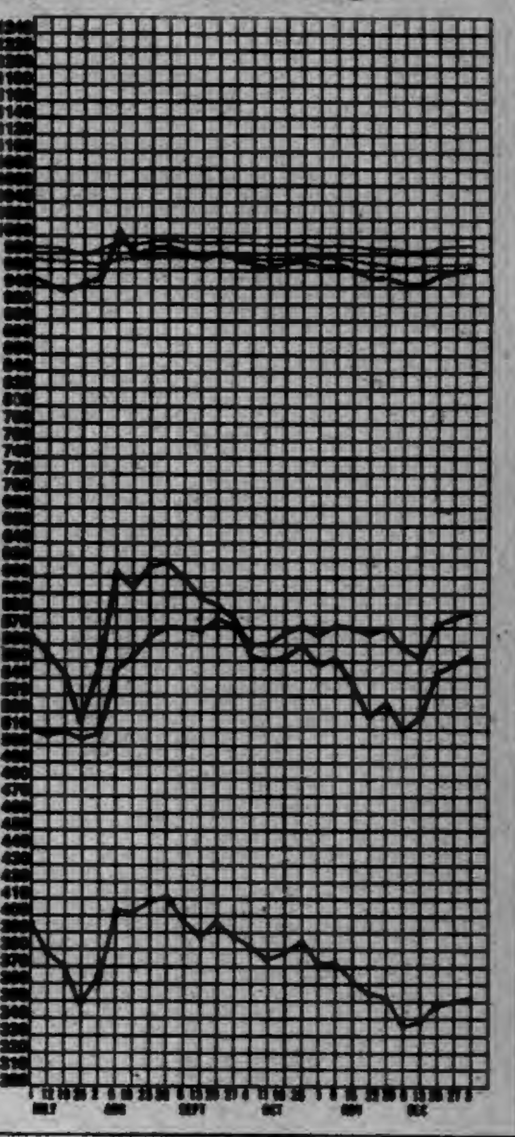

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CLOSING PRICES MONDAY, DECEMBER 31, 1984

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

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EXCH		1984 RANGE (1)	CLOSE DEC 31 1984	WEEK NET CHANGE	WEEK PCT CHANGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LEASING COMPANIES

EXCH		1984 RANGE (1)	CLOSE DEC 31 1984	WEEK NET CHANGE	WEEK PCT CHANGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

COMPONENTS

EXCH		1984 RANGE (1)	CLOSE DEC 31 1984	WEEK NET CHANGE	WEEK PCT CHANGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

SOFTWARE & EDP SERVICES

EXCH		1984 RANGE (1)	CLOSE DEC 31 1984	WEEK NET CHANGE	WEEK PCT CHANGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PERIPHERALS & SUBSYSTEMS

EXCH		1984 RANGE (1)	CLOSE DEC 31 1984	WEEK NET CHANGE	WEEK PCT CHANGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUPPLIES & ACCESSORIES

EXCH		1984 RANGE (1)	CLOSE DEC 31 1984	WEEK NET CHANGE	WEEK PCT CHANGE
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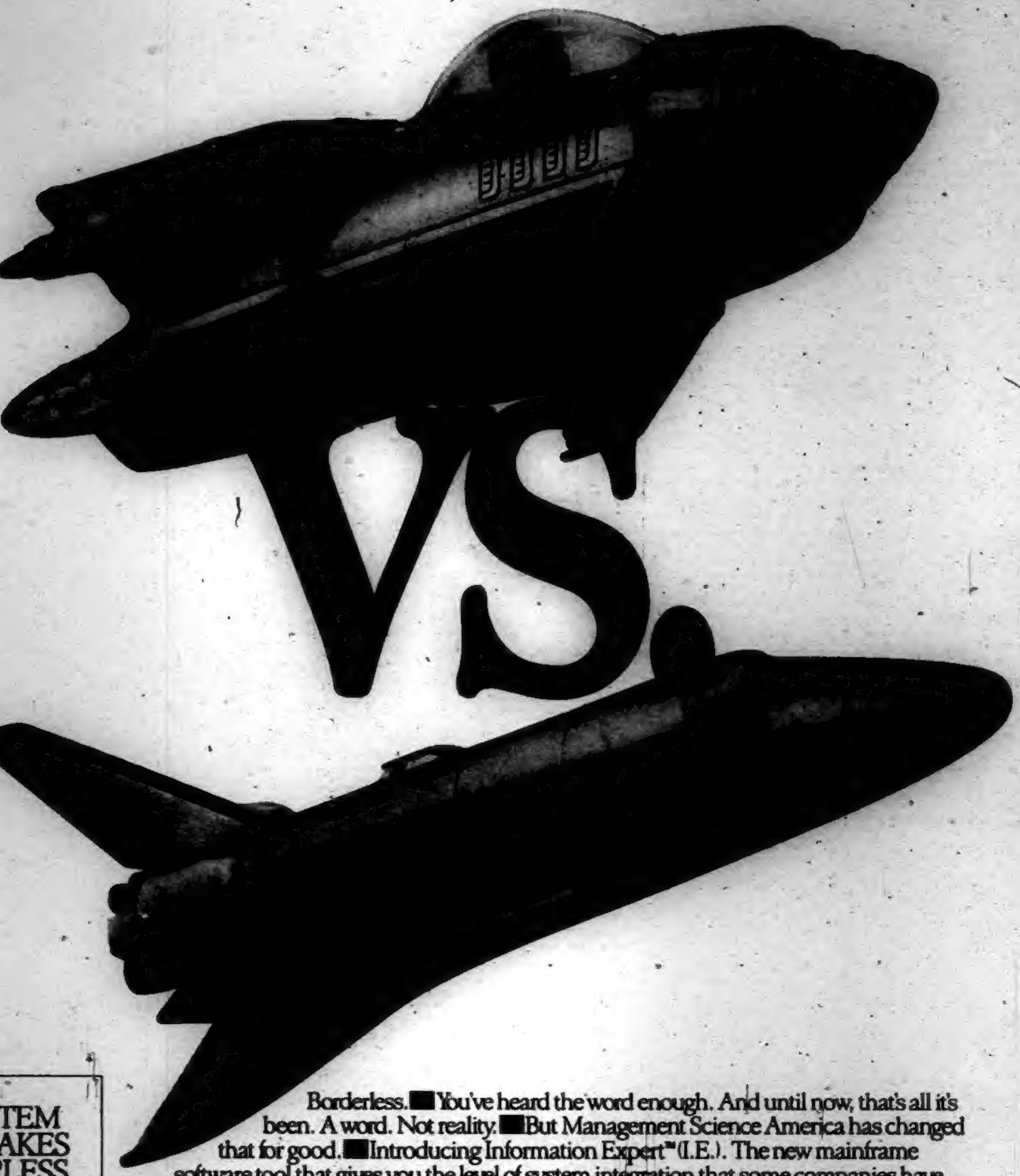

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